Halitinã RED project

Source(s):

VCS (HALITINÃ RED PROJECT VERSION 1.0) March 8th 2010 *(English)*

http://gec.jp/gec/jp/Activities/cdm/sympo/2010/t2-1_kanematsu.pdf *(Japanese)　(*2)*

FY2009 CDM/JI Feasibility Study Report Summary "Halitinã" REDD project *(English) (*3)*

*Interview with Kanematsu Corporation (2010.08.12) (*4)*

Report of the study on emissions from deforestation and degradation (REDD) in Mato Grosso,　Brazil, March 2010 *(body<Japanese>/Annex1-3<English>) (*5)*

平成22年度経済産業省 地球温暖化対策技術普及等推進事業(第二次)　ブラジル'Halitina'REDD+プロジェクトF/S調査報告書 *(Feasibility Study of the Halitina REDD+ Project) (Japanese)　(*6)*

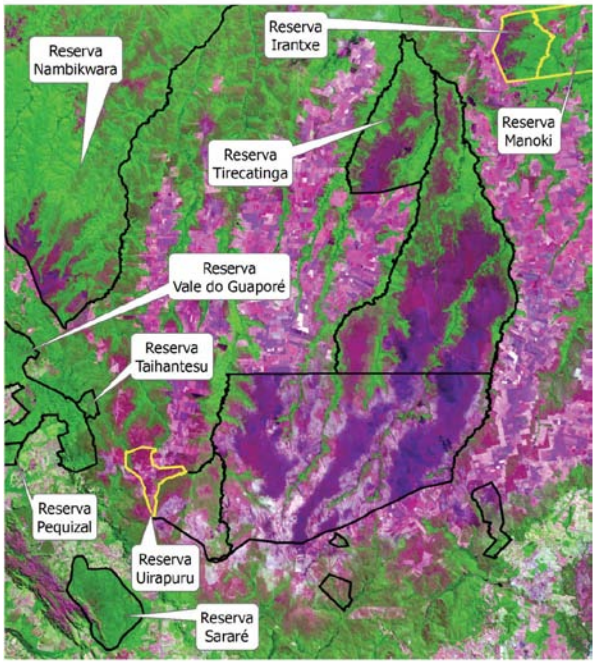
Note: Some of the material below is translated from Japanese.

Project location

The circle on the map above depicts the area in which the project activity is located (*5, Annex 3).

The project is located inside the indigenous territories of the Paresi people, state of Mato Grosso, Brazil. The following indigenous territories (Territórios Indígenas) compose the project area: Utiariti; Paresi; Juininha; Rio Formoso; Estivadinho; Figueiras. The territories Utiariti, Paresi and Juninha constitute one single contiguous area. Territoreis Estivadinho, Figueiras and Rio Formoso are three discrete areas south of the main area. The map below depicts the indigenous territories in the project area (*5, Annex 1, p. 86).

Territórios Indígenas no Entorno da Área do Projeto



Forest area and types

Nearly the whole project area is located within the Cerrado (Brazilian Savannah) biome (*5, Annex1). The total project area is 1,038,000 ha. (p. 15).

The Cerrado biome occupies 21% (2,000,000 km^2) of the country's land area, being the second largest Brazilian biome (Borlaug, 2002). The Cerrado is located in the central region of Brazil and also occurs in disjointed areas within other adjacent Brazilian biomes as shown in the first figure above.

In the context of the Cerrado biome, the most predominant forest formations are (*5, Annex1, p. 87):

- **Cerradão** (large, tall or thick Cerrado) – Characterized by both species that occur in Cerrado *strictu sensu* and in woodlands. It has a continuous canopy with an arborous cover typically ranging between 50-70% of the area. The height of its canopy ranges typically between 8-15 meters.
- **Riparian Forest** – Forested land adjacent to medium and large-sized rivers (Mata Ciliar). Its extension is typically proportional to the river width, but generally does not surpass 100 meters. Smaller rivers are also companied by similar formations, which, in this case, have different name in Portuguese (Mata Galeria).

Mata Seca (Dry Forest) are also present in the Cerrado biome, but not in the reference region.

The following Savannah formations are found in the area:

- **Cerrado *strictu sensu*** – Characterized by the presence of short, tortuous and bended trees, with irregular and twisted ramification, and whose barks are thick and corked and generally show evidences of past burnings.

- **Cerrado Ralo** (Less Dense Cerrado) – A sub-type of cerrado *strictu sensu*, but has a lower density of arborous vegetation: 5-10%.
- **Veredas**, **Palmerais**, **Cerrado Rupestre** and **Parque Cerrado** – Also typical formations of the Cerrado biome, but have insignificant presence in the region.

The following grassland formations are found in the area:

- **Campo Sujo** (Dirt Grassland) – Formed primarily from herbaceous and shrub species that are less developed than those found in Cerrado *sensu strictu*.
- **Campo Limpo** (Clean Grassland) – This physiognomy is predominantly herbaceous, with sparse shrubs and infrequent trees. It is more frequently found in mountains and plateaus.

Klink and Machado (2005) state that "Despite this rich biodiversity, the Cerrado has received less attention than the Amazon or Atlantic forests in terms of conservation measures. Only 2.2% is legally protected, and the indications are that 20% of endemic and threatened species remain outside of any of the region's parks and reserves".

Considering its high levels of endemism and anthropogenic pressure, Cerrado is deemed a biodiversity hotspot (da Silva and Bates, 2002; Myers et al., 2000). A literature review on threatened animal species in Brazil, taking into account their geographic occurrence, suggests that 11 threatened species distributed in 9 families potentially occur in the project area (*5, Annex 3).

Forest management and use context

The land inhabited by the Paresi is owned by the Federal State of Brazil, but the Paresi have the exclusive right to use the land. Indigenous territories in Brazil – often called Indigenous Reserves – receive special classification under Brazilian law. The 'Indigenous Bill' of 1973 transferred to the indigenous people the use rights of their lands; the property rights were retained by the state. The rights of use extend indefinitely during the period the indigenous community is resident in the area and establishes that:

> Article 24 – The right of use provided to the indigenous communities comprises the right of possession, the use of natural resources existing within the occupied land, as well as the products of economic exploitation of such resources.
>
> §1º The right of use extends to water catchment areas and water resources.
>
> §2º The indigenous communities have exclusive rights over hunting and fishing activities in the areas they occupy. (p. 10)

The Indigenous National Foundation (FUNAI) counted 900 individuals in 1991, and 1,200 individuals in 2003 in the project area; local information points to the existence of 1,600 individuals in 2009. The basic form of organization is the hamlet, commonly grouping 3 generations of the same family totaling 60 people per hamlet in average, led by a chief - the elder. Each hamlet has autonomy to establish political relations within the tribes and with non-indigenous institutions. The hamlets also have autonomy to produce economic goods (crops and handmade products) (*5, Annex 2).

The indigenous economic system was traditionally composed of subsistence crops, fruits and herbs collection, hunting and fishing. Since the 1960s, wage labor on surrounding farms has been induced by local policies. More recently, toll fees have been charged on vehicles crossing the indigenous territories and land leasing inside indigenous territories for soy plantations is taking place: Since 2000, over 15,000 ha of indigenous lands were leased for soy plantations, generating US$ 500,000 in 2007. Other sources of income for the Paresi people that have been of great importance to their economic stability come from the government (social security) and other interventions (e.g. projects supported by the GEF Development Marketplace) (p. 3).

Rates and drivers of deforestation and degradation

Indigenous territories within the Cerrado biome are some of the few areas in Brazil where large tracts of native vegetation are still intact. However, these territories are becoming increasingly surrounded by pasture and cropland, and indigenous communities are facing pressure from soy farmers to lease tracts of their land for large-scale soy farming operations. Mato Grosso currently grows more soybeans than any other Brazilian State, and accordingly has one of the country's highest deforestation rates. Mato Grosso alone accounted for half of all Amazon deforestation in 2003, and nearly a third of Brazil's total soybean harvest in 2004 (p. 5).

Deforestation in the state of Mato Grosso is closely linked to its development pattern over the last decades. Most notably, deforestation is linked to a series of development policies led by the federal government in the 1970s aimed at economic development, at demographic migration from South and South-Eastern regions of the country, and at its national integration. Economic development policies have been based on the primary sector, notably agribusiness. As a result of these policies and due to the large availability of unoccupied land, Mato Grosso is nowadays Brazil's leading state in the production of both beef and soybean (pp. 25-26).

The agents and drivers of *deforestation* within the *reference region* and the *project area* are the same type. Soy growers were the main drivers responsible for the expansion of the deforestation frontier outside the project area. The main deforestation pressure over the project area is the rental model established between the Paresi and large soy growers. In addition, population increase and subsistence slash and burn agriculture is also expected to convert some of the forest to agricultural land (p. 14).

In 2007, 15,304 ha of the project area was large-scale agricultural plantations, mainly soybeans. The Paresi leadership reported during 2009 that the current extension of this area was around 17,000 ha, and that given the existing incentives, land conversion to agriculture would continue to increase. These large-scale plantations are managed by the Paresi in partnerships with commercial farmers from the vicinity. The agreements have been concluded under the supervision of FUNAI (the National Foundation for Indigenous People) – a government agency (pp. 5-6).

The National Environmental Policy (Law 6.938/81) and the Law of Public Forest Management (Law 11.284/06) do not prohibit commercial use of indigenous land as long as environmental legislation is followed. Data from PRODES (*Program for Deforestation Assessment in the Brazilian Legal Amazonia*) showing deforestation rates in indigenous reserves in the State of Mato Grosso demonstrate that since 1997 4% of forest has been lost in such areas (p. 15).

Most of the private land suitable for soy crops and ranching in the surroundings of the project area has been claimed and deforested. Consequently, such activities started to spill over into the indigenous reserve; first, into the frontiers of the Indigenous Territories (given the proximity with the existing crops and ranches), and second, as road infrastructure evolves, into the project area in specific regions where local tribal leaders have greatest contact with outside farmers and where the labor force in the indigenous settlement is large (p. 16).

Until recently, there was limited road access through the project area, but increased deforestation pressure is expected after the MT-255 road, which passes through the Utiariti and Paresi territories, was paved. The project area is also cut north-south by MT-235.

The link between road access and deforestation is illustrated by the marked increase in soy production along BR-163 in Mato Grosso. Soy production along the BR-163 rose from 6,000 acres in 2002 to more than 111,000 acres in 2005 (p. 6). The total road infrastructure in the project area covers 394.1 km corresponding to a road density of 0.038 km per km^2 (p. 14).

Demographic pressures in the region are also significant. The population of the 9 municipalities that constitute the project area increased from 109,846 in 1992 to 211,166 in 2006. This corresponds to a 92.24% increase in 14 years (p. 29).

Although the Cerrado is a fire-adapted ecosystem, frequent burning activities to clear land for pasture and to stimulate new growth of plants for animal feed has resulted in major problems with leaching, soil impaction, and erosion, especially in the more mountainous regions such as eastern Goiás and western Minas Gerais. Large fires are caused by farmers starting fires to clear the land at the end of the dry season, when plant biomass is high and humidity is low. Accidental fires are also a threat. In 2007, an un-extinguished cigarette burned an extensive amount of the Paresi reserve (p. 6).

Despite conspicuous biodiversity, the Cerrado savannah formations in the central and western parts of Brazil have been relegated to marginal talks and diffuse policies to stop ongoing deforestation in the area. As a result, by the year 2002, 54.9% of the original area of this biome has been lost to agricultural expansion and grazing pasture. This is partially due to the fact that Brazil's forest law requires only 20% of a land holding in the Cerrado be maintained in its natural state. In the Amazon rainforest, this number rises to 80% (p. 5, 30).

Project proponents

- Associação Halitinã. The Halitinã RED project is owned and controlled by Associação Halitinã, a Brazilian NGO created in 1992 by the indigenous community of the Paresi ethnicity, the natural inhabitants of the northwest part of Mato Grosso State. Associação Halitinã objectives include the protection of the Paresi's rights over its inalienable land possession, preservation of its traditional culture and habits, provision of assistance and support to the indigenous community with regards to its needs, desires and aspirations, both in legal and economic fields (p. 2).
- Mundus Carbo. Project coordination (p. 9)
- Kanematsu Corporation. Marketing (*3, p. 9)

Implementation timeframe

Project start date: not yet fixed (*4)

VCS project crediting period:10 years, which may be renewed 2 times, comprising a total of 30 years (p. 5)

Project goals

The project objective is to reduce GHG emissions from indigenous land use change by preventing land conversion without interrupting the flow of economic resources crucial to the Paresi economic system. In a 10-year crediting period, it is expected that this project will reduce emissions by 4,076,291.30 tCO_2 metric tonnes (p. 3).

The project aims to avoid unplanned mosaic deforestation and degradation and reduce emissions from mature forests under the mosaic configuration (p. 1).

Implementation activities

The planned project activities to mitigate the drivers of deforestation are (pp. 6-8):

1. Prevent the conversion of Paresi indigenous reserve to soy plantations.
2. Implement fire management techniques to reduce land degradation.

Training and employing a local fire crew will contribute to employment generation in the area, and education activities will increase awareness about fire. These traditional fire management practices will be implemented in conjunction with modern methods for fire management, prevention, and risk assessment in order to mitigate the negative impacts of fire on the territories' carbon stocks.

3. In addition to the above activities, the following project activities are being evaluated:
    - Improving efficiency and yield of subsistence agriculture;

- Assisted Natural Regeneration of previously burned areas;
- Control of illegal activities in the project area;
- Implementation of a socioeconomic program for efficiently improving the living standards of the Paresi people while fostering the identity of the community and its sustainability.

Among these activities, the implementation of an indigenous fire brigade (2) is seen as a first level priority and will be developed in partnership with local environmental and security agencies, who will build the capacity of indigenous teams. Credits sales will fund the fire brigades with wages, equipment and supplies (*5, Annex 2).

Actors' roles and responsibilities

Associacao Halitinã	- Project ownership (p. 9) Halitinã Association will be in charge of the annual land cover and land use analyses, and in charge of the sampling, collection and analyses for maintaining the registries and reports during the lifetime of the project activity (pp. 56 - 57).
Kanematsu Corporation, Kanematsu America do sul Representacao Comercial de Produtos Automotivos Ltda (Sao Paulo)	Coordination including financing, carbon credit sale, etc. (*4)
MundusCarbo	Project coordination (p .9)

Community participation

The project is expected to directly employ 20 people (p. 8). See the sections on 'Implementation Activities' and 'Monitoring'

Project financing

Based on current soy prices, the Paresi are receiving approximately US$ 223,000/year from soy leasing contracts. In the project scenario, implementation of project activities, and resulting income generated from the sale of carbon credits would increase this revenue to approximately US$2,000,000/year (p. 7). A quarter of sale of carbon credits in the VER (Voluntary Emissions Reductions) market, US$500,000, will be allocated to Paresis every year, which is much higher than income derived from land rentals. This will encourage the Paresis to refrain from allowing conversion for soy plantations (*2, slide 10).

Benefit sharing

The primary benefit of the RED project to the Paresi community will be the replacement of income from land conversion to revenue generated from the sale of carbon credits. Currently, 50% of the revenues from soy leases are distributed equally amongst Paresi families, and the remaining 50% is kept in an investment account for future development initiatives such as health and educational programs, which have long term impacts on life expectancy and income potential. Despite such initiatives, the Paresi people have significantly lower levels of health, education and income than the national average (*5, Annex 2).

A quarter of the sale of carbon credits in the VER market will be allocated to Paresis every year (*4). The project is expected to transfer resources to 1,600 people and directly employ 20 people (p. 8).

- Co-benefits

Replacing soy-related income with revenues from the sale of carbon credits will increase the direct income of Paresi families and constitutes a fund that will be used for infrastructure projects and health and education programs. A socioeconomic rescue program based on sustainable principles and respecting local knowledge and ancient traditions, will be designed in order to maximize the benefits of the additional income to the Paresi people and their land, while contributing to maintain their identity.

In addition to income generation, the preservation and maintenance of the forest resources benefits the Paresi people who rely on the land for subsistence agriculture and hunting. The Paresi people associate themselves strongly with myths and the Cerrado products, and the prevention of land conversion will preserve these traditions. Involving local communities in the maintenance of their land gives the Paresi a central stake in the project (*5, Annex 2).

Emissions and removals with and without project

The methodology applied in this project is based on the World Bank BioCarbon Fund Methodology for estimating Reductions of GHG Emissions from Mosaic Deforestation (p. 11, 40).

Of the forest carbon pools, above and below ground biomass are included and dead wood, harvested wood products, litter, and soil organic carbon are excluded.

Baseline scenario

Definition of Boundaries

The *project area* is the legally established Halitinã Indigenous Reserve comprising the indigenous territories Utiariti, Paresi, Juninha, Figueiras, Estivadinho and Rio Formoso. The *reference region* of the project is 5.9 times larger than the project area, following best practice suggested in the literature. The reference region is a contiguous area including the project area and was found to be under similar risk of deforestation (p. 13). The *leakage belt* is defined as other discrete Indigenous Territories inside the reference region (p. 16).

Biomass content

The reference region, leakage belt and project area were divided into the 6 land use / land cover classes listed in the following table, which also provides their average biomass content (p. 19).

Class Identifier		Average biomass density (t dry matter.ha-1)		
ID	Name	Below Ground biomass	Aboveground biomass	Total biomass
Native1	Dense Arborous Forest (Floresta Arbórea Densa)	52.8	220	272.8
Native2	Open Arborous Forest (Floresta Arbórea Aberta)	52.9	24.9	77.8

Native3	Herbaceous-shrub (Vegetação gramínio-lenhosa)	30.1	9.3	39.4
Native4	Naturally exposed soil (Solo-exposto natural)	30.1	9.3	39.4
Antrop1	Cropland (Area cultivada)	N.A.	N.A.	10
Antrop2	Pasture (Patagem)	N.A.	N.A.	16.1

Note: N.A. = Not Available; The land classes are based on Spring's ISOSEG unsupervised classification method (p. 55).

Vegetation Classification by Ground Truthing Points – Forest / Non - Forest

Ground-based measurement

A statistical error of 10% and precision of above 95% were set for the project. Circular plots of 12.61 radius (area = 500m^2), set at 1 km intervals, will be used. In the sample plots, 100% enumeration will be conducted for tress with DBH > 5 cm and height > 1.5 m. Species will be recorded for trees with height > 1.3 m (*6, p. 59).

70 ground truthing points for interpretation of the satellite imagery were selected over 95 % of the Paresi reserve (*6, p. 60).

Analysis of historical land-use and land-cover change

The historical reference period starting date is 1987 and the ending date is 2007 (p. 17). Historical land-use and land-cover change analysis within the reference region, leakage belt and project area was performed using Landsat 5 images (6 scenes per image - 30m by 30m resolution; 185km by 185km coverage) from 1987, 2000 and 2007 (p. 18). Data on the carbon stocks associated with each of the land use / land cover classes was derived from scientific studies conducted in Cerrado ecosystems and derived from (Intergovernmental Panel on Climate Change) IPCC defaults.

The following table shows the quantification of the area for each class in the reference region for 1987, 2000 and 2007, respectively (p. 22).

Class Identifier		Area(ha)		
ID	Name	1987	2000	2007
Native1	Floresta Arbórea Densa	2,047,877	2,010,714	1,982,898
Native2	Floresta Arbórea Aberta	1,349,032	1,219,177	1,120,085
Native3	Vegetação gramínio-lenhosa	1,444,215	1,086,631	1,038,230
Native4	Solo-exposto natural	787,289	464,005	256,930
Antrop1	Area cutivada	304,669	1,000,456	1,289,549
Antrop2	Patagem	10,336	247,315	305,921

Land-Use and Land-Cover classes in the project area (2007) based on Landsat imagery (*6 p.59)

Class Identifier		**Area(ha)**
ID	name	
Native1	Dense Forest	144.901
Native2	Open Forest	172.859
Native3	Savannah Vegetation	559.428
Native4	Exposed Soil	146.072
Antrop1	Cultivated area	15.304

Antrop2	Pasture	0

Baseline scenario

The baseline considers the continuation of the business as usual scenario: land conversion of indigenous territories for soybean plantations under partnerships of indigenous people and soybean farmers from the vicinity (p. 26).

For the projection of future deforestation a linear projection is used based on past trends observed in the reference region (p. 32). The calculation of historical deforestation trends, derived from the analysis of satellite imagery of the reference area, is depicted below (pp. 32-33):

CO2 emissions in the reference area by the land-use and land-cover classes(1987-2007)

Category Identifier		From Class ID	To Class ID	Area(ha),% of original area	Average yearly conversion (ha,%)	Emissions
ID	Name					tCO2/yr
Change1	Arbórea Densa to Cultivada	Native1	Antrop1	37,163 (1.81%)	1,858 (0.09)	841,541
Change2	Arbórea Aberta to Cultivada	Native2	Antrop1	157,105 (11.65%)	7,855 (0.58)	917,823
Change3	Gramínio-Lenhosa to Cultivada	Native3	Antrop1	524,896 (36.34%)	26,245 (1.82)	1,329,719
Change4	Solo to ultivada	Native4	Antrop1	262,157 (33.30%)	13,108 (1.66)	664,122
Change5	Arbórea Densa to Pastagem	Native1	Antrop2	259,615 (12.68%)	12,981(0.63)	5,742,420
Change6	Arbórea Aberta to Pastagem	Native2	Antrop2	79,466 (5.89%)	3,973(0.29)	422,480
Change7	Gramínio-Lenhosa to Pastagem	Native3	Antrop2	58,886 (4.08%)	2,944(0.2)	118,224
Change8	Solo to Pastagem	Native4	Antrop2	0	0	0

The carbon density in the identified classes was calculated by multiplying the biomass stocks depicted by the IPCC (2006) default carbon content for biomass (47%) (p. 36).

In the absence of the project activity deforestation rates would continue and consequently 407,724 tCO2e would be released annually to the atmosphere (p. 37).

The Baseline will be revisited over time because agents, drivers and underlying causes of deforestation change dynamically. The procedure to be used for update the baseline will be transparent and the updates will be every 10 years (p. 49).

Quantifying GHG emission reductions

Soybean prices and population growth are considered the drivers of deforestation. Underlying factors that also drive deforestation were identified as agribusiness as a development strategy, land use policies, and low level of enforcement.

A linear projection is used for the deforestation rate (modeling is not used); hence, the continuation of past deforestation trends is assumed. The calculation of historical deforestation trends is derived from the analysis of satellite imagery of the reference area, as discussed above. It is assumed that the land use class that will replace forest is cropland. IPCC (2006) total biomass values for these classes were used for the purposes of ex ante estimation of emissions reductions.

Ex ante net anthropogenic GHG emission reductions are calculated by subtracting project emissions and leakage from a given year from the baseline emissions (p. 60). Estimated emission reductions of the proposed activity are equal to 407,629.13 tCO2 in the first crediting period (ten years) (p. 2).

Leakage

There will be no leakage prevention measures (p. 45). The risk of leakage (of farmers opening new soybean plantations in the reference area) is very low since most of this area has already been converted to soybean plantations. Therefore, the only risk of leakage by the project implementation is the conversion of areas in the nearby other indigenous reserves in the reference region, that is, reserves of Manoki, Irantxe, Tirecatinga, Nambikwara, Vale do Guaporé, Taihantesu, Pequizal, Uirapuru and Sararé (p. 45).

Project emissions

Project emissions are estimated as 95.02 Mg CO2e.year-1 and account for all fossil fuels consumed for implementation and monitoring the project during any given year. The calculation is based on: 2 trucks run 20,000 km/yr with 4km/liter consumption; project implementation in the first year consumes 25,000 liters diesel; net calorific value for diesel, CO2 emission factor for diesel and global warming potential are based on IPCC defaults; fuel density is 0.852 kg/liter.

Ex ante net anthropogenic GHG emissions reduction

Ex ante net anthropogenic GHG emissions reduction was calculated as follows:

$ER_y = \tilde{BE_y} - PE_y - \tilde{L_y}$

Where:

ERy = Emission reductions in the year y (Mg CO2e)

BEy = Baseline emission in the year y (Mg CO2e)

PEy = Project Emissions in the year y (Mg CO2e)

Ly = Leakage in the year y (Mg CO2e)

Baseline LU/LC change and emissions in the project area (p. 61)

Yr	Baseline Emissions (tCO2)	Project Emissions (tCO2)	Leakage Emissions (tCO2)	Emission Reductions (tCO2)
1	407,724	95.02	0	407,629.13
2	407,724	95.02	0	407,629.13
3	407,724	95.02	0	407,629.13
4	407,724	95.02	0	407,629.13
5	407,724	95.02	0	407,629.13
6	407,724	95.02	0	407,629.13
7	407,724	95.02	0	407,629.13
8	407,724	95.02	0	407,629.13
9	407,724	95.02	0	407,629.13
10	407,724	95.02	0	407,629.13
11	652,359	95.02	0	652,263.61
12	652,359	95.02	0	652,263.61
13	652,359	95.02	0	652,263.61
14	652,359	95.02	0	652,263.61
15	652,359	95.02	0	652,263.61
16	652,359	95.02	0	652,263.61
17	652,359	95.02	0	652,263.61

18	652,359	95.02	0	652,263.61
19	652,359	95.02	0	652,263.61
20	652,359	95.02	0	652,263.61
21	815,448	95.02	0	652,263.61
22	815,448	95.02	0	652,263.61
23	815,448	95.02	0	652,263.61
24	815,448	95.02	0	652,263.61
25	815,448	95.02	0	652,263.61
26	815,448	95.02	0	652,263.61
27	815,448	95.02	0	652,263.61
28	815,448	95.02	0	652,263.61
29	815,448	95.02	0	652,263.61
30	815,448	95.02	0	652,263.61
total	**18,755,311**	**2,851**	**0**	**18,752,460**

Monitoring

The ex post methodology (to be implemented immediately after project start) includes two main tasks (pp. 41-50):

1. Monitoring (to be implemented during the crediting period); and
2. Adjustment of the baseline for the subsequent crediting period (to be implemented at the end of each crediting period).

Task1: Monitoring

Baseline monitoring;

The baseline adopted was based on ‘linear projection’ and therefore baseline monitoring will not be conducted.

Project monitoring

The risk of leakage will be annually monitored by remote sensing analysis of Landsat 5 TM images.

Monitoring of land-use and land-cover change

For the reservoirs of CO2, the project will use the most recent data and images from INPE/PRODES to conduct an analysis of the real deforestation rate.

Land Use and Land Use Changes will be analyzed using images obtained by the sensor TM of the Landsat 5 satellite.

Georeference will be conducted based on orthorectified Landsat images from the NASAGEOCOVER program, from S-21-15 zone (available at https://zulu.ssc.nasa.gov/mrsid/). The following criteria will be adopted: UTM (Transverse_Mercator) projection; South American 1969 datum (p. 54). The images will be classified using the MultisPec W32 software. Considering the size of the area studied and the objectives of the study, each image will be classified in 5 classes: dense forest, open forest, herbaceous-shrub, crops and exposed soil. Such class definition follows the methodological procedures of the RADAM (Radar in Amazon) project, which created a phitophysiognomy scale (p. 55).

Monitoring of carbon stocks and non-CO2 emissions

Even though IPCC and other literature data were used for the ex-ante emissions reduction estimate, carbon stock variation in the project area will be estimated throughout the project lifetime. Land cover and land use change will be monitored annually. A carbon inventory for the project area will be developed and the carbon content of above and below ground biomass will be estimated for each land use / land cover class (p. 43). The Winrock Guide to Monitoring Carbon Storage in Forestry and Agroforestry Projects will be used together with appropriate adjustments to take into account land-use / land-cover class differences.

The sampling design will be based on stratified sampling. Each stratum will represent different land-use / land-cover classes and they will be defined by the use of satellite images combined with ground measurements for verifying remotely-sensed images.

Aboveground and belowground biomass will also be estimated by destructive sampling.

Monitoring of large natural disturbances

The main natural disturbance the reference area faces is fires. The number of fires and the total burned area in the project area will be monitored daily by using the real-time fire monitoring system from INPE. Every time a fire occurs in any of the Indigenous Reserves of the project area INPE will send an automatic email with the GPS coordinates of that fire.

*The estimated cost of monitoring is 200,000 USD per year, including work paid to the Paresis (*4).

Reporting

Limited information.

Verification

Project design will be submitted to the VCS for validation.

Risks and risk management

No risk assessment performed in project description for VCS

Progress and plans

The project proponent plans to obtain VCS certification to produce VER carbon credits for sale (p. 26). Third party validation is targeted for 2011 and the project proponent aims to begin the project in the same year (Denki Shimbun 2010.7.28) .

Links:

Project-related documents

See sources at beginning of this profile.

Others

Denki Shimbun 2010.7.28