CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM FOR SMALL-SCALE AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-SSC-AR-PDD)
(Version 02)

CONTENTS

SECTION A. General description of the proposed small-scale A/R CDM project activity:

A.1. Title of the proposed small-scale A/R CDM project activity:

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Title: Southern Nicaragua CDM Reforestation Project
Version: PDD version 04
Date: November 30, 2010

A.2. Description of the proposed small-scale A/R CDM project activity:

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The project consists in the reforestation of 813 ha of former pasture land with teak and native wood species in Southern Nicaragua. The objectives of this project is to contribute to the sustainable development of Nicaragua through reforestation to generate sustainable wood supplies to reduce pressure on natural forests and to serve as carbon sink.

The project contributes to alleviate poverty in one of the poorest countries of Central America. The main economic activity of the area is subsistence agriculture and cattle farming that offer very few employment opportunities. The majority of the population living in the vicinity of the project depends on small-scale agriculture and few people are employed in public services. The project seeks to generate income and employment opportunities for rural poor and landless and prevent their emigration to neighboring Costa Rica.

The project is a major source of employment for local communities and the project operations are run almost exclusively by the communities. This will include jobs on a permanent basis as well as seasonal jobs for tasks such as planting, weeding, pruning, fire control, thinning, harvesting and wood processing. The project operations such as planting, maintenance, harvest and wood processing offer work opportunities throughout the operational life of the project. The wages paid to workers are above average wage, which is significantly above the minimal wage. The project also provides training and career opportunities for young people.

The major species planted under the project is teak (*tectona grandis*); But also a variety of valuable native species are planted. Most of these native species have become rare or threatened due to overexploitation of natural forests in Central America, some are important as fruit, food and habitat for wildlife.

The environmental benefits of the project include prevention of fire and erosion, groundwater protection, improvement of soil and microclimate. The project obtained certification in accordance with the criteria laid out by the Forestry Stewardship Council (FSC)[1] in 2007.

The project will have a harvest cycle of 18 to 30 years, depending on site quality and species. Forest products from thinning and harvest will be processed locally to improve value addition and to provide local employment.

[1] The Forest Stewardship Council FSC is an international non-profit organization, founded in 1993 to support environmentally appropriate, socially beneficial, and economically viable management of the world's forests. It is recognized as the highest international standard for sustainable forest management.

A.3. Project participants:

Please list project participants and Party(ies) involved and provide contact information in Annex 1. Information shall be indicated using the following tabular format.

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Indicate if the Party involved wishes to be considered as a project participant (Yes/No)
Nicaragua (host party)	Precious Woods Nicaragua SA	No
Canada	International Bank for Reconstruction and Development as Trustee of the Bio Carbon Fund	Yes
(*) At the time of making the CDM-SSC-AR-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

A.4. Description of location and boundary of the small-scale A/R CDM project activity:

The project consists in the reforestation of 813 ha pasture land at three different sites.

A.4.1. Location of the proposed small-scale A/R CDM project activity:

The project is located on three former cattle ranches in Southern Nicaragua near the village of Sapoá and Esperanza. The topography of these sites is hilly. The altitude varies from 50 to 250 m above sea level.

Figure 1: Location of the three project sites (yellow circles)

A.4.1.1. Host Party(ies):

Nicaragua

A.4.1.2. Region/State/Province etc.:

Departments of Rivas and Rio San Juan

A.4.1.3. City/Town/Community etc:

Municipality of Cárdenas and Municipality of San Carlos

A.4.2. Detail of geographical location and project boundary, including information allowing the unique identification(s) of the proposed small-scale A/R CDM project activity:

The project boundaries are defined by the following geographical coordinates. Detailed geo-referenced maps will be made available to the DOE.

Table 1: Detailed geographical coordinates of project sites

	Coordinates	
	Latitude	**Longitude**
Finca La Pimienta	N 11.17 N 11.21	W 85.67 W 85.62
Finca Javalina	N 11.14 N 11.16	W 85.42 W 85.38
Finca Esperanza	N 11.11 N 11.09	W 84.52 W 84.56

A.5. Technical description of the small-scale A/R CDM project activity:

A.5.1. Type(s) of small-scale A/R CDM project activity:

The project is a small-scale A/R CDM reforestation activity on grassland.

A.5.2. A concise description of present environmental conditions of the area, which include information on climate, soils, main watershed, ecosystems, and the possible presence of rare or endangered species and their habitats:

All three project sites are located in the south of Nicaragua, close to the lake of Nicaragua. They show very similar environmental conditions. Differences are pointed out in the paragraphs below if required.

Climate

The climate is tropical, with a mean annual temperature of 26° C. The temperature varies relatively little throughout the year, there is no frost occurrence and seasonal differences are related primarily to rainfall patterns. A prolonged dry season of 4 to 5 months occurs between December and April. The average annual precipitation is 1800 mm to 2000 mm per year[2].

[2] Gobierno de Costa Rica, Gobierno de Nicaragua, Programa de las Naciones Unidas para el Medio Ambiente (1997): Manejo Ambiental y Desarrollo Sostenible de la Cuenca del Río San Juan. Estudio de Diagnostico de La Cuenca del Rio San Juan y Lineamientos del Plan de Accion

No extreme weather events have occurred in this region of Nicaragua. It has not been affected by hurricanes, natural fires or floods. Although hurricanes occur in Central America, the pacific area and the inner lands of Nicaragua have not been touched by extreme weather events such as cyclone Mitch.

Hydrology and soils

Clay soils are predominating in the project area. The three project sites are located in the large watershed of the Rio San Juan that leads from the Lake Nicaragua to the Caribbean Sea. Several creeks and rivers are found in the fincas (farms): The river dominating the watershed of the finca la Pimienta is the Rio Sapoá, the one of la Javalina is the Rio Ostayo and the one of Esperanza is the Rio San Juan itself as the finca is located at its shore.

Vegetation and Biodiversity

The pastures are dominated by the invasive grass species Jaragua (Hyparrhenia rufa). Isolated trees such as *Enterolobium cyclocarpum* (Guanacaste), *Guazuma ulmifolia* (Guácimo), *Byrsonima crassifolia* (Nance), *Cedrela odorata* (Cedro), *Bombacopsis quinata* (Pochote), *Tabebuia rosea* (Roble de sabana) and *Scheelea rostrata* (Palma real) are found on the pastures.

The natural vegetation originally found in the project area corresponds to the Tropical Moist Forest according to the Holdridge Life Zone Classification System[3]. It occurs in areas with an average annual precipitation of 1900-3000 mm. This ecosystem is characterized as a tall, multistratal, semi-deciduous or evergreen forest with trees up to 40-50 m in the canopy, trees up to 30 m in the sub-canopy and trees of 8-20 m height in the understory. Natural forests showing these characteristics have completely disappeared in the project region because of logging, fires and establishment of pastures several decades ago. Secondary forests can be found along creeks and rivers, on hilltops and steep slopes.

Within the project boundaries, no endangered animals are found. However, populations of the green macaw (*ara ambigua*), a species listed on the red list of IUCN are found in the larger area around the western project site. Some tree species that appear on the list of endangered species of IUCN grow in the remaining secondary forests of the region.

A.5.3. Species and varieties selected:

The species considered for reforestation activity are outlined in the Table 2 below.

Table 2: Species considered for planting in the project

	Scientific Name	Common Name	Forest type	Clonal Offspring
Naturalized Species	*Tectona grandis*	Teak	Groups of native species planted as mosaic within the teak plantation. Pre-existing native trees have been left standing.	Yes (<10%)
Native Species	*Astronium graveolens*	Ron Ron	Groups of native species	No

[3] Holdridge L. Ecología basada en zonas de vida. San José, Costa Rica. Editorial IICA, serie: Libros y Materiales Educativos Nº34, 1978.

	Bombacopsis quinata *Hymenaea courbaril* *Albizia guachapele* *Tabebuia rosea* *Vochysia guatemaltensis* *Terminalia oblonga* *Hyeronyma alchorneoides* *Samanea saman* *Virola koschnyi* *Schizolobium parahyba*	Pochote Guapinol Guayaquil Roble Chancho Surá Pilón Genízaro Cebo Gallinazo	are planted as mosaic within the teak plantation	
Native species listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) or in the IUCN Red list of threatened species	*Swietenia macrophylla* *Dalbergia retusa* *Cedrela odorata* *Dipteryx panamensis* *Platymiscium pleistotachium*	Caoba Cocobolo Cedro Almendro Cristóbal		

The planting will take place during five following years. The two types of stand models used in the project are: teak and mixed native species.

Table 3: Schedule of planting by year

	Year	**2003**	**2004**	**2005**	**2006**	**Total**
Strata	Teak	133	278	173	180	**764**
	Native species (ha/y)	7	14	16	12	**49**

Teak has been selected as the predominant species because the behaviour of this species in reforestations is well known and growth rates as well as market acceptance can be predicted with a reasonable grade of security. Although teak originates from Asia, it has been planted in Latin America under similar conditions since the beginning of the 20th Century. Teak is proven not to be an invasive species[4,5].

The native species will be planted in groups within the teak plantation. The objective of planting native species is to improve the biodiversity and support the propagation of native species that are under threat.

4 Randall, R. (2003). "Rob Randall's Big Weed list." from http://tncweeds.ucdavis.edu/biglist.html.

[5] Richardson, D. (1998). "Forestry trees as invasive aliens." Conservation Biology 12(1): 18-26.

A.5.4. Technology to be employed by the proposed small-scale A/R CDM project activity:

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The plantation aims at establishing a diverse mosaic landscape that integrates plantations of teak and native species with pre-existing single trees. The planting will be done manually and use of machinery will be very limited for the maintenance of the plantation.

Planting

The reforestation is carried out with seedlings produced in greenhouses and nurseries from seeds and vegetative reproduction. For some species, seeds are planted directly into the soil. The topography is hilly and ploughing was carried out only on completely flat areas. In total, 7.8% of the planting area was ploughed. Maps of the ploughed area can be found in the annex. Vegetation is removed only around the seedlings. The planting has been done using manual methods.

With exception of one single dose of bokashi, an organic fertilizer based on chicken manure, which is added to each planting hole, no fertilizer is applied. In total, 278 kg of bokashi is applied per ha, which totals in about 230 tons for the entire project. This value has been used to calculate emission from organic fertilizer use. By applying the "A/R methodological Tool, "*Estimation of direct nitrous oxide emission from nitrogen fertilization*", it is demonstrated that the project emissions from the use of organic fertilizer do not represent more than 10% of the emission reductions from the project. The total project emissions from fertilizer use are less then 1%.

Tending

The undergrowth vegetation in the plantation will be trimmed manually with machetes (chapea) at periodic intervals in order to control weed competition to the young trees. The tending activities up to 3 years from planting will enable the trees to reach sufficient height to withstand competition from undergrowth vegetation.

Thinning and Harvesting

Thinning will be carried out at different ages to enable healthy stand growth. The harvesting cycle is expected to vary between 18 and 30 years as per the site quality and silvicultural requirements of species. For the harvest, low impact harvest techniques will be applied. The reforestation will remain in place after conclusion of the first harvesting cycle. After felling, the trees are replanted immediately or regrow from coppice shoots.

Fire prevention

Due to the frequency of fires in the region, fire prevention measures are carried out during the dry season. This includes removal of vegetation along fences, 24-hour surveillance during dry season, permanent availability of water supply and equipment to fight fire. As the teak trees reach a height of 4-6 meters (2-3 years), the risk of mortality due to fire is substantially reduced because the high fire resistance of the species.

Biodiversity

The proposed project differs greatly from the traditional commercial plantations as it is designed to have substantial benefits in relation to biodiversity: In addition to teak, a number of native forest species ornamental and fruit-bearing trees will be planted. These will amount to 6% (for the sum of all species)

of total plantation surface. The species included in planting activity are listed in section A 4.2. Most of these species are threatened by extinction and some of them are protected under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The native species planted add to the native single trees that remained as shade trees in the former pastures and are left standing. The result will differ clearly from conventional tree monocultures, creating a mosaic of secondary forest, pre-existing single trees, teak and groups of newly planted native trees. Thus, vegetation developed under the project would provide structure to a formerly impoverished landscape and serve as localized habitat for the native fauna.

A.5.5. Transfer of technology/know-how, if applicable:

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So far very few reforestation projects have been implemented in Nicaragua. None of them have proven commercially successful in the long term. The knowledge on best practice is still new and not wide spread. This project brings new technology such as successful planting, vegetative reproduction, successful seed production and timber processing to Nicaragua. The staff is recruited and trained locally.

The project would disseminate reforestation technical know-how by sharing information with visitors from universities, government, and non-government institutions and local farmers and facilitate transfer of experience beyond the project.

A.5.6. Proposed measures to be implemented to minimize potential leakage as applicable:

According to the methodology, three types of leakage need to be assessed if there are displaced activities due to the project activity:

- Area under cropland displaced
- Number of domesticated grazing animals displaced
- Time-average number of domesticated roaming animals displaced

In the case of this project, only domesticated grazing animals need to be analyzed as the previous land-owners used their land as pasture for cattle. Leakage is considered zero if:

- the number of domesticated grazing animals displaced is less than 10% of the average grazing capacity of the project area, or
- If evidence can be provided that the lands that received the shifted activities have been deforested or degraded before the activity shift.
- If no activity shift occurs because the previous land-owners have changed their occupation (ie.trade instead of farming)

In order to analyze the situation, interviews were conducted with the previous land owners short after the purchase of the land. They stated that it is unlikely that they will engage in deforestation activities and subsequent subsistence agriculture. To deforest and practice subsistence agriculture in deforested areas (which is the main driver for deforestation in Nicaragua) is an arduous work with low benefits. However, in order to verify the testimonials, a second set of interviews with the previous landowners will take place 5 years after the project start.

Another type of activity shift could occur if the previous land use had offered more employment and the previous workers would turn to activities that include deforestation. In this case, the project employs significantly more people than the previous land use. Compared to cattle ranching, reforestation is much more labor intensive. In general, those people that have previously worked on the land are now employed

by the project entity. Due to the creation of employment and income for local communities, the number of people that might potentially act as deforesters is smaller than without the project. All these people will not be forced to migrate to forest areas.

No measures are needed to minimize the leakage as it is not expected to occur.

A.6. A description of legal title to the land, current land tenure and land use and rights to tCERs / lCERs issued:

The project will be carried out on private land that Precious Woods has acquired in 2003 (La Pimienta and Esperanza) and 2004 (Javalina) from three private land owners. This land was used by these former owners for cattle breeding. It has been deforested a long time ago. The pastures were dominated by the invasive grass species Jaragua (Hyparrhenia rufa). Only isolated shade trees such as *Enterolobium cyclocarpum* (Guanacaste), *Guazuma ulmifolia* (Guácimo), *Byrsonima crassifolia* (Nance), *Cedrela odorata* (Cedro), *Bombacopsis quinata* (Pochote), *Tabebuia rosea* (Roble de sabana) and *Scheelea rostrata* (Palma real) could be found on the pastures. The majority of these trees were left standing. No crops or trees were planted before project start.

There are no residents within the project boundary. There are no ownership disputes with regard to the land. According to the land tenure legislation in Nicaragua, Precious Woods holds legal title to the lands as per the public registry. As the legal owner of the project lands, the project entity has rights to the carbon assets and the tCERs to be generated under the reforestation project.

A.7. Assessment of the eligibility of land:

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Nicaragua has reported to the Executive Board its parameters for the definition of forest. The parameters are set at a minimum area of land of 1.0 hectares; a minimum tree crown cover of 20 per cent; and a minimum tree height of 4 metres at maturity *in situ*.

The eligibility of land is demonstrated as per the guidance of the small-scale methodology AMS0001/Version 5. The *procedures to define the eligibility of lands for afforestation and reforestation activities* (EB22, Annex 16)[6] are used to demonstrate the eligibility of lands for undertaking the project.

a) Demonstrate that the project activity is carried out on non-forest land:

Step 1: The images from the date close to the project start are geo-referenced and analyzed with a two-staged classification analysis using GIS analysis software specifically designed to process and interpret aerial photographs and satellite images (ArcView Image Analysis extension). The program uses the Iterative Self-Organizing Data Analysis (ISODATA) technique to categorize image data based on its spectral values. With the help of the program's built-in functionality three types of vegetation cover can be separated:

- bare pasture
- pasture with natural regeneration
- secondary forests

[6] http://cdm.unfccc.int/EB/Meetings/022/eb22_repan16.pdf

The satellite images and /or aerial photos from dates close to 1989 and 2003 (project start) demonstrate that the land has not been forested since 1989 (LandSat 2000 Quickbird 2004 instituto nicaraguense de estudios territoriales 1988 Therefore, the land is eligible for undertaking the project.

Step 2: The next step consists of reclassifying the vegetation classes (on pixel by pixel basis). Some pixels can have similar spectra, even if components may be very different, for instance shades can have a similar reflection as forest.

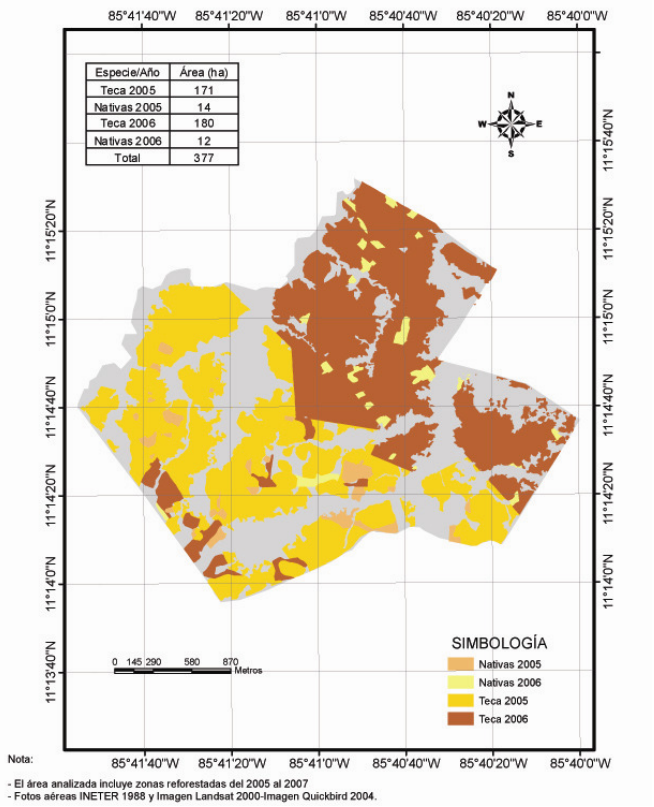
In order to obtain a conservative estimation of the eligible area, only the vegetation class that unambiguously shows the characteristics of non-forest, bare pasture, is considered eligible.

b) Demonstrate that the activity is a reforestation or afforestation activity:

In order to exclude areas that had not been non-forest in 1989, Steps 1 and 2 are repeated with the images taken in 1989.

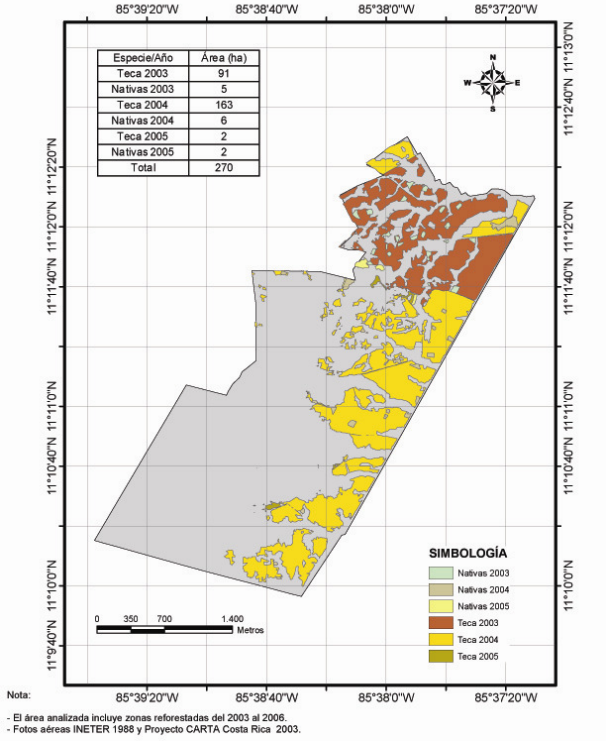
By overlaying the maps produced from the images from 1989 and the start date of the project, the eligible areas can be identified as those not reaching the parameters for crown cover and minimum height chosen by Nicaragua in both images. The following maps result for the three project areas. They include stratification of the species and planting time.

Áreas elegibles por año de plantación por especie para el Mecanismo de Desarrollo Limpio de la finca La Javalina, Análisis 1988-2004



Nota:
- El área analizada incluye zonas reforestadas del 2005 al 2007
- Fotos aéreas INETER 1988 y Imagen Landsat 2000-Imagen Quickbird 2004.

Áreas elegibles por año de plantación por especie para el Mecanismo de Desarrollo Limpio de la finca La Pimienta, Análisis 1988-2003



Nota:
- El área analizada incluye zonas reforestadas del 2003 al 2006.
- Fotos aéreas INETER 1988 y Proyecto CARTA Costa Rica 2003.

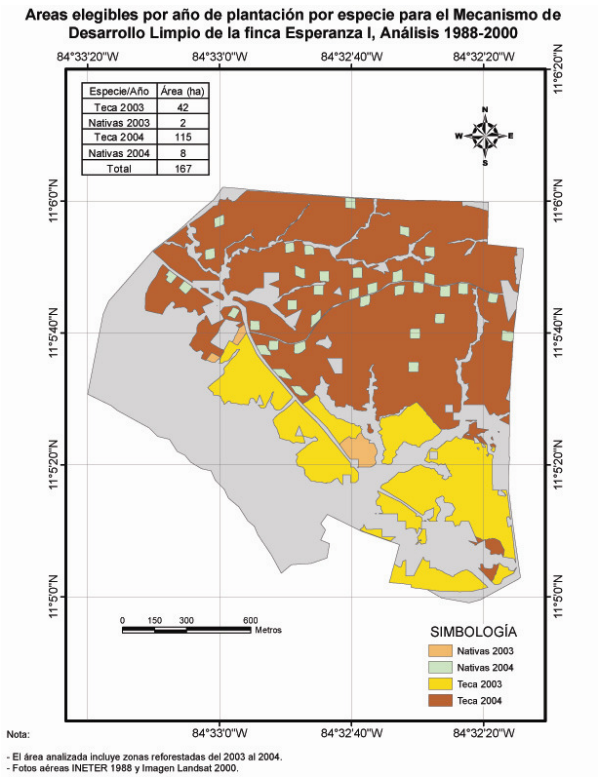


Figure 2: Stratified maps of the eligible areas. Grey areas are not eligible

A.8. Approach for addressing non-permanence:

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Please select between:

X Issuance of tCERs

Issuance of lCERs

The initial planting phase is distributed over four years at the start of the project and subsequent plantings take place as per the scheduled harvest regime. The different harvest regimes applied are: 18 years for about 2/3 of the teak and 30 years for the native tree species and 1/3 of the teak. After harvest, the sites will immediately be replanted. This distribution allows for a smoothing of the carbon sequestration curve, avoiding extreme peaks and minimums. The risk of natural fire is low. The forest management plan seeks to address the risk of fire.

A.9. Duration of the proposed small-scale A/R CDM project activity / Crediting period:

The project proposes to implement several planting and harvesting cycles and has no determined end of life. The fixed crediting period of 30 years is chosen for accounting GHG removals in the project.

A.9.1. Starting date of the proposed small-scale A/R CDM project activity and of the (first) crediting period, including a justification:

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The starting date of the project activity is **4 July, 2003**, when the purchase contract of the first project site was signed.

A.9.2. Expected operational lifetime of the proposed small-scale A/R CDM project activity:

The project is designed to cover several harvesting cycles and has no determined end of life. However, the operational lifetime of the project is 60 years, covering two full harvest cycles.

A.9.3. Choice of crediting period and related information:

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Please select one of the following:

1.	Renewable crediting period	☐
2.	Fixed Crediting period	X

A.9.3.1. Duration of the first crediting period (in years and months), if a renewable crediting period is selected:

N/A

A.9.3.2. Duration of the fixed crediting period (in years and months), if selected:

Duration of fixed crediting period is 30 years (30 years-00-months) from 4 July 2003 to 3 July 2033

A.10. Estimated amount of net anthropogenic GHG removals by sinks over the chosen crediting period:

Table 4: Estimated net anthropogenic GHG removals by sinks during the crediting period.

Years	Annual estimation of net anthropogenic GHG removals by sinks in tonnes of CO_2 e
2003	975
2004	4274
2005	10022
2006	18280
2007	26092
2008	31705
2009	33616
2010	22156
2011	10389
2012	19393

2013	7617
2014	9391
2015	15054
2016	13857
2017	27494
2018	29092
2019	17463
2020	-25788
2021	-68734
2022	-39967
2023	-34571
2024	19579
2025	24196
2026	26245
2027	26219
2028	16657
2029	7760
2030	13431
2031	2532
2032	-26980
Total estimated net anthropogenic GHG removals by sinks (tonnes of CO_2 e)	**237'448**
Total number of crediting years	**30**
Annual average over the crediting period of estimated net anthropogenic GHG removals by sinks (tonnes of CO_2e)	**7'915**

A.11. Public funding of the proposed small-scale A/R CDM project activity:

This project does not receive public funding.

A.12. Confirmation that the small-scale A/R CDM project activity is not a debundled component of a larger project activity:

This small-scale A/R CDM project activity is implemented in three locations. Together their net anthropogenic GHG removals by sinks do not exceed the small-scale limit of 16’000 t CO2e per year. There are no other small-scale projects of the same project participants that will be registered within two years, nor that are located within 1 km of the project boundary of the proposed A/R activity. Therefore it is not part of a debundled large scale project as defined in the Appendix C of the Decision 6/CMP.1.

SECTION B. Application of a baseline and monitoring methodology :

B.1. Title and reference of the approved baseline and monitoring methodology applied to the proposed small-scale A/R CDM project activity:

The project will use the UNFCCC approved methodology "Simplified Baseline and Monitoring Methodologies for Selected Small-Scale Afforestation and Reforestation Project Activities under the Clean Development Mechanism Implemented on Grasslands or Croplands" (AR-AMS0001/Version 5).

B. 2. Justification of the applicability of the baseline and monitoring methodology to the proposed small-scale A/R CDM project activity:

The project activity complies with the following applicability conditions of the methodology.

Small scale A/R eligibility

- The project will sequester less than 16,000 tonnes of CO_2e per year and therefore is considered a small-scale A/R project.

Applicability conditions of AR-AMS0001

- Project activities are implemented on grasslands
- There were no crops planted on the land in question, so less than 50% cropland was displaced
- The number of displaced grazing animals is less than 50% of the average grazing capacity of the project area:
  The total grazing capacity of the three fincas is calculated for the total area including the shrubland that has been conservatively excluded for the CER calculation. This shrubland is also heavily grazed because there is no dense vegetation that would prevent the cattle from grazing. It is fully used as pasture. If we look at the number of heads, we have to take this land into account. If we look at each plot separately we get the following picture:

  - On finca Javalina, all animals were brought directly to the slaughterhouse. No displacement to other areas took place.
  - The owner of Pimienta had about 300 cows. 70%, about 210 were displaced to other areas.
  - On finca Esperanza, all animals, 85 in total, were displaced to the owner's other finca in this area.

  In total on all areas, 734 heads could be displaced to other areas. However, in total only 295 were displaced. Therefore, the methodology can be applied. [7]
  These facts have been confirmed in interviews 6 years after the project start. The DOE talked directly to the former owner of Javalina and the others were confirmed in a written questionnaire.

- Less than 10% of the grasslands are ploughed before plantation. The respective maps can be found in the annex.

[7] Even if we look only at eligible areas, the number of displaced animals is less than 50 of the max. GC. 50% of the max. grazing capacity of 810 hectares is 358.

B.3. Specification of the greenhouse gases (GHG) whose emissions will be part of the proposed small-scale A/R CDM project activity:

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The project emissions from the use of fertilizers will result from a one-time use of bokashi, an organic fertilizer based on locally sourced chicken manure during the planting. The amount is approximately 278 kg fertilizer per ha with a nitrogen content of 2.9% which leads to an emission of 177 t CO2e over the entire project lifetime. This represents less then 10% of the estimated GHG removal by sinks. As per paragraph 47 of the methodology, the emissions from organic fertilizer use are insignificant, and therefore are not accounted in the calculations of actual net GHG removals by sinks.

B.4. Carbon pools selected:

The following carbon pools have been selected:

Table 5: Selected Carbon Pools

Carbon pools	Selected (answer with yes or no)
Above ground	Yes
Below ground	Yes
Dead wood	No
Litter	No
Soil organic carbon	No

B.5. Description of strata applied for ex ante estimations:

Two types of species will be planted during four years. The teak stand model can be further divided into two categories based on the harvest regime, i.e., (1) teak harvested at 30 years and (2) teak harvested at 18 years. These categories are used for stratification.

- Stratum 1 - Area planted with teak for harvesting at 30 years
- Stratum 2 - Area planted with teak for harvesting at 18 years
- Stratum 3 - Area planted with native tree species

For the project scenario, the project area of 813 ha is stratified according to species / species group and sub-stratified according the planting year. The strata are included in the maps of eligible areas, found in chapter A.7. The two teak strata can only be used for the ex-ante estimation of carbon sequestration but, they cannot be allocated to specific areas because the detailed harvest plan will be developed only in a later phase of the project. Therefore the maps show the two species strata and the planting year sub-strata.

Table 6: Description of Strata

	Planting year				
Planted species:	**2003**	**2004**	**2005**	**2006**	**Total**
Teak	133	278	173	180	**764**
30 years(ha)	*44*	*92*	*57*	*59*	
18 years (ha)	*89*	*186*	*116*	*121*	
Native species (ha)	7	14	16	12	**49**

Total (ha)	**140**	**292**	**189**	**192**	**813**

B.6. Application of baseline methodology to the proposed small-scale A/R CDM project activity:

i) The most likely baseline scenario of the small-scale A/R CDM project activity is considered to be grasslands, the land-use prior to the implementation of the project activity:

The areas selected for reforestation correspond to pastureland/grassland and were subjected to extensive grazing prior to the project.

Considering the pressures of grazing and fires, it is unlikely that a permanent forest cover would be established under the baseline scenario. This assumption is based on the following facts:

a) Prevailing land use
Land generally represents by far the most significant share of the total household assets of landowners[8] and the land prices are high relative to household incomes. As a consequence lands are put into some form of use. Due to the high pressure on land for grazing and agricultural use, the occurrence of natural regeneration in the region is generally a consequence of temporary lack of working capital than sign of permanent abandonment.

b) Use of fire
During the pronounced dry season, fire as land clearing tool is a widespread practice in the project region. Fire is used to clean the pastures from dried and unpalatable grass stands, activate nutrients and promote the re-growth in the rain season. Because working capital is scarce, fire is generally the only input applied to enhance growth of pastures. From 1999-2003 in research carried out with satellite monitoring in Nicaragua between 4000 and 6000 fires have been detected every year with an increasing tendency[9].

Due to the practice of burning the pastures before the raining season, the woody perennials are scarce or largely absent in the baseline. Considering this prevailing land use practice, it is very unlikely that in the absence of the project activity, long term natural regeneration would determine the future land cover.

Since the status of grassland is similar across all land parcels included in the project the whole project area is stratified under one baseline stratum.

ii) Changes in the carbon stocks in the living biomass of woody perennials and the belowground biomass of grasslands are expected not to exceed 10% of ex-ante actual net GHG removals by sinks. The changes in carbon stocks can therefore assumed to be zero in the absence of the project activity:

[8] Deininger K., Chamorro S. (2002): Investment and income effects of land regularization: The case of Nicaragua. World Bank Policy Research Working Paper 2752.

[9] Mejía S. et al. (2004): Application of low resolution satellite data for the detection and monitoring of fire in Nicaragua.

Only the areas without signs of natural regeneration in both reference points 1989 and 2003 have been selected for the project activity. Given this long history of the bare pasture condition the potential changes in the living biomass is unlikely to exceed 10% of the *ex-ante* GHG removal.

Thus, the changes in carbon stocks in the absence of the project activity can be assumed to be zero and the baseline constant.

According to AR-AMS0001 Version.5 II.6.a), the changes in stocks are:

$$\Delta C_{BSL,t} = (B_{(t)} - B_{(t-1)})*(44/12) = 0 \qquad (1)$$

For the calculation of grassland baseline the net changes in the carbon stocks are considered zero. Although there is grass growing on all pastures, it is not regarded as perennial in Nicaragua due to the common practice of completely burning the pastures before the raining season.

If the isolated pre-existing mature trees on the pastures were counted to the baseline, the biomass would be increasing due to tree growth. Instead of taking them into account in the baseline calculations, they are excluded from the eligible project area as shown on the maps to facilitate the calculations.

Therefore, changes of carbon stocks in grasslands and of woody perennials under the baseline scenario are considered zero.

Table 1: Summary of baseline assumptions

Land Use	Actual changes in carbon stock of biomass	Baseline ; changes in carbon stock used for calculation	Comment
Grassland	Annually reduced to zero	0	Prevailing practise in the region is the use of fire. The grassland is burned annually.
Woody perennials	<10%	0	Non-forest land is more valuable than forest or shrub land. Therefore the regular use of fire is widespread and natural regeneration very unlikely.

B.7. Description of how the actual net GHG removals by sinks are increased above those that would have occurred in the absence of the registered small-scale A/R CDM project activity:

Project scenario:
Reforestation is the only way of restoring a forest vegetation cover on the grassland in the project area. The planting of trees will lead to a gradual increase of carbon stocks. As part of management activity, thinning and harvesting are planned to be carried out at scheduled intervals. As the project activity involves multiple plantation years, management regimes and carbon pools, the CO2 sequestration curve is smoothed and over time a constant carbon stock is built up.

The project activity is subject to multiple barriers. As a consequence, implementation of project activity not as a CDM project activity is unlikely in the project scenario in the context of the barriers discussed in detail below.

Assessment of Additionality

The assessment of additionality is carried out using the steps of *Tool for the Demonstration and Assessment of Additionality in A/R CDM Project Activities* and guidance of the methodology Appendix B.

Step 0: Preliminary screening based on the starting date of the A/R project activity

Because reforestation project has a starting date after 31 December 1999 but before the date of its registration it has to be shown that the project start was after 31 December 1999. Evidence for this fact is the land purchasing contract of the first finca that was signed on the 4 July 2003 and officially registered on the 7 August 2003.

Additionally, evidence has to be provided that that the incentive from the planned sale of CERs was seriously considered in the decision to proceed with the project activity. There are two documents proving this fact.

1. Before starting the reforestation project in Nicaragua Precious Woods consulted the national Authorities, namely the "Oficina Nacional de Desarollo Limpio", the governmental Institution established for the Kyoto Mechanisms about the viability of registering a Nicaraguan CDM reforestation project. The decision taking process for starting this project is documented in Precious Woods' Annual report 2003, p.15[10]:
   "In February 2003 a delegation from Precious Woods visited various government ministries and non-governmental organizations to ascertain the position of the government and the authorities concerning privately funded projects, particularly in the forestry sector. The delegation also held talks with the Swiss Embassy and the coordinator of Swiss development aid. All parties stressed the urgent need for jobs in the private sector and emphasized how open Nicaragua is to new, private investments. Reforestation was considered to be a top a priority by all, regardless of their political persuasion. For PWCA the prospect of obtaining CO2 credits and the favourable implications of Nicaragua's recently approved Forestry Law are both important issues. Along with other benefits provided by the new law, companies carrying out reforestation are exempt from paying import duties and taxes on capital goods and half the income tax on earnings is waived. Moreover, the new forestry law guarantees plantation owners absolute freedom to decide when their trees should be harvested, whereas the harvesting of natural forests remains subject to strict rules and regulations."
2. In the purchasing contract of the first finca, la Pimienta it is stated: "*Declara la compradora (…) c) que para la compradora es elemento fundamental el obtener todos los derechos relativos a Certificados por Servicios Ambientales y derechos relacionados con los beneficios ambientales que genera una plantación forestal en el trópico*." In English: "The buyer declares that (...) for the buyer, it is fundamental to obtain all the rights regarding certificates from ecosystem services and rights regarding environmental benefits that are generated by a forest plantation in the tropics."

Step 1: Identification of alternative land use scenarios to the proposed A/R CDM project activity
Sub-step 1a: Identify credible alternative land use scenarios to the proposed CDM project activity

The alternative land use scenarios are, as described in B.6:

Scenario 1: Continuation of existing land use as pasture.

[10] http://www.preciouswoods.com/dmdocuments/pdf/GB_2003_E.pdf.

Scenario 2: Implementation of the reforestation project activity not undertaken as a CDM project activity.

There are no legal requirements to reforest the area and so far there have been no reforestation activities in this region of Nicaragua.

Sub-step 1b. Consistency of credible land use scenarios with enforced mandatory applicable laws and regulations

Both scenarios comply with national laws and regulations. Use of the land as pasture is common practice in the region and the main source of income for many rural communities.

Sub-step 1c. Selection of the baseline scenario:

The baseline scenario is continuation of existing land use as described in section B.6.

Step 3: Barrier analysis
Sub-step 3a Identify barriers that would prevent the implementation of type of the proposed project activity:

As per Appendix B of the methodology the barriers considered to demonstrate project additionality are outlined below.

Investment barriers

Large sovereign risk translates to high risk premiums which in turn deter capital flows in long term investments such as plantations. The country risk combined with high incidence of natural disasters contributes to a high financing barrier, not to mention additional risks associated with the CDM process and planting trees, which are not acceptable to commercial investors. The Republic of Nicaragua is still the second poorest country of Latin America after Haiti. Nicaragua's poor investment climate is reflected in the current Moody's country risk rating of Caa1: "Obligations rated Caa1 are judged to be of poor standing and are subject to very high credit risk, and have "extremely poor credit quality…may be in default." This poor credit rating deters potential investors and reflects the poor economic conditions and lack of investment climate, which are also documented in the World Bank's "Country Partnership Strategy" (CPS)[11], which is the World Bank's main assistance strategy for a country, as well as its "Nicaragua Country Brief"[12].

The frequent natural hazards and the poor ratings of the country indicate that no private capital was available from domestic or international capital markets due to real or perceived risks associated with investment in Nicaragua.

→ The above barriers constrain the occurrence of the project scenario and do not prevent the continuation of the prevailing practices prior to the project (baseline scenario)

[11] http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/LACEXT/NICARAGUAEXTN/0,,contentMDK:20214837~pagePK:1497618~piPK:217854~theSitePK:258689,00.html
[12] http://siteresources.worldbank.org/INTNICARAGUAINSPANISH/Resources/FinalCPS_Post-Board_.pdf

Technical barriers[13]

- Lack of technical know how with regard to timber plantation establishment and maintenance
- Qualified personnel and examples of success are scarce
- Very little experience exists in Nicaragua in producing tropical quality wood via reforestation

Evidences for these technical barriers are documented in the national report of Nicaragua published in 2004 by the FAO and the "ministerio agropecuario y forestal (MAGFOR). The report describes the difficult situation for reforestation projects in Nicaragua.

→. The above barriers constrain the occurrence of the project scenario and do not prevent the continuation of the prevailing practices prior to the project (baseline scenario)

Barriers due to prevailing practice

→ The above barriers constrain the occurrence of the project scenario and do not prevent the continuation of the prevailing practices prior to the project (baseline scenario).

Barriers due to social conditions

- Nicaragua's recent history is characterised by social instability with far-reaching changes. Although the situation tended to stabilize in recent years, the record of improvement is short and progress cannot be taken for granted.[14]
- Precious Woods has operated so far in comparatively stable countries. No experience with the political, social, economic and legal climate in Nicaragua or other comparable countries existed before project start.

→ *Plantations are more dependent on long-term stability than cattle breeding. For a plantation, at least 18 years without disturbance are indispensible* The above barriers constrain the occurrence of the project scenario and do not prevent the continuation of the prevailing practices prior to the project (baseline scenario).

The mentioned barriers prevent the project from being implemented. Without the CDM incentives, it is unlikely that Precious Woods would have decided to start a reforestation preoject in Nicaragua

The historical plantation rate in Nicaragua is estimated at about 3500-4000 ha per year (including energy wood). The area suitable for reforestation is estimated at 2.5 Million ha. Most of the reforestations established in the past have been done with the assistance of international development organizations. Privately financed reforestations have been carried out occasionally by a few individual parties. The rate of success for past reforestations is reported to be very low and many plantations were poorly maintained, abandoned or re-converted to agricultural land[15, 16, 17]. In spite of a trend to increasing

[13] Guevara, M. (2004): Informe Nacional Nicaragua, FAO and Ministerio agropecuario y forestal, chapter 2.5

[14] Guevara, M. (2004): Informe Nacional Nicaragua, FAO and Ministerio agropecuario y forestal, chapter 2.3

[15] Viteri J.A., Rodríguez, J (2002) Proyecto Bosques y Cambio Climático. CCAD / FAO. Estudio del Potencial de Mitigación del sector Forestal de Nicaragua para el Cambio Climático. Diciembre, 2002. Managua, Nicaragua.FAO

[16] Frühling P. (2000): When Development Projects go Orphan. Lessons from 20 years of Swedish forestry support to Nicaragua. Sida Evaluation 00/34. Swedish Department of Natural Resources

regulatory and institutional stability in Nicaragua and the recent creation of a new modern forest law it is not likely that the project activity would be carried out without additional incentives.

B.8. Application of monitoring methodology and monitoring plan to the small-scale A/R CDM project activity:

B.8.1. Data to be monitored: Monitoring of the actual net GHG removals by sinks and leakage.

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A. Ex post estimation of the baseline net GHG removals by sinks

In accordance with paragraph 6 of Appendix B to decision 6/CMP1, no monitoring of the baseline is necessary. For this project, in accordance with decision 6 / CMP1, it is assumed that the baseline will be constant throughout the crediting period, and equal to the values estimated based on the formulae shown in B.3.2.

B. Ex post estimation of the actual net GHG removals by sinks

1. Stratification

The project area is stratified. Parameters for initial stratification are tree species (native species and teak) and planting year (2003 to 2006).

In year 4 after plantation the stratification is refined with strata that represent the growth conditions. These are mapped based on a grid of geo-referenced systematically distributed circular temporary sample plots of 100 m2 with a distance of 50 m between every plot. In each plot diameter at breast height (DBH) of every tree is measured. With an allometric formula total volume of the tree is calculated as a function of DBH. The average volume of each plot is then assigned to a growth class. With the help of a GIS computer program with interpolation functionality a growth map with homogeneous growth conditions is produced.

The final stratification thus separates

1. tree species /species group
2. planting year
3. growth class

2. Calculation of the number of sample plots

Sample frame and sample size For the determination of the number of sample plot per stratum the Metholodical Tool ***"Calculation of the number of sample plots for measurements within A/R CDM project activities" (Version 02) is used.***

To calculate the number of permanent sample plots used for monitoring the formula of method II (samples drawn with replacement) of this tool are used. The number of plots per stratum is determined

[17] Guevara, M. (2004): Informe Nacional Nicaragua, FAO and Ministerio agropecuario y forestal

according to a targeted precision level of ±10 % of the mean at a 95% confidence level. The standard deviation within each stratum is derived from the data underlying the growth map.

The calculations are made for each stratum individually. An example of input and output values for Finca La Pimienta, species Teak, plantation year 2003 is given below:

Species (Stratum)	Plantation Year (Stratum)	Growth Category (Stratum)	Average Volume (m3)	Standard Deviation	Coefficient of Variation (%)
Teak	2003	Marginal	0.0257	0.0200	0.7797
Teak	2003	Poor	0.0531	0.0231	0.4356
Teak	2003	Average	0.0698	0.0255	0.3660
Teak	2003	High	0.0917	0.0266	0.2899
Teak	2003	Excellent	0.1178	0.0307	0.2611

Plot Quantity - Aboveground biomass

Enter values into the green cells. Use the "Tab" or "Enter" key to jump to the next green cell.

REQUIRED ERROR AND CONFIDENCE LEVEL		
e - level of error (%)	5.0%	
Error (decimal)	0.05	
Z(1-a) - Confidence level	95.0%	
Sample statistic Z(1-a)	1.96	
Total project area size	99.013	hectares

SIZE AND VARIANCE OF EACH STRATA

Strata Name	Area (ha)	Mean C/ha (tonnes)	Error	Coefficient of Variation %	Variance (tonnes C/ha)
Marginal	56.563	0.025681553	0.001284078	77.96883979	0.000400945
Pobre	19.29	0.053098	0.0026549	43.5603897	0.000534983
Promedio	8.193	0.069790244	0.003489512	36.59611071	0.000652318
Alto	9.531	0.091671429	0.004583571	28.98672897	0.0007061
Excelente	5.436	0.1177625	0.005888125	26.10943416	0.000945386
Strata 6	0	0	0	0	0
Strata 7	0	0	0	0	0
Strata 8	0	0	0	0	0
Strata 9	0	0	0	0	0
Strata 10	0	0	0	0	0

GoTo Next

INTERMEDIATE CALCULATIONS		
Total Area	99.013	hectares
Weighted Mean C	0.046080362	tonnes/ha
Weighted Error	0.002304018	
Weighted SD	2.208424995	
Weighted Total Variance	0.050211865	
Total Sample Size	76.49349913	

TOTAL PLOT QUANTITY - ABOVEGROUND BIOMASS

STRATA NAME	Plot Quantity	Rounded Plot Quantity
Marginal	39.22985208	40
Pobre	15.45411078	16
Promedio	7.247938132	8
Alto	8.772301557	9
Excelente	5.789296581	6
Strata 6	0	0
Strata 7	0	0
Strata 8	0	0
Strata 9	0	0
Strata 10	0	0
TOTAL NUMBER OF PLOTS		79

Sample plot size

The area of the permanent sample plots AP is 500 m2, the plots are circular.

Permanent sample plot location

The plots are located systematically with a random start prior to establishment with the GIS program, geo-referenced and marked in the field. Series number, stratum and GPS coordinates are registered in a database.

Calculation of Carbon Stocks

The carbon stocks expressed in tCO2-e shall be based on the following equations:

$$P_{(t)} = \sum_{i=1}^{I} (P_{A(t)\,i} + P_{B(t)\,i}) * A_i * (44/12) \quad (3)$$

where:

$P_{(t)}$	carbon stocks within project boundary at time t achieved by the project activity (tCO_2e)
$P_{A(t)\,I}$	carbon stocks in above-ground biomass at time t of stratum i achieved by the project activity during the monitoring interval (t C/ha)
$P_{B(t)\,i}$	carbon stocks in below-ground biomass at time t of stratum i achieved by the project activity during the monitoring interval (t C/ha)
A_i	project activity area of stratum i (ha)
i	stratum i (I= total number of strata)

The calculations shown below will be performed for each stratum.

For above-ground biomass

$P_{A(t)}$ is calculated per stratum i as follows:

$$P_{A(t)} = E_{(t)i} * 0.5 \quad (4)$$

where:

$P_{A(t)}$	carbon stocks in above-ground biomass at time t achieved by the project activity during the monitoring interval (t C/ha)
$E_{(t)i}$	estimate of above-ground biomass at time t achieved by the project activity (t dm/ha)
0.5	carbon fraction of dry matter (t C/t dm) - IPCC default value / AR-AMS0001

$E_{(t)}$ shall be estimated through the following steps:

Measurement of above-ground biomass

a) Measurement of the diameter at breast height
Diameters at breast height (DPH) of all trees in the sample plot are measured.

b) Calculation of the tree biomass

Above-ground biomass

The aboveground tree biomass (kg of dry matter per tree) is determined with the allometric equations relating biomass to DBH given in GPG LULUCF Table 4.A.1 for native species in tropical moist forests and Table 4.A.3 for Teak. The value for teak has been determined in this region by Kanninen and Perez

at CATIE, Costa Rica[18]. The value for native species is a general value for tropical moist forest because there are no specific values for most of the species. The results are multiplied with the number of trees per hectare to obtain kg of dry matter per hectare.

For teak:	$AGB_{(t)teak}$	$= 0.153*DBH^{2.382}$	(5)
For native species:	$AGB_{(t)\ native}$	$= \exp[-2.289 + 2.649*\ln(DBH) - 0.021 \bullet (\ln(DBH))^2]$	(6)
Biomass per hectare	$E_{(t)i}$	$= AGB_{(t)i} * NT_i$	(7)

DBH diameter at breast height
NT number of trees per hectare

c) Calculation of Below-ground biomass

Below-ground carbon stocks per hectare are determined by the allometric equation for teak respectively native species relating belowground biomass to aboveground biomass in tropical forests (GPG LULUCF Table 4.A.4) as follows:

P_B	$= 0.5* BGB_i$	(8)
BGB	$= \exp[-1.085+0.9256*\ln AGB]$	(9)

Where:

E_B estimated below ground biomass per tree
0.5 carbon fraction of dry matter (t C/t dm) (IPCC default value / AR-AMS0001)

C. Ex post estimation of project emissions

The methodology requires to calculate ex-post project emissions if "the use of fertilizers would result in significant emissions of N2O (>10 per cent of the actual net greenhouse gas removals by sinks)". This is assessed by using the AR methodological tool: "Estimation of direct nitrous oxide emission from nitrogen fertilization" to ensure that project emissions represent less than 10 per cent of the actual net greenhouse gas removals by sinks. The greenhouse gas emissions from the one-time fertilizer use during the first year of planting are less then 1% of total GHG removals. In accordance the methodology, these emissions will not be monitored.

D. Ex-post estimation of leakage

As defined in the methodology, leakage is considered to be zero and does not need monitoring if evidence can be provided that the activity shift of the previous owners does not lead to deforestation or if the lands surrounding the areas that receive the activity shift are not forested.

As shown in chapter A 5.6, leakage was considered unlikely at project start. The three different project sites had three previous owners, all of them cattle farmers. At project start, interviews with them were conducted. In order to obtain more detailed information on the current status, a second interview was conducted in 2009. These interviews took place during the validation process and have been inserted in version 2 of the PDD. The goal was to evaluate their future plans regarding location and businesses. The following table summarizes the outcome of these interviews.

[18] Pérez and Kanninen, 2003; Aboveground biomass of *Tectona grandis* plantations in Costa Rica; .J Trop For 15(1) pp. 199-213.

Table 7: Summary of the interviews with previous owners

Site	Previous owner	New planned occupation	Assessment of leakage
Finca Pimienta	Salvador Monterrey	Cattle farming	Mr. Monterrey possessed roughly 300 animals on his lands. 70% were displaced to his other finca, the rest was brought to the slaughterhouse. Mr. Monterrey moved the animals that were not slaughtered to his finca in Nandaime, a region along the Pan-American highway that has been deforested long ago and is traditionally and currently used for grazing. All the lands were already deforested at the time of displacement and used by Mr. Monterrey for cattle farming. No deforestation took place. He already owned this finca before project start. The displacement of the animals to that area did not and will not lead to deforestation. No leakage due to deforestation occurs.
Finca Javalina	Henry Urcuyo	Cattle farming/ Tourism	Mr. Urcuyo still lives in the same area.. As stated in the interview at the site visit of the DOE, all his cattle was brought to the slaughterhouse and was not displaced to another area..He continues being a cattle farmer in the same area but also has other business activities.
Finca Esperanza	Antonio Mendoza	Transport services and some agriculture	Mr. Mendoza stays in the same region. He owned 85 cows. In the second interview which took place in 2009, he stated that he had bought a new finca which was already deforested and used as pasture at that time. All the animals were displaced to this new finca.

According to the interviews it becomes clear that some animals were dislocated to other areas. The previous owners of the fincas reinvested the money they earned from the sale of their properties into new businesses or other lands. Two of them stay in the same areas. The third one displaced his activities from Rivas to Nandaime where he already possessed farmland before he sold the finca Pimienta. The animals themselves were often not displaced to other grazing areas but to the slaughterhouse. All potential receiving areas of Nicaragua are already deforested and generally used as pasture which makes leakage due to deforestation highly unlikely.

E. Ex-post estimation of the net anthropogenic GHG removals by sinks

The resulting tCERs at the year of verification *tv* are calculated as follows

for the first crediting period:

$$ER_{,t} = \Delta C_{PROJ,\,t} - \Delta C_{BSL,\,t} - GHG_{PROJ,(t)} - Lt \quad (10)$$

Where:

$ER_{ARCDM,t}$	Total emission reduction by the project (t CO_2e/ year)
$\Delta_{CBSL,t}$	baseline net GHG removals by sinks (t CO_2e/ year)
$\Delta C_{PROJ,}$	project GHG removals by sinks at time t (t CO_2e/ year)
$GHG_{PROJ,(t)}$	project emissions from use of fertilizers (t CO_2e/ year)
Lt	total GHG emission due to leakage at the time t (t CO_2e)

for subsequent crediting periods L_t= 0

$$tCER(tv) = \sum_{t=0}^{tv} ER_{ARCDM,t} * \Delta t \quad (11)$$

F. Monitoring Frequency

The monitoring frequency is defined in chapter B.8.1.1.1.

G. Data Storage

All monitored data will be archived electronically and in printouts. The data will be kept until two years after the end of the crediting period.

B.8.1.1. Actual net GHG removals by sinks data:

B.8.1.1.1. Data to be collected or used in order to monitor the verifiable changes in carbon stock in the carbon pools within the project boundary resulting from the proposed small-scale A/R CDM project activity, and how this data will be archived:

>>

ID number	Data variable	Source of data	Data unit	Measured (m), calcu-lated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
V.1	*Stratum ID*	*Stratification map*	*Alpha numeric*		*Before the project start*	*100%*	*Electronic and paper*	*Each stratum has a particular combination of soil type, climate, existing vegetation and landform*
V.2	*Sub-stratum ID*	*Stratification map*	*Alpha numeric*		*Before the project start*	*100%*	*Electronic and paper*	*Each sub-stratum has a particular year to be planted under each stratum*
V.3	*Confidence level*		*%*		*Before the project start*	*100%*	*Electronic and paper*	*95% for the purpose of QA/QC and measuring and monitoring precision control*
V.4	*Precision level*		*%*		*Before the project start*	*100%*	*Electronic and paper*	*5% for the purpose of QA/QC and measuring and monitoring precision control*
V.5	*Standard deviation of each stratum*			*e*	*Before the project start*	*100%*	*Electronic and paper*	*Used for estimating numbers of sample plots of each stratum and substratum*
V.6	*Number of sample plot*			*e*	*Before the project start*	*100%*	*Electronic and paper*	*For each stratum and substratum, calculated from V.3-V.5*
V.7	*Sample plot ID*	*Project and plot map*	*Alpha numeric*		*Before the project start*	*100%*	*Electronic and paper*	*Numeric series ID will be assigned to each permanent sample plot*
V.8	*Plot location*	*Project and plot map and GPS locating*		*M*	*5 years*	*100%*	*Electronic and paper*	*Using GPS to locate before start of the project and at time of each field measurement*
V.9	*Tree species*	*Project design map*			*5 years*	*100%*	*Electronic and paper*	*Arranged in PDD*
V.10	*Age of plantation*	*Plot measurement*	*year*	*M*	*5 years*	*100% sampling plot*	*Electronic and paper*	*Counted since the planted year*
V.11	*Number of trees*	*Plot measurement*	*number*	M	*5 years*	100% *trees in plots*	*Electronic and paper*	*Counted in plot measurement*
V.12	*Diameter at breast height*	*Plot measurement*	cm	M	5years	*100% trees in plots*	*Electronic and paper*	*Measuring at each monitoring time per sampling method*

	(DBH)							
V.13	*Mean DBH*	*Calculated*	*cm*	C	*5 years*	*100% of sampling plots*	*Electronic and paper*	*Calculated via V.11 and V.12*
N/A	*Height of trees*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*The biomass is calculated with formula using as input parameter only DBH and not height of trees (formula 5, p. 24). Therefore it is not necessary to monitor this variable.*
N/A	*Basic wood density*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*The biomass is calculated with a formula using as input parameter only DBH and not basic wood density (formula 5, p. 24). Therefore it is not necessary to monitor this variable. The value for basic wood density itself that is used in the formula comes from existing published data and so monitoring is not required.*
V.14	*Above ground biomass*	*Calculated using equations (5)- (7)*	*$M_3.ha^{-1}$*	*c/m*	*5 years*	*100% of sampling plots*	*Electronic and paper*	*Calculated using equation (5) to (7) via V.13*
V.15	*Carbon fraction*	*IPCC or direct measuring*	*t C.(t d.m)$^{-1}$*	E	*Before the first monitoring event*	*100% of species*	*Electronic and paper*	*IPCC default value or direct measuring*
V.16	*Carbon stock in above-ground biomass of plots*	*Calculated from equation*	*t C ha^{-1}*	*C*	*5 year*	*100% of Sampling plots*	*Electronic and paper*	*Calculated using equation (4) via V14 and V15*
V.17	*Carbon stock in below-ground biomass of plots*	*Calculated from equation*	*t C ha^{-1}*	C	5 years	*100% of sampling plots*	*Electronic and paper*	*Calculated using equations ((8) and (9) via V.14 and V.15*
V.18	*Mean Carbon stock in above-ground biomass per stratum per species*	*Calculated from plot data*	*t C ha^{-1}*	*c*	*5 years*	*100% of strata and sub-strata*	*Electronic and paper*	*Calculated from V.11 to V.16*
V.19	*Mean Carbon*	*Calculated*	*t C ha^{-1}*	*C*	*5 years*	*100% of*	*Electronic and paper*	*Calculated from V.18*

	stock in belowground biomass per stratum per species	*from plot data*				*strata and sub-strata*		
V.20	*Area of stratum and sub-stratum*	*Stratification map and data*	*ha*	*M*	*5 years*	*100% of strata and sub-strata*	*Electronic and paper*	*Actual area of each stratum and substratum*
V.21	*Project boundary*	*Project map and GPS locating*		*M*	*5 years*	*100%*	*Electronic and paper*	*Using GPS to verify the boundary before start of the project and at time of each field measurement*
	Total carbon stock change	*Calculated using equation (4)*	*t CO_2-e yr^{-1}*	*C*	*5 year*	*100% project area*	*Electronic and paper*	*Summing up carbon stock change in V.19 and V.20for all strata, sub-strata and tree species*

B.8.1.2. Data for monitoring of leakage (if applicable)

B.8.1.2.1. If applicable, please describe the data and information that will be collected in order to monitor leakage of the proposed small-scale A/R CDM project activity

As described in chapter B.8.1.D, leakage is expected to be zero and does not need monitoring.

B.8.2. Describe briefly the proposed quality control (QC) and quality assurance (QA) procedures that will be applied to monitor actual GHG removals by sinks:

To ensure the net anthropogenic GHG removals by sinks to be measured and monitored precisely, credibly, verifiably and transparently, a quality assurance and quality control (QA/QC) procedure will be implemented,

a) Reliable field measurements
To ensure the reliable field measurements,

Standard Operating Procedures (SOPs) for each step of the field measurements, including all detail phases of the field measurements and provisions of documentation for verification purposes are proposed in this document and they will be adjusted periodically.

- Training courses on the field data collection and data analyses will be held for persons involving in the field measurement works. The training courses will ensure that each field-team members is fully aware of all procedures and the importance of collecting data as accurately as possible.

b) Verification of field data collection
To verify that plots have been installed and the measurements taken correctly,
- Randomly selected plots will be re-measured by teams other than those involved in the prior plot measurements
- Key re-measurement elements include the location of plots, DBH and tree height.
- The re-measurement data will be compared with the original measurement data. Errors assessed in the prior measurements will be corrected and recorded and would be used to calculate the measurement error.

c) Verification of data entry and analysis
To minimize the possible errors in the process of data entry, the entry of both field data and laboratory data will be reviewed by an independent expert team and compared with independent data to ensure that the data are realistic. Communication between all personnel involved in measuring and analyzing data will be used to resolve any apparent anomalies before the final analysis of the monitoring data is completed.

d) Data maintenance and archiving
Data archiving will take both electronic and paper forms, and copies of all data will be provided to each project participant. All electronic data and reports will also be copied on durable media such as CDs and copies of the CDs are stored in multiple locations. The archives include:

- Copies of all original field measurement data, laboratory data, data analysis spreadsheet;

- Estimates of the carbon stock changes in all pools and non-CO2 GHG and corresponding calculation spreadsheets;
- GIS products;

All the media will be stored at least 5 years after verification.

Table 8: Quality Control and Quality Assurance

Data	Uncertainty level of data (High/ Medium/ Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
Project area and project boundaries	low	Random plot verification using GPS to ensure the consistent measuring
Size of the areas for each type of strata	low	Random plot verification using GPS to ensure the consistent measuring Random Verification over the project area to ensure the area of each tree species is correctly measured
Plot location	low	Detailed thinning protocols, random Verification over the project area
Diameter at breast height (DBH)	low	Measures to ensure reliable collection of data include, use of standard procedures in the field, training of field teams, checking the plausibility of the values during processing of the data and re-measurement of doubtful data.
Total CO2	low	Use of default values

B.8.3. Please describe briefly the operational and management structure(s) that the project operator will implement in order to monitor actual GHG removals by sinks by the proposed small-scale A/R CDM project activity:

>

The monitoring will be carried out by a trained team, lead by the director of research of Precious Woods Central America. The team will include personnel trained in measurement of biomass, GPS technology, and data processing. In addition to the periodic verification of carbon stocks by the DOE, Precious Woods reports its financial results according to IAS 41, which requires measurement and valuation of biological assets on an annual basis. The combination of financial and carbon accounting, and the external verification of both, will guarantee for reliable and transparent monitoring results.

B.9. Date of completion of the baseline study and the name of person(s)/entity(ies) determining the baseline and the monitoring methodology:

Data of completion of baseline study and monitoring methodology: December 16th 2008

The baseline study has been completed by the following people: Manuela Gaehwiler, Jaime Mendoza, Francisco Matamoros, and Adrian Delgado. They are all part of the Precious Woods Nicaragua project team.

SECTION C. Estimation of ex ante net anthropogenic GHG removals by sinks:

C. 1. Estimated baseline net GHG removals by sinks:

>> The baseline scenario is pasture without woody stands and no significant biomass increase. The baseline is considered to be stable and does not need to be monitored for the reasons explained in section B.6.

C. 2. Estimate of the actual net GHG removals by sinks:

>>

The stocks of carbon for the project scenario at the starting date of the project activity (t=0) is the same as the baseline stocks of carbon at the starting date of the project (t=0). For this project, it will be equal to the baseline carbon stocks ($B_{(0)}$ as specified in Section B.3.2). Therefore,

$$N_{(t=0)} = B_{(t=0)} = 0 \quad (13)$$

For all other years, the carbon stocks within the project boundary at time "t", N(t) shall be calculated as follows:

$$N_{(t)} = \sum_{I}(N_{A(t)} + N_{B(t)}) * A_i \quad (14)$$

$$N_{A(t)i} = T_{(t)i} * 0.5 \quad (15)$$

$$N_{B(t)} = \exp[-1.085+0.9256*\ln T_{nat}] \quad (16)$$

$$T_{(t)nat} = NT_t * EXP(-2.289+2.649*LN(DBH_{(t)})-0.021*LN(DBH_{(t)})^2) \quad (17)$$

$$T_{(t)teak} = NT_t * 0.153*DBH_{(t)}^2.382 \quad (18)$$

Where:

$N_{(t)}$	total carbon stocks in biomass at time t under the project scenario (t C/ha)
$N_{A(t)i}$	carbon stocks in above-ground biomass at time t of stratum i under the project scenario (t C/ha)
$N_{B(t)i}$	carbon stocks in below-ground biomass at time t of stratum i under the project scenario, IPCC GPG for LULUCF Table 3A.4. (t C/ha)
A_i	project activity area (ha)
$T_{(t)}$	Above-ground biomass at time "t" for teak and native species, under the project scenario, IPCC GPG LULUCF 4A1 and 3 (tdm/ha)
DBH_i	diameter at breast height (m^3/ha)
i	stratum
0.5	Carbon fraction of dry matter, IPCC default (tdm^{-1})

C. 3. Estimated leakage:

No leakage calculation is required as according to pre-project interviews, leakage is not expected to take place.

C. 4. The sum of C. 2. minus C.1. minus C.3. representing the net anthropogenic GHG removals by sinks of the proposed small-scale A/R CDM project activity:

>>

C.1.	C.2.	C.3.	Total
0	**215'730**	**0**	**215'730**

C. 5. Table providing values obtained when applying equations from the approved methodology:

The result of the application of equations from approved methodology above shall be indicated using the following tabular format:

Year	Estimation of baseline net GHG removals by sinks (tonnes of CO_2 e)	Estimation of actual net GHG removals by sinks (tonnes of CO_2 e)	Estimation of leakage (tonnes of CO_2 e)	Estimation of net anthropogenic GHG removals by sinks (tonnes of CO_2 e)
2003	-	975	-	975
2004	-	4274	-	4274
2005	-	10022	-	10022
2006	-	18280	-	18280
2007	-	26092	-	26092
2008	-	31705	-	31705
2009	-	33616	-	33616
2010	-	22156	-	22156
2011	-	10389	-	10389
2012	-	19393	-	19393
2013	-	7617	-	7617
2014	-	9391	-	9391
2015	-	15054	-	15054
2016	-	13857	-	13857
2017	-	27494	-	27494
2018	-	29092	-	29092
2019	-	17463	-	17463
2020	-	-25788	-	-25788
2021	-	-68734	-	-68734
2022	-	-39967	-	-39967
2023	-	-34571	-	-34571
2024	-	19579	-	19579
2025	-	24196	-	24196
2026	-	26245	-	26245
2027	-	26219	-	26219
2028	-	16657	-	16657
2029	-	7760	-	7760
2030	-	13431	-	13431
2031	-	2532	-	2532
2032	-	-26980	-	-26980
Total (tons of CO_2e)	-	**237'448**	-	**237'448**

SECTION D. Environmental impacts of the proposed small-scale A/R CDM project activity:

D.1. Provide analysis of the environmental impacts, including transboundary impacts (if any):

Generally, the environmental impact is positive. Although commercial plantations have less biodiversity than primary forest, the conditions for flora and fauna are much better than in grassland. The trees provide shade and shelter for animals and in the undergrowth, many different plant species can be found. The patches of groups of native trees and pre-existing native trees and the interlaced secondary forests form a mosaic and wildlife corridors which improve the connectivity of habitats of animals and plants.

However, two potentially negative impacts have been identified. They are both related to the use of teak:

a) Teak is a non-native tree species
b) The combination of the large leaves of teak and low undergrowth may lead to soil erosion.

Precious Woods has assessed both aspects and considers the real risks as very low:

a) Teak has been planted in Latin America since the beginning of the 20th Century and is, especially in comparison with other plantation species such as eucalyptus, considered non-invasive [4,5] as teak needs humidity as well as extremely high temperatures to germinate. These conditions cannot be obtained in the project region unless the reproduction takes place in artificially created conditions in nurseries and greenhouses.

b) If teak plantations are not managed carefully, erosion can occur because the large leaves collect water and concentrate its flow on the ground. This problem only occurs when the trees grow so densely that no underbrush or vegetation can develop. This will be prevented with regular thinning and pruning to ensure that the ground vegetation is always dense and diverse.

There are no transboundary impacts.

D.2. If any negative impact is considered significant by the project participants or the host Party, a statement that project participants have undertaken an environmental impact assessment, in accordance with the procedures required by the host Party, including conclusions and all references to support documentation:

An environmental impact assessment did not take place, as no significantly negative impacts are expected.

D.3. Description of planned monitoring and remedial measures to address significant impacts referred to in section D.2. above:

N/A

SECTION E. Socio-economic impacts of the proposed small-scale A/R CDM project activity:

E.1. Provide analysis of the socio-economic impacts, including transboundary impacts (if any):

The main socioeconomic impact of the project is related to the generation of employment opportunities for poor rural communities. The project generates jobs on a permanent basis as well as for seasonal tasks. The seasonal tasks such as planting, maintenance, harvest, and wood processing will be distributed over several years to offer work opportunities in a continuous and sustainable manner instead of concentrating all activities in one big operation. A special focus lies in the generation of employment for local women. The wages paid to workers will be above the local average wage and significantly above the minimal wage in Nicaragua. The project provides more job opportunities than the previous land use cattle farming. Before the project most people in the region relied on subsistence agriculture. Especially in Esperanza there were no job opportunities in the private sector; only a handful of people were employed in public services.

In addition to income and employment to local communities, the project provides training to improve the technical skills of staff and labor. Career opportunities are available for young local people from the project region; also higher positions are occupied with local staff as can be demonstrated with the example of Erasmo Roca who grew up in Cardenas, a local village. He started his career as a simple forester in the plantations of Precious Woods in Costa Rica and had now the possibility to return to his hometown. He is now responsible for the finca Pimienta.

Potential negative socio-economic impacts have been assessed as part of the FSC certification process. There are no negative impacts expected. The corresponding documentation will be made accessible to the DOE.

For this activity there are no socio-economic transboundary effects.

E.2. If any negative impact is considered significant by the project participants or the host Party, a statement that project participants have undertaken a socio-economic impact assessment, in accordance with the procedures required by the host Party, including conclusions and all references to support documentation:

N/A

E.3. Description of planned monitoring and remedial measures to address significant impacts referred to in section E.2. above:

N/A

SECTION F. Stakeholders' comments:

F. 1. Brief description of how comments by local stakeholders have been invited and compiled:

The project was presented to the stakeholders in a seminary co-organised by the DNA Nicaragua on October 12, 2005. To that presentation all local and relevant national stakeholders were invited. The list of invited persons and organizations was put together in cooperation with the DNA. The list of attending persons can be found in the Annex.

Besides the official stakeholder consultation, the project was visited by many local and national interested parties, including the president of Nicaragua and ministerial delegates who visited the project at an early stage of the project and showed their approval.

F. 2. Summary of the comments received:

>>

- A municipal council member expressed support for the project given the social benefits that the project provides.
- Cárdenas Deputy Mayor welcomed the project's social benefits and expressed concern about the low price of emission reductions.
- A member of the municipality of Cárdenas asked about the status of project endorsement to support its approval.

F. 3. Report on how due account was taken of any comments received:

The results of the public consultation indicated that no changes in project design were suggested.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROPOSED SMALL-SCALE A/R CDM PROJECT ACTIVITY

Organization:	Precious Woods Nicaragua S.A.
Street/P.O.Box:	P.O. Box 16
Building:	
City:	Rivas
State/Region:	Sapoa
Postfix/ZIP:	
Country:	Nicaragua
Telephone:	+50 5 837 00 56/+41 (0) 44 245 80 10
FAX:	+50 5 837 00 56
E-Mail:	office@preciouswoods.com
URL:	www.preciouswoods.com
Represented by:	
Title:	Manager/ Head of Ecoservices
Salutation:	Mr./Mr.
Last Name:	Mendoza/ Gminder
Middle Name:	
First Name:	Jaime/Carl Ulrich
Department:	
Mobile:	
Direct FAX:	+41 (0) 44 245 80 12
Direct tel:	+41 (0) 44 245 81 24
Personal E-Mail:	jaime.mendoza@preciouswoods.ni carl-ulrich.gminder@preciouswoods.com

Organization:	International Bank for Reconstruction and Development as Trustee of the Bio Carbon Fund
Street/P.O.Box:	1818H St
Building:	
City:	Washington, DC
State/Region:	District of Columbia
Postfix/ZIP:	20433
Country:	USA
Telephone:	202-458-1873
FAX:	202-522-7432
E-Mail:	IBRD-carbonfinance@worldbank.org
URL:	www.carbonfinance.org
Represented by:	Ms. Joelle Chassard
Title:	
Salutation:	Ms.
Last Name:	Joelle
Middle Name:	
First Name:	Chassard
Department:	Environment Department
Mobile:	
Direct FAX:	202-522-7432
Direct tel:	202-458-1873
Personal E-Mail:	IBRD-carbonfinance@worldbank.org

Organization:	Government of Canada-Ministry of Foreign Affairs and International Trade
Street/P.O.Box:	111 Sussex Drive
Building:	
City:	Ottawa
State/Region:	Ontario
Postfix/ZIP:	K1A 0G2
Country:	Canada
Telephone:	613-992-1505
FAX:	613-944-0064
E-Mail:	
URL:	http://www.international.gc.ca/enviro/index.aspx?lang=en
Represented by:	
Title:	Deputy Director
Salutation:	Mr.
Last Name:	Jeremy
Middle Name:	
First Name:	Wallace
Department:	Department of Foreign Affairs and International Trade Canada
Mobile:	
Direct FAX:	613-992-2229
Direct tel:	613-944-0064
Personal E-Mail:	Jeremy.Wallace@international.gc.ca

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding involved in this project

Annex 3

DECLARATION ON LOW-INCOME COMMUNITIES

Please provide a written declaration that the proposed small-scale afforestation or reforestation project activity under the CDM is developed or **implemented** by low-income communities and individuals as determined by the host Party.

The letter of approval issued by the designated national authority of Nicaragua states that this project is implemented by low-income communities as defined by the host party. The letter is attached below in English and Spanish.

Gobierno de Reconciliación y Unidad Nacional
El Pueblo, Presidente!

2010: AÑO DE LA SOLIDARIDAD!
Viva Nicaragua Libre!

Despacho de la Ministra

Managua, 16de Febrero del 2010
DM-JAS- 0225-02-10

Señor
Ronald Guerrero
Gerente General
Maderas Preciosas de Nicaragua
Su Despacho

Estimado Señor Guerrero:
Reciba Cordiales saludos de nuestra parte

Tengo el agrado de dirigirme a usted en ocasión de informarle que el Ministerio del Medio Ambiente y Recursos Naturales en su calidad de Autoridad Nacional Designada (DNA), representada por la Oficina Nacional de Desarrollo Limpio (ONDL) del Ministerio del Medio Ambiente y Recursos Naturales de Nicaragua, para atender al Protocolo de Kyoto, me ha solicitado otorgarle el aval gubernamental requerido para que el Proyecto de Reforestación MDL "Southern Nicaragua CDM Reforestation Project" de Maderas Preciosas Nicaragua S.A. / Precious Woods Nicaragua S.A. pueda reclamar reducciones certificadas de gases de efecto de invernadero que emanen del mismo.

El Gobierno de Nicaragua, habiendo firmado y ratificado el Protocolo de Kyoto y desgnado a la ONDL como Autoridad Nacional Designada, a traves de la presente aprueba la participación voluntaria de este proyecto para los propósitos del protocolo de Kyoto.

La ONDL después de examinar el Documento de Proyecto (PDD), del "Southern Nicaragua CDM Reforestation Project" de la empresa Maderas Preciosas Nicaragua S.A. / Precious Woods Nicaragua S.A. y de encontrar que el mismo contribuye al desarollo sostenible del pais, está implementada por personas con bajos ingresos y califica como proyecto de pequeña escala y se ajusta a la legislación nacional, se compromete a cooperar con los procesos que conllevan a la emisión y transferencia de las Reducciones Certificadas de Gases de Efecto de Invernadero.

PODER CIUDADANO
Nicaragua Tiene Con Voz!

Ministerio del Ambiente y los Recursos Naturales
Km. 12 ½ Carretera Norte, Frente a Corporación de Zonas Francas
Teléfonos: (505) 22334432
www.marena.gob.ni

Gobierno de Reconciliación y Unidad Nacional
El Pueblo, Presidente!

2010: AÑO DE LA SOLIDARIDAD!
Viva Nicaragua Libre!

Despacho de la Ministra

A través de la presente, también se expresa el apoyo del Gobierno de Nicaragua para que dicho proyecto pueda vender al Fondo de Carbono del Banco Mundial. Las Reducciones Certificadas de Gases de Efecto de Invernadero que emanen del mismo.

Quedando a su entera disposición, le reiteramos las muestras de nuestra más alta consideración.

Atentamente

Juanita Argeñal Sandoval
Ministra

Amb

PODER CIUDADANO
Nicaragua Gana con Vos!

Ministerio del Ambiente y los Recursos Naturales
Km. 12 ½ Carretera Norte, Frente a Corporación de Zonas Francas
Teléfonos: (505) 22334432
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Despacho de la Ministra

Managua, January 15, 2010
DM-JAS- 0224-02-10

Mr. Lex de Jonge
Chair of the CDM Executive Board

Dear Mr. de Jonge:

I have the honor to inform you that the Clean Development National Office (Oficina Nacional de Desarrollo Limpio, ONDL) of the Ministry for law of the Environment and Natural Resources of Nicaragua (MARENA), as the Designed National Authority (DNA) for Kyoto Protocol, endorses the "Southern Nicaragua CDM Reforestation Project" of Maderas Preciosas Nicaragua S.A. / Precious Woods Nicaragua S.A and gives the required approval for it to claim certified emission reductions.

The Nicaraguan Government, having signed and ratified the Kyoto Protocol and designed the ONDL as its Designed National Authority, through the present letter approves the voluntary participation of this project for the purposes from the article 12 from the Kyoto Protocol.

The ONDL, after reviewing the Project Design Document (PDD) and finding that this project contributes to the sustainable development of the Country, is in accordance with the rule that small scale forestry projects have to be implemented by low income individuals and complies with national legislation, expresses its willingness to cooperate with the Clean Development Mechanism (CDM) in all the processes that lead to the emission and transfer of the certified emission reductions resulting from them.

Through this communication the Government of Nicaragua expresses its support for the transfer of certified emissions reductions that result from this project.

I express my willingness to provide further information about this project and my respect for you. Please do not hesitate to contact me for further information about any issues related to this project.

Sincerely yours,

Juanita Argeñal Sandoval
Minister

Amb

PODER CIUDADANO
Nicaragua Gana con Vos!

Ministerio del Ambiente y los Recursos Naturales
Km. 12 ½ Carretera Norte, Frente a Corporación de Zonas Francas
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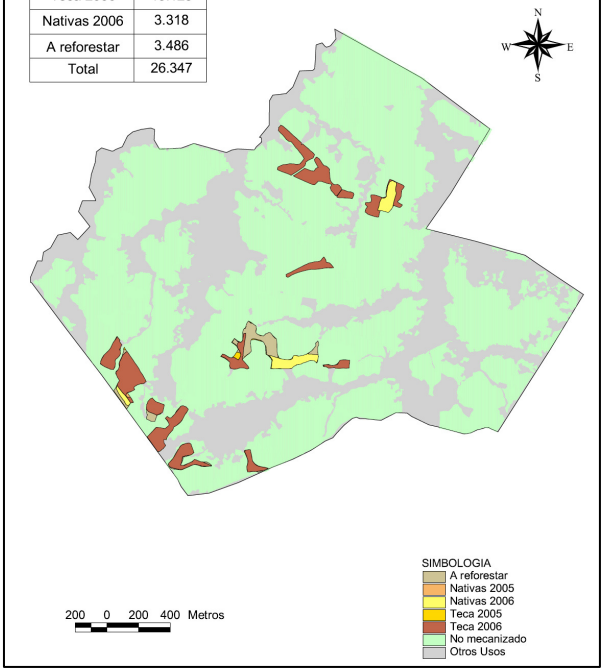
History of the document

Version	Date	Nature of revision
02	EB35, Annex 22 19 October 2007	• Sections A and B were restructured; • Requirement to repeat equations has been removed from section C; • Sections D and E have been aligned with the requirements of the Modalities and Procedures.
01	EB 23, Annex 16(a) and 16(b) 24 February 2006	Initial adoption

Annex 4: Ploughed areas

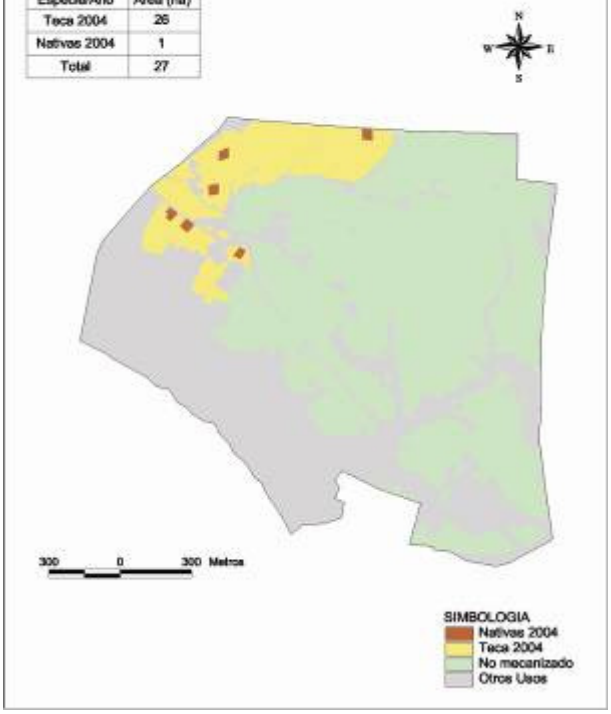
Areas mecanizadas por año de plantación por especie para el Mecanismo de Desarrollo Limpio de la finca La Jabalina.

Especie/Año	Area (ha)
Teca 2005	0.353
Nativas 2005	0.067
Teca 2006	19.123
Nativas 2006	3.318
A reforestar	3.486
Total	26.347



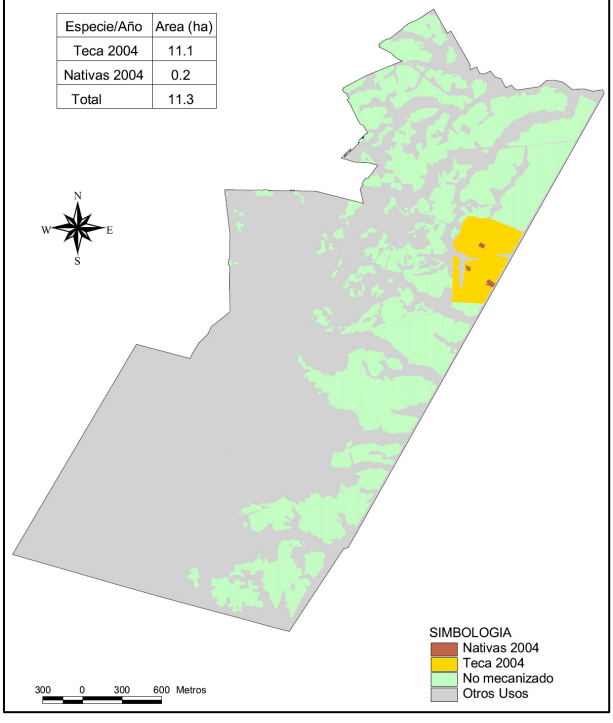
Areas mecanizadas por año de plantación por especie para el Mecanismo de Desarrollo Limpio de la finca Esperanza I.

Especie/Año	Area (ha)
Teca 2004	26
Nativas 2004	1
Total	27



Areas mecanizadas por año de plantación por especie para el Mecanismo de Desarrollo Limpio de la finca La Pimienta.

Especie/Año	Area (ha)
Teca 2004	11.1
Nativas 2004	0.2
Total	11.3



Annex 5: List of Participants at the Stakeholder Consultation

PRECIOUS WOODS

LISTA DE ASISTENTES CONSULTA PUBLICA PROYECTO MDL MADENICA S.A.

FECHA : 12/OCTUBRE /05.
LUGAR: PARADOR FRONTERA SUR.

Nº	NOMBRE Y APELLIDO	INSTITUCION/EMPRESA	TELEFONO	CORREO ELECTRONICO
1	Jaime Mendoza	MADENICA S.A	8553540	rfptmendoza@yahoo.es
2	CARAINA BARRETO	ONDL / MARENA	2331868	barretoajina@yahoo.com
3	Marina Stalthaepen	ONDL/ MARENA	233.868	marines@.bw.com.ni
4	Luis Adolfo Salgado	Vice Alcalde Alcaldía de Cárdenas	5630437	—
5	Roger Perez Aguilar	Abogado y Notario	56-33332	ropeag@hotmail.com
6	Oleuido Argueta Pérez	Alcaldía de Cárdenas	5630437	—
7	Eddy Maria Espinoza	MADENICA S.A	882616.	edmariaesp@yahoo.com.mx
8	Erasmo Ruiz Garcia	MADENICA	845 8928	—
9	Marcial Alcalá	Comisariado	5630437	—
10		Alcaldia de cardenas		
11	Erick Cortes	Contador	8826216.	
12	Reynaldo Cruz	Comisariado	9376044	
13				
14				
15				