# REDD+ and Bio-Fuel Production and Utilisation in Gorontalo Province, Indonesia - Feasibility Study

Source(s):

- [New Mechanism Feasibility Study on REDD+ and Bio-Fuel Production and Utilisation in Gorontalo Province, Indonesia - Kanematsu Corporation, Tokyo](#)

- [新メカニズム実現可能性調査報告書（詳細版）　インドネシア・ゴロンタロ州における REDD+ とバイオ燃料生産利用に関する新メカニズム実現可能性調査](#) (Japanese) (*2)

Project location

- Boalemo District, Gorontalo Province, Sulawesi, Indonesia
- Project site: 20,230 ha (p.1)
- Reference area: 155,020 ha (p.1)
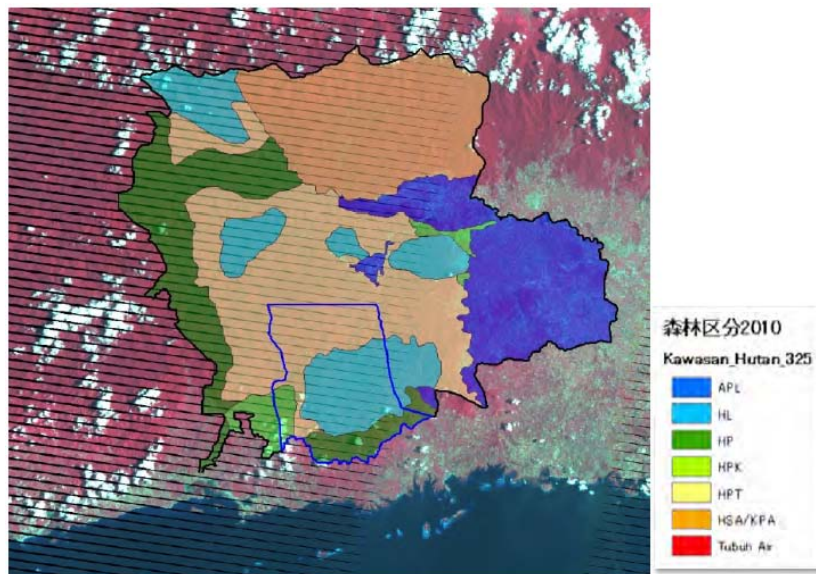
Land use classification in the Project site (marked by a blue line) and the reference site (marked by a black line) (p.75 *2)

Forest area and types

The vegetation in Gorontalo is classified as lowland vegetation, hill vegetation and vegetation on volcanoes. Because of the effect of human interference, most area is now covered by the secondary forest or *alang-alang* (glass land) (p.16 *2).

Forest management and use context

Agriculture: Among cultivated crops, corn and red pepper are typical examples of single-year crops while coconut palms and cacao are typical examples of multi-year crops. Income-generating activities

besides agriculture include a variety of jobs such as processing of black sugar, agricultural labor, honey collection, rattan collection, street vending, peeling of sugar palm, and transport of lumber. The planting season in Indonesia is between May and July and the harvesting season is between October and December, and the periods other than planting and harvesting are the farmers' slack seasons in which farmers are involved in activities other than agriculture. If fuel crops are to be cultivated in the Project site, farmers should use the slack seasons for this purpose (p.11).

Problems communities are facing: In Rumbia Village, declining productivity, flooding, shortage of kerosene, and poverty are identified by communities as their main problems. Since general problems in Rumbia Village are deeply linked to deforestation and fuel-related matters, introduction of the Project in this village is considered to be relatively easy. Problems identified by locals in Botumoito Village include infrastructure (roads) and the low level of education. We thus assume that the residents of Botumoito Village have less awareness about deforestation than the residents of Rumbia Village. For communities with less awareness about deforestation and low motivation to cope with the problem, the Project must incorporate awareness and motivation into income generating activities (p.11).

Fuel use by agricultural villages: In Gorontalo Province, fossil fuels including gasoline are in short supply. The main fuels used by rural residents are firewood and kerosene. In Boalemo Regency, residents use a lot of firewood because they can buy kerosene only once a week. Residents collect most of their firewood not by cutting it in forests away from their homes but rather by gathering it from nearby farmland (kebun). It is common that each home has a small kerosene stove and a cooking range for firewood. The price of kerosene has been kept low by government subsidies. Through interviews, it was found that many people are looking for twice the amount of fuel as they are presently getting. They also mentioned that should there exist alternative fuels to kerosene, they would be glad to use them (p.11).

Rates and drivers of deforestation and degradation

In the Project site, deforestation due to swidden/ shifting agriculture aiming to increase corn production in particular is quite obvious, and in the reference area a deforestation rate of 0.68% per year (base year = 2000) or of 0.83 % (base year = 1990) was confirmed based on the analysis of LANDSAT images taken in 1991, 2000 and 2010 (p.5).

Main causes for deforestation and forest degradation and proposed countermeasures (p.12)

Cause (Reason)	Outline	Proposed Countermeasures		
		By Local Residents	By Private Companies	By Local and Central Governments
Illegal Felling	Lumber has been cut down (for the purpose of selling) in preserved and protected forest areas illegally.	· Enhancement of observation and control of illegal felling. · Provision of economic incentives. · Implementation of environmental education	· Enhancement of observation and control of illegal felling.	· Introduction and enhancement of policies (Countermeasures against illegal felling).
Swidden Agriculture and Spread of Fire	Swidden agriculture has been conducted to cultivate farmland and to maintain cultivated land.	· Enhancement of fire prevention measures in forest areas.	· Enhancement of fire prevention measures in forest areas.	· Introduction and enhancement of policies (countermeasures against forest fire).
Expansion of Farmland and Increase in Demand for Felling	Lumber has been cut down for purposes of increasing agricultural products.	· Increase in productivity by adding higher value to agricultural products. · Realization of higher efficiency through transfer of agricultural technologies. · Provision of economic incentives.	· Possession of concessions (or cooperation with concession-holding companies). · Putting into practice of sustainable forest management.	· Introduction and enhancement of policies (issuance and operation of concessions, zoning, etc.) ·People's forest plantation (HTR) project ·Ecosystem restoration (RE) project

Project proponents

Kanematsu Corporation

Implementation timeframe

20 years (p.17, p.22, p.85 *2)
The one year feasibility study was conducted from 2011 to March 2012

Project goals

- The business project and activities aim at preserving forest areas by controlling the expansion of farmland for corn and other crops in the Project site(s) of 20,230 hectares in the western part of Boalemo Regency in Gorontalo Province in Sulawesi Island, Indonesia. This Project is composed of a REDD+ project (business) aiming at the establishment of a bilateral offset credit mechanism (BOCM) to obtain revenues from the sale of credits and a biofuel business (as a safeguard for farmers) aiming to make up the opportunity cost in controlling the expansion of farmland (p.4).
- Through the activities described in the next section, project developers expect emission reductions and improved capacity of responsible staff members in the government. Project developers believe that this kind of supportive approach will lead to a long-term improvement of operational capabilities (pp.12-13).
- Recovery of vegetation and ecosystem functions is expected. Sulawesi Island is well known for its abundance in endemic species of animals and plants, and the national park there is endeavoring to preserve its biodiversity (p.1).

Implementation activities

- In order to control the expansion of farmland in the Project site in conjunction with local

- residents activities will be undertaken to increase productivity by adding higher value to agricultural products, increase efficiency through transfers of agricultural technologies from Japan, and provide local residents with economic incentives (p.5).
- Project developers also incorporated in their possible activities (as a safeguard for farmers) a business in which they have local residents plant crops, such as jatropha and coconut palms, to produce fuel. The fuel crop seeds cultivated by farmers will be sold to vegetable oil producers, who in turn extract oil from the purchased seeds and then sell the oil to farmers as an alternative fuel to kerosene (p.5).
- In the study on biofuel business (in the region covered by this study), a survey of the actual living conditions of residents was conducted, as well as their activities related to agriculture, fuel use and forests among others. The methods used were semi-structured interviews and PRA (participatory rural appraisal). With respect to the PRA, an analysis was conducted of the problems in the villages of Rumbia Village and Botumoito in the Project site by using a seasonal calendar, resources maps, and a ranking voting method. A study was also made of suitable fuel crops regarding the production biofuel in the subject area (pp.8-9).
- Project developers believe their Project will become efficient and practicable if they can link it with the government-run "people's forest plantation" (HTR) project which promotes plantations by local residents, or if the Project links to "ecosystem restoration" (RE), which allows development of forests as farmland but requires certain environmental consideration activities by the concession holders (p.7).

Actors' roles and responsibilities

Project implementing structure (pp.20-21)

REDD+	
Indonesian Central Government	DNPI manages business registry and credits, while Ministry of Forestry follows up the progress of REDD+ project and administers/stores monitoring data on REDD+ project compiled by Agency of Forestry of Gorontalo Province, in a comprehensive manner.
Boalemo Regency, Gorontalo Province	This local government carries out capacity building programs for local residents regarding forest preservation, by organizing workshops, etc. and also undertakes programs for farmers regarding agricultural production technologies, by dispatching instructors. A part of income from the sales of bilateral offset credit mechanism (BOCM) credits is used to fund these activities.
Kanematsu Corp., Taiju Research Institute	Kanematsu and Taiju create a REDD+ development company (SPC as developer), which undertakes business activities and monitoring in conjunction with Nihon-Indonesia Yuko Kyokai.
Nihon-Indonesia Yuko Kyokai (Panasonic Gobal)	N-I Yuko Kyokai firstly urges the central and local governments to collaborate in establishing a REDD+ project. It also buys corn in conjunction with local private companies such as food distributing companies, through influential persons who have strong networks in Gorontalo Province. It utilizes a part of income from the sales of BOCM credits as incentives.
Local residents group (farmers)	Local residents are to receive capacity building and technology instructions from Boalemo Regency and decrease the ratio of swidden agriculture while increasing productivity of agriculture and consequently controlling deforestation. They prepare monitoring data for the REDD+ Project by taking part in forest carbon stock monitoring and/or performing monitoring of the use of their own farmland.
Biofuel program	
Office of Forestry, Boalemo Regency	Office of Forestry undertakes activities to spread/promote cultivation of

(Office of Energy)	fuel crops, deliver seedlings to local residents, conduct capacity building programs about the ways to cultivate fuel crops and help increase harvested volume of biofuel (crude oil).
Local residents group	Local residents record cultivation areas and harvested volume and submit reports to their group leaders, who in turn report them to Office of Forestry of Boalemo Regency.
Private companies	Private companies purchase seeds from local residents at higher prices than ordinary market prices, produce crude oil by utilizing vegetable oil extraction equipment which they had introduced in the past, and distribute it among local residents at reasonable prices. These companies also monitor and record sales volume and kerosene substitution.

Community participation

The REDD+ project aims to obtain credits by preserving forests and/or planting trees, and because the Project site is large, it is indispensable to get cooperation from local residents. Thus, workshops were held at two villages within the Project site and obtained comments from local residents on the feasibility of implementing a project to replace kerosene with vegetable oil. Both villages were in favor of the idea and they wanted to test its workability, but at the same time, there were voices expressing concerns about the (non-) existence of a market, main operator of oil extraction and sales, final owner of fuel crops, initial investment and management of the system. Project developers promised that they will examine each of their concerns in detail (p.20).

More generally, communities will participate in more productive agricultural activities, carbon stock monitoring, and production of biofuels.

Project financing

Income from the sale of carbon offsets will be used for the REDD+ activities. Assuming a price of US$ 12-21/tCO2e during 2013-2022, income from offsets will be US$ 737,000-1,290,000/year. This will cover the cost of remote sensing, capacity building, refinement of crude oil, and forest protection activities, etc. (p.2).

The figures in the next table are calculated based on information obtained on the spot or from stakeholders through interviews. They will be further examined and refined by inquiring with the governments of Gorontalo Province and Boalemo Regency.

Financial plan (p.22)

	2012	2017	2022	2027	2032	Total
Project Year	0	5	10	15	20	
Credit Volume(tCO2e)	0	61,000	61,000	61,000	61,000	1,220,000
(lower side 10% less)	0	54,900	54,900	54,900	54,900	1,098,000
Credit Price(US$/t)	0	18	21	21	21	
(lower side 10% less)	0	16.2	18.9	18.9	18.9	
Credit Income	0	1,098	1,281	1,281	1,281	23,790
(worst case)	0	889	1038	1038	1038	19,270
PDD	−200					
Validation	−40					
Verification		−30	−30	−30	−30	
Carbon Stock Monitoring SV		−15	−15	−15	−15	
Carbon Stock Monitoring		−10	−10	−10	−10	
Remote Sensing		−15	−15	−15	−15	
Capacity Building		−200	−200	−200	−200	
Bio−fuel refinement		−100	−100	−100	−100	
Total Cost	−240	−370	−370	−370	−370	−7705

Benefit sharing

Indonesia has not yet decided upon distribution rules on credits created from REDD+ projects. It is an important issue in what manner credits are to be distributed among the central government, the local government and the Project operator. The timing of the start-up of the Project is to be determined only after the distribution rules are concretely fixed (p.23).

Emissions and removals with and without project

- Monitoring methods and plans

Kokusai Kogyo Co. supervises the local government staff and GIS consultant for the ground truthing, which verifies the satellite imagery analysis. Technology transfer to local Government will take place.

Local people participate in data sampling monitoring to obtain some incentives from the activity, which also contributes to lowering costs and improving the project feasibility (p.1).

- Establishment of reference scenario and boundaries (p.13)

In establishing the reference scenario, developers investigate and combine such factors as (i) deforestation rate of the relevant areas in the past, (ii) current situation of the land cover, (iii) situation of land use and (iv) future land use plan, and we assume, as our basic way of thinking, that the trend of the past deforestation trend should continue.

Five villages are selected (Ayuhulalo, Botumoito, Hutamonu, Dulangeya and Rumbia) located around Botumoito Village in Boalemo Regency as the Project site(s) (p.15).

- Monitoring method and plan

Successor satellites of LANDSAT and ALOS are used. SAR data, which is not affected by clouds, is also used. With respect to the L-band SAR data in particular, there are many cases where the existence of correlation between backward scattering coefficient and wood volume is demonstrated. In Japan, ALOS-2, which is a successor satellite of ALOS/PALSAR (which is L-band SAR) is scheduled to be launched in fiscal year 2013, and monitoring using data from this satellite is thought to be useful (pp.15-16).

9 plots were established and DBH and tree height measured. Plot dimensions were: 10m X 10m plots for trees < 10 m height; 20 X 20 m plots for trees 10-20 m height; 30mX30m plots for trees >20m height.

If developers conduct a survey of 10 plots for each of the 12 zones in total (4 forest zones times 3 forest stratifications), they need 120 plots in total. They deem it desirable to conduct tree measurment every 3 to 5 years in light of the growing speed of forests, and to conduct the monitoring by way of satellite image analysis every year (p.16).

- Greenhouse gas emissions and emission reductions

The Project aims at quantitatively assessing the reduction of GHG emissions associated with the control of deforestation and forest degradation, and issuing credits in proportion to the reduced amount of GHG emissions. The project will establish a specific methodology for assessment, by referring to VCS methodologies and the like (p.16).

Project elements that can deliver GHG emissions reductions (p.13)

	Element by which GHG reduction can be expected	Expected GHG reduction effects
1	Sustainable land management through cultivation of fuel crops.	CO_2 absorption by cultivation of fuel crops.
2	Use of vegetable oil as an alternative to kerosene.	CO_2 reduction from the use of alternative fuel to kerosene.
3	Use of vegetable oil as an alternative to kerosene.	CO_2 reduction associated with transport of kerosene.
4	Production of compost from oil extraction residues and increase in productivity of farmland.	Prevention of increase in CO_2 emission due to reforestation resulting from farmland expansion.
5	Production of compost from oil extraction residues.	GHG reduction as a result of use of chemical fertilizer.

Baseline emissions as well as Project emissions are assessed, based on the result of analysis of decease in deforestation. As a result, it is found that the expected emission reduction from the Project will to 845,152 tCO2 in total over the coming 20 years (or 42,258 tCO2per year on average) (p.17).

Baseline emissions at the project site, project emissions and expected emission reduction (in 20 years from the start of the project) (pp.17-18)

Emission/reduction	Total CO2 emissions (tCO2)	CO2 emissions per year (average) (tCO2)
Baseline emissions	389,375	19,469
Emissions from the project	-835,646	-41,782
Expected reductions	1,228,580	61,429

Monitoring

See the sections 'Actors' roles and responsibilities' and 'Emissions and removals with and without project'

Local residents do not seem to recognize the importance of biodiversity, and thus, there is a high risk

of the ecosystem being damaged and collapsed. As a means of preventing that from happening, monitoring can be conducted not only for wood/ forests but also including the ecosystem, and also the possibility of collaboration with existing biodiversity preservation activities (pp.19-20).

Reporting

Based on the understanding (premise) that permits for implementation of the Project need to be obtained from regulators (namely from the Japanese government and the Indonesian government), the Project operator assumes that submission of, or preparation for certain documents, is required by referring to the existing regulatory systems (J-VER system, VCS, UN CDM, etc.).

Documents assumed to be needed for submission

- Explanatory document on the Project outline: Materials explaining the outline at the outset of the Project.
- Project plan: Basic material required for the registration of the Project.
- Appropriateness-validation report: This report is used for the registration of the Project, after validating the appropriateness of the Project plan
- Monitoring report: This report is used as the basic material for credit issuance after verification by a third verifier.
- Verification report: This is a report by a third party about the result of verification (p.19).

Verification

Procedures and other items required for validation of appropriateness and verification of emission reduction were examined by referring to ISO 14064-3:2006: "Greenhouse gases -- Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions", which is globally acknowledged as a means of reporting calculated GHG emissions (p.19).

Risks and risk management

No data

Progress and plans

No data

Links:

Project-related documents

- [報告書資料](#)　(Japanese)

- [新メカニズム実現可能性調査 最終報告書（概要版）「インドネシア・ゴロンタロ州における REDD+とバイオ燃料生産利用に関する新メカニズム実現可能性調査」](#)　(Japanese)

- [ゴロンタロ REDD+事業とバイオ燃料によるセーフガード](#)　(Japanese)

Others