Marubeni Proposed REDD+ Project, Central Kalimantan, Indonesia

Source(s):

平成 22 年度 地球温暖化対策技術普及等推進事業 インドネシアにおける森林保全（REDD+）事業性調査 委託業務完了報告書 (Japanese) (2011.3)

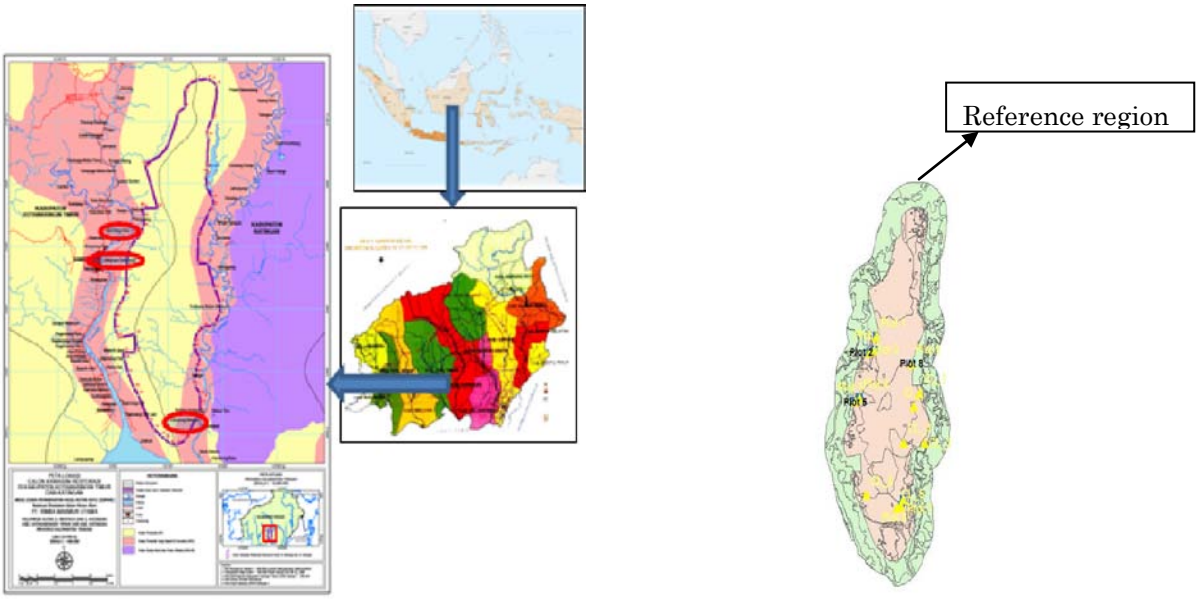
インドネシア・中部カリマンタン州泥炭地における森林保全（REDD＋）を通したGHG 削減事業について (Japanese) (2011.10.13) (*2)

Project location

Information on the pilot site (pp.46, 52)

Information	Explanation
Area	217.755 ha (though figures below suggest 21, 548 ha)
Government administration	Kotawaringin Timur District (82,217 ha) and Katingan District (145,043ha), Kalimantan, Indonesia
Geographical boundary	113º 0’ 26’’ BT - 113º 19’ 35” BT 2º 2’ 49 “ LS - 3º 2’ 14” LS
Group of Forest	Mentaya River and Katingan River

Pilot site (p.52)



Forest area and types

53.5% of the project site is primary peat forest (p.44). The peat depth is between 1.33 and 6.5 meters (p.48). According to the satellite image analysis (Landsat ETM 7 and ASTER) and above-ground survey,

the forest distribution is as follows (pp.47-48):

Primary peat forest:120,548ha (53.05% of project area)

Primary peat forest is divided into two classes: high-density primary forest and low-density primary forest. High-density primary forest covers 99,162 ha (43.63%) and low-density primary forest includes deep peat, covers 21,386 ha (9.41%), and is located in the upper part of peat dome.

Logged Over Area: 77,752 ha (34.21%).

Non-forested area: 28,960 ha (12.74%).

Forest stratification (p.111)

	Non-forest (ha)	Forest (ha)	Total (ha)
Primary swamp forest		43,307	43,307
Secondary swamp forest		143,716	143,716
Swamp shrubs	25,292	2,821	28,113
BareLand	800		800
Water body	56		56
Swamp	1,466		1,466
Total			217,548

Forest management and use context

Marubeni corporation is applying for an **ecosystem restoration concession** license, which is prescribed by Presidential Decree No.402/Menhut-II/2010 and No.273/Menhut-II/2009 (p.44, *2 p.81).

The project site includes areas designated for production forest (200,000 ha) and conversion forest (30,000 ha) (*2, p.81).

There are 34 villages around the project site (16 villages in Katingan district and 20 villages in Kotim district). Of these, 20 villages are spread over the site and reference region. Development projects by the government such as agricultural development, rubber plantation and infrastructure development are conducted around these villages (p.52).The communities in the project area make their living through agriculture (rubber and fruit cultivation, etc.), fishing and palm or latex harvesting. They receive rice and rubber seeds from government officials.

According to *The Last Stand of the Orangutan* (2007), orangutan inhabit the Sampit district at a density of 1~1.5 /km^2 (p.48).

Rates and drivers of deforestation and degradation

At one time 90% of the project site was covered by primary forests but it was found that 8,000 ha of forest (equivalent to 4% of the total area) were lost between 2000 and 2009 (p.106). The main drivers of deforestation and degradation are:

- **Illegal logging** (p.48)

East Kotawaringin district is especially easy to access, thus the threat of illegal logging is high.

- **Plantation** (*2, p.81)

Plantation development has progressed in the western part of the site. (*2, p.81)

- **Silicon mining**

Silicon mining can be found in the northern part of the area. (*2, p.81)

- **Forest fire**

In Katingan and Kotim districts, forest fires occur almost every year. The Government of Indonesia is planning to make release a guideline for reducing the risk of forest fire as a government decree. The draft of this government decree states that clearing of forest land for cultivation will be restricted (p.48).

Drivers of deforestation and forest degradation and their countermeasures in Central Kalimantan (p.54)

	Forest	Non forest
Drivers of deforestation and forest degradation	illegal logging, industrial tree plantation, forest fire	Oil palm plantation, illegal mining, poverty、encroachment
Countermeasures	Forest fire management, reforestation, law enforcement, peatland water-table management, agroforestry	Land use policy, agricultural land policy, ban on shifting cultivation, intensive agriculture, reforestation and land rehabilitation, creating alternative income sources

Project proponents

Marubeni Corporation (p.15)

Implementation timeframe

2010 – 2011: A two-year feasibility study is initially being conducted (p.43). Full-scale activity will begin in FY2012 (p.12) for 30 years (p.185).

Project goals

The study intends to demonstrate the feasibility of establishing a “Bilateral Offset Credit Mechanism(BOCM)” between Indonesia and Japan in the field of REDD+ (p.12).

The feasibility study aims to validate the methods for achieving the long term goals of the project. These are (p.17);

- International cooperation in the field of environmental issues (forest conservation, biodiversity conservation, sustainable forest management, emission reduction of GHG through enhancement of carbon stock, improvement of living condition of local community, etc.)
- Contribution to the reduction of the GHG emission (26% compared with BAU) in Indonesia
- Contribution to the GHG emissions reduction target in Japan by generating credits, etc.
- Establish a business model for a REDD+ project and share the lessons learned
- For Japan to catch up with the EU, United States and Australia on REDD+ through promoting private investment.

Implementation activities

(pp.l7-18)

The main aspects of the feasibility study are:

- **Selection of project site**

In the first-year of the feasibility study (FY2010), the site in Central Kalimantan was selected over an alternative site in Riau (pp.12, 43, 49).

The conditions to select the project site are (p.43): peat depth of at least 30 cm and the peat includes 30% organic matter as dry weight; no concessions; area between 100,000 - 200,000 ha; site is

accessible.

- **Formulate a 5-year plan to implement the REDD+ project (p.12)**

After fiscal year 2012 (the start of full scale activity), Marubeni Corporation intends to establish a joint corporation with a private company in Indonesia (p.56).

The action plan for implementing REDD+ project was established in terms of short, middle and long period. This plan will be effective after 2012.

Schedule

Short term period plan (one year period after the concession will be granted)

1. Participatory mapping to help solve the problem of overlapping land use rights
2. Establishment of forest boundary, which will aid in preventing land use conflict.
3. Establishment of resource inventory, to be assessed every 5 years
4. Design of the management system
5. Develop community development plans through collaboration with NGOs
6. Establish the land use plan
7. Acquire the concession for implementing REDD+ project
8. Preparation for carbon credit certification
9. Forest conservation
10. Maintenance of infrastructure
11. Monitoring and verification of the REDD+ activities

Mid-term plan (2-5 year period after the short term plan is completed

The mid-term plan will build on the results of the short term plan. The seven activities to be implemented are establishment of the forest boundary (by the end of the 3rd year), establishment of the management system, community development, carbon credit certification, forest conservation, maintenance of infrastructure and monitoring/evaluation.

Long term plan

The long term plan focuses on the resource inventory, community development, forest conservation, maintenance of infrastructure and carbon credit certification will be done

- **Formulate the REDD+ project**

Analysis of required conditions to implement the REDD+ project such as finance and investment will be undertaken.

Countermeasures to prevent deforestation (forest fire and illegal logging), plantation development will be implemented and carbon stocks will be enhanced through forest restoration and peat land ground water management.

- **Economic analysis of REDD+ project**
- **Survey of MRV methodologies**

Actors' roles and responsibilities

Marubeni Corporation	Conduct the feasibility study contracted to it by the Japanese Government (Ministry of Economy, Trade and Industry) (p.15)

Community participation

(The following statements have implications for community participation)

- Conduct community forest fire patrols (p.57)
- Take measures to meet social safeguard (e.g. identify conflicts over land rights through implementing free prior informed consent, and conduct community education) (p.58)
- Participatory Mapping (p.58)
- Formulate short, medium and long term community development programs (pp.59-60) through collaboration with NGOs. The long-term plan regards measurement of poverty reduction as important. For example, concrete targets such as annual income increases by 5% will be formulated

Project financing

- US$10,000,000 equity fund for full-scale activities from fiscal year 2012 (p.185)

Profitability analysis (pp.13-14)

Profitability analysis of the project from 2012 was undertaken with the following assumptions:

- The benefit sharing arrangement stipulated by government will be used;
- 70% of the GHG emission reduction (30% of which will be put aside in a buffer pool) can be sold at US$10/ton to Japanese companies, following the Bilateral Offset Credit Mechanism(BOCM);
- The total costs will be covered by equity because of the uncertainties of the national level REDD+ strategy and international movement.

The internal rate of return (IRR) was calculated as 38% over the 30 year project life using the “average scenario”.

Benefit sharing

Government 20%, Community 20%, Project Proponent 60%

(These are the figures described in Decree of the Minister of Forestry P.36/2009 for IUPHHK-RE. They will be applied for the full-scale activity from FY2012) (p.184)

Emissions and removals with and without project

Baseline

30 m resolution Landsat images (2000, 2003, 2006 and 2009) and 10 m resolution ALOS AVNIR images (8/2009 – 4/2010) to analyze the latest land use change (p.105,*2 p.82).

The estimation of emission reduction will be completed using VCS VM0004 methodology which can be applied to detailed forest planning or land use planning. As a detailed forest management plan is still being formulated by the provincial government of Central Kalimantan, VCS VM0006 and VM0007 methodology (which can be applied for the case that there is no forest planning or land use planning) was used (pp.102-103).

The change of the deforestation area in the reference region was analyzed with satellite images from 2000 to 2009. The result was an average rate of deforestation of 0.63% for the past 9 years, 0.76% for

the past 6 years and 1.4% for the past 3 years. According to an Indonesian consultancy, the annual deforestation rate of the site between 1980 to 2005 would have been 3.63% if the past land use classification database, RePPProt Landsystem (Regional Physical Planning Programme for Transmigration), Badan Tanahan Nasional(National Land Agency), Bakosurtanal (Coorinating Agency for Surveys and Mapping) were applied (p.104).

- **Carbon stock estimation**

1. Above Ground biomass survey (p.114)

Step 1: Sample plot establishment

The plot size is established in accordance with the Forest Health Monitoring Field Methods Guide (USDA Forest Service) (p.114). The dimensions of the plots are: 17.95 m radius for DBH ≥ 19.9 cm; 7.32 m radius for DBH 5 cm - 19.9 cm; 2.07 m radius for DBH < 5 cm and destructive sampling for non-tree biomass. 8 plots were set up. (*2, p.82).

Step 2: Estimation of biomass of standing trees (p.114)

An allometric model from Ketterings et al. (2001) has been adopted:

Wood biomass (kg/tree) = $0.11\rho DBH^{2.62}$

Step 3: Estimation of biomass of <DBH5cm trees and non-tree biomass

Biomass data were gathered within the 2.07 m radius plot nest and raw weight was measured.

Step 4. Carbon stock estimation

Following IPCC (2006), carbon stock = wood biomass × 0.47. For <5cm DBH trees and shrubs, the formula below was used from Brown (1997).

Carbon stock = wood biomass or area shrub was cut down × 0.35.

Step 5. Estimation of carbon stock of above ground biomass

Wood and non wood biomass were included in the above ground biomass estimate.

2. Bellow ground biomass (peat) survey (p.115)

Step 1: Measurement of peat depth

Step 2: Peat sampling

Peat samples were collected from the surface to a depth of 6 m every second meter.

Step 3: Measurement of ground water level

PVC pipes with 2.5 inch radius were inserted in the peat. The pipes have a lot of small holes so that water in the peat can flow into them (Rumbang et al. 2009; Murdiyarso et al. 2004).

Step 4: Calculation of carbon stock of peat

Carbon stock (tC/ha) = BD × PD × C-org, where

BD = bulk density: g/cm^3 , kg/m^3

PD = peat depth: m

C-org = carbon organic content: %

The analysis of carbon organic content was conducted following the methodology of Walkiey & Black.

Step 5: Estimation of carbon removal from peat

The GHG emission from the peat land was estimated on the basis of the following formula described in VCS VM0004:

Emission from peatland = emission of carbon included in the peat water + carbon emission caused by peat fire

3. Results

The carbon stock at the project site is 2,881.79 tC/ha and the amount of CO2 is 10,566.58 tCO2/ha. The rate of carbon stock included in above-ground biomass is 2% and in bellow ground biomass is 98% (p.125).

	DBH (cm)	Total biomass (t/ha)	Total carbon (t/ha)	CO2 stocks (t/ha)
Tree	DBH>19.9	112.80	53.02	194.41
	DBH5-19.9	56.58	26.59	97.50
	DBH<5	18.20	6.37	23.35
Non tree	Shrubs	4.90	1.71	6.29
Above ground biomass (t/ha)		192.48	87.69 (3%)	321.55 (3%)
Below ground biomass (peat soil) (t/ha)	243 cm (average of peat depth)	5156.59	2794.10 (97%)	10245.03 (97%)
Total (ton/ha)		5349.07	2881.79	10566.58

Project emissions

It is assumed that there are no project emissions (p.127).

Leakage

The system to transfer credits should be developed under a compliance scheme based which links national and sub-national levels through a 'Nested Approach' that will be helpful for solving leakage and non-permanence issues (p.13, 191).

Estimation of emission reductions

Emission reduction was estimated using the following 9 scenarios of deforestation rates (p.188).

- Past deforestation rate of reference region(3 cases)
- Past deforestation rate of Central Kalimantan (3 cases)
- Past deforestation rate of peatforest in the central part of Central Kalimantan using model analysis (1 case)
- Past deforestation rate of peatforest in the central part of Central Kalimantan (1 case)
- Past deforestation rate of peatforest classified along with forest zoning in the central part of Central Kalimantan(1 case) (p.141)

	Baseline emissions (Projection of emissions reductions)					
	Historical deforestation rate for reference region			Deforestation rate for Central Kalimantan		
Period	**2000-09**	**2003-09**	**2006-09**	**2000-09**	**2003-09**	**2006-09**
Deforestation rate	**0.63%**	**0.76%**	**1.4%**	**0.9%**	**1.1%**	**1.4%**
Year1	322,794	389,402	717,32□	461,134	563,609	717,320
Year2	440,987	531,985	979,972	629,982	769,978	979,972
Year3	559,181	674,567	1,242,624	798,830	976,347	1,242,624
Year4	677,374	817,150	1,505,276	967,677	1,182,717	1,505,276
Year5	795,567	959,732	1,767,927	1,136,525	1,389,086	1,767,927
Year6	913,761	1,102,314	2,030,579	1,305,372	1,595,455	2,030,579
Year7	1,031,954	1,244,897	2,293,231	1,474,220	1,801,824	2,293,231
Year8	1,150,147	1,387,479	2,555,883	1,643,068	2,008,194	2,555,883
Year9	1,268,341	1,530,062	2,818,535	1,811,915	2,214,563	2,818,535
Year10	1,386,534	1,672,644	3,081,186	1,980,763	2,420,932	3,081,186
Year11	1,504,727	1,815,226	3,343,838	2,149,610	2,627,301	3,343,838
Year12	1,622,921	1,957,809	3,606,490	2,318,458	2,833,671	3,606,490
Year13	1,741,114	2,100,391	3,869,142	2,487,305	3,040,040	3,869,142
Year14	1,859,307	2,242,974	4,131,794	2,656,153	3,246,409	4,131,794
Year15	1,977,500	2,385,556	4,394,445	2,825,001	3,452,779	4,394,445
Year16	2,095,694	2,528,139	4,657,097	2,993,848	3,659,148	4,657,097
Year17	2,213,887	2,670,721	4,919,749	3,162,696	3,865,517	4,919,749
Year18	2,332,080	2,813,303	5,182,401	3,331,543	4,071,886	5,182,401
Year19	2,450,274	2,955,886	5,445,053	3,500,391	4,278,256	5,445,053
Year20	2,568,467	3,098,468	5,707,704	3,669,239	4,484,625	5,707,704
Year21	2,686,660	3,241,051	5,970,356	3,838,086	4,690,994	5,970,356
Year22	2,804,854	3,383,633	6,233,008	4,006,934	4,897,363	6,233,008
Year23	2,923,047	3,526,215	6,495,660	4,175,781	5,103,733	6,495,660
Year24	3,041,240	3,668,798	6,758,312	4,344,629	5,310,102	6,758,312
Year25	3,159,434	3,811,380	7,020,963	4,513,477	5,516,471	7,020,963
Year26	3,277,627	3,953,963	7,283,615	4,682,324	5,722,841	7,283,615
Year27	3,395,820	4,096,545	7,546,267	4,851,172	5,929,210	7,546,267
Year28	3,514,013	4,239,127	7,808,919	5,020,019	6,135,579	7,808,919
Year29	3,632,207	4,381,710	8,071,571	5,188,867	6,341,948	8,071,571
Year30	3,750,400	4,524,292	8,334,222	5,357,714	6,548,318	8,334,222
Total	**61,097,913**	**73,705,419**	**135,773,140**	**87,282,733**	**106,678,896**	**135,773,140**

(p.142)

	Baseline emissions (Projection of emissions reductions)		
Souce of information	Past deforestation rate in peatland (Central Kalimantan) *(Hooijer et al., 2006)*	past deforestation rate of peatforest using model analysis (Central Kalimantan) *(Fuller et al. 2010)*	Past deforestation rate of forest planned to be productive forest (Central Kalimantan) *(RePPProt Landsystem)*
Period	**1985-2000**	**2005-2020**	**1980-2005**
Deforestation rate	**2.2%**	**2.6%**	**3.63%**
Year1	1,127,217	1,332,166	1,859,163
Year2	1,539,956	1,819,948	2,539,908
Year3	1,952,695	2,307,730	3,220,653
Year4	2,365,433	2,795,512	3,901,399
Year5	2,778,172	3,283,294	4,582,144
Year6	3,190,910	3,771,076	5,262,890
Year7	3,603,649	4,258,858	5,943,635
Year8	4,016,387	4,746,640	6,624,380
Year9	4,429,126	5,234,421	7,305,126
Year10	4,841,864	5,722,203	7,985,871
Year11	5,254,603	6,209,985	8,666,616
Year12	5,667,341	6,697,767	9,347,362
Year13	6,080,080	7,185,549	10,028,107
Year14	6,492,819	7,673,331	10,708,853
Year15	6,905,557	8,161,113	11,389,598
Year16	7,318,296	8,648,895	12,070,343
Year17	7,731,034	9,136,677	12,751,089
Year18	8,143,773	9,624,459	13,431,834
Year19	8,556,511	10,112,241	14,112,580
Year20	8,969,250	10,600,023	14,793,325
Year21	9,381,988	11,087,804	15,474,070
Year22	9,794,727	11,575,586	16,154,816
Year23	10,207,465	12,063,368	16,835,561
Year24	10,620,204	12,551,150	17,516,306
Year25	11,032,943	13,038,932	18,197,052
Year26	11,445,681	13,526,714	18,877,797
Year27	11,858,420	14,014,496	19,558,543
Year28	12,271,158	14,502,278	19,479,189
Year29	12,683,897	14,990,060	18,989,243
Year30	13,096,635	15,477,842	18,989,243
total	**213,357,792**	**252,150,118**	**346,596,696**

Projected CO2 emission reduction at the project site（p.184）

Scenario	Annual average	30 years total
1. Minimum scenarios	2,036,597 tCO2e	61,097,913 tCO2e
2. Maximum scenario	11,553,223 tCO2e	346,596,696 tCO2e
Average of 1 and 2	6,794,910t CO2e	203,847,304 tCO2e

Monitoring

No data

Reporting

No data

Verification

No data

Risks and risk management

The Kotim government intends to give a concession license for 50,000 ha of the project area to rubber plantation companies and this plan has been approved by the government of Central Kalimantan.

Permission has already been granted by the Katingan government for 9 companies to mine and for 6 companies to manage plantations.

Conflict at the local level could arise because of: Overlapping of land rights claims in villages; Fire being used for land clearing; Canals being built to reduce the water table of the peat; Pressure to increase the area of farmland due to population growth.

Progress and plans

Marubeni Corporation made a contract with Cargill to for collaborating on GHG emission

Reduction (http://www.marubeni.co.jp/news/2010/100817.html).

Links:

Project-related documents

- *地球温暖化対策技術普及等推進事業（FS 調査事業）の受託について （Japanese）*
- *Marubeni Corporation(Dec. 2010)REDD+ Feasibility Study in Indonesia (English)*

Others

METI,Japan (Feb.2011) Green IT Initiative in Japan