

**CCBA  
PROJECT DESIGN DOCUMENT FOR PROJECT  
ACTIVITIES (CCBA-PDD)  
Version 01**

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**Forest Carbon Project in Quirino Province  
Sierra Madre Biodiversity Corridor, Luzon, Philippines**

**May 2009**

**Conservation International**

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**Sierra Madre Biodiversity Corridor, Luzon, Philippines**

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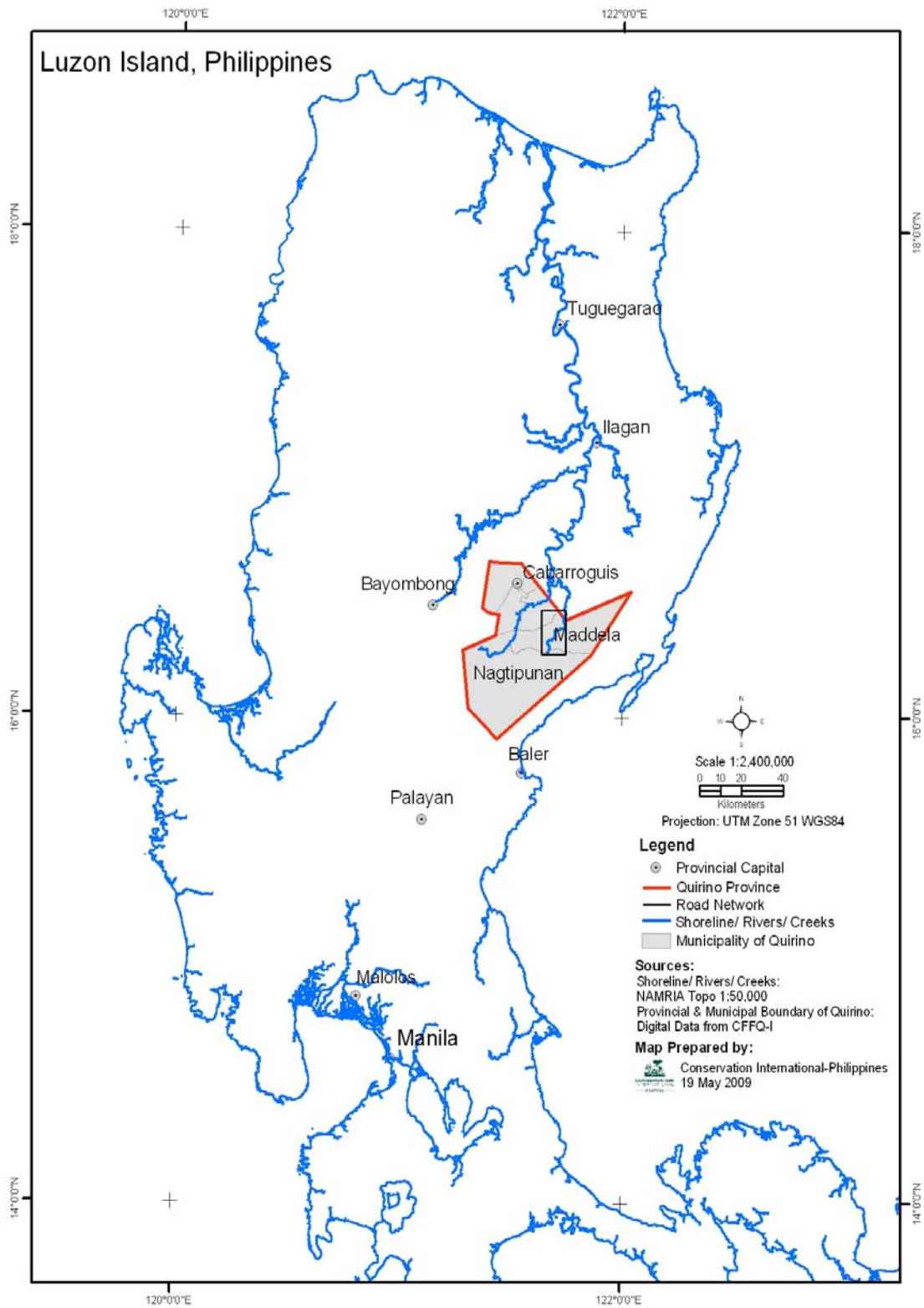
## I. General Section:

### G1 Original Conditions at the Project Site (Required)

G.1.1 Describe the location of the project and basic physical parameters (e.g., soil, geology, climate).

The project with a total area of 177 hectares is situated in the towns of Maddela and Nagtipunan, province of Quirino, Philippines (Figure 1). It is a composite of 63 parcels of lands under the category of “forestland” (in contrast to privately owned lands). For their detailed locations, see Section G.3.3.

The project is partly within the Quirino Protected Landscape which forms part of the Sierra Madre Biodiversity Corridor. This corridor covers approximately 1.7 million hectares and one of the most biologically important areas in the Philippines as it includes 15% of the remaining closed canopy *Dipterocarp* forests in country as well as 47% of the remaining mossy forests. Aside from the diverse habitat types, the corridor is also home to the endangered Philippine eagle and Philippine crocodile.



**Figure 1.** General location of the project site in Luzon Island

### **Topography**

The project site is characterized by rolling to mountainous terrain with an elevation ranging from 100 m. as to 700 m. with slopes ranging from 18 % to 50 %. The specific elevation and slope class distribution and description by area and percentage coverage of the drainage area shall be determined.

### **Climate**

Quirino Province has a mean annual temperature of 26.6°C with a mean maximum of 32.6°C and a minimum of 22.2°C. On the average, January is the coolest month, while the warmest month is May with a mean temperature of 30.3°C. Annual rainfall within the Province ranges from less than 1,500 mm to over 2,100 mm at the southernmost border to Aurora Province. The driest area of Quirino Province is the northeast portion towards the Cagayan River Valley whereas the other parts of the lowland areas receive up to 1,700 mm (e.g., near Diffun). Rainfall distribution is not constant throughout the years.

Two agro-climatic regions were identified in the Quirino-Region, namely moist and dry zones. The moist zone is characterized by an annual rainfall from 1,500 to 2,500 mm and a growing period of 210-270 days. This zone covers most of the present agricultural and expansion areas in the lowland, upland and hilly areas. It represents by far the largest area of the province. These moist conditions are a good indication that only moderate moisture deficit exists during the dry season. As such, it could sustain maximum production through careful planning and crop adjustments taking into consideration moisture availability.

### **Soil**

Soils in the area come in various types. In lowland areas, soil types include the Maligaya clay loam, Quinga clay loam, and Quinga silt loam. In gently sloping areas, San Manuel silt loam dominates the area. Bolinao clay loam and Cauayan clay loam are found in slightly sloping to rolling areas. In steep areas are Rugao clay and Rugao sandy loam, while in very steep slopes, soil types include Luisiana clay loam, Luisiana Anna complex, undifferentiated mountain soils, and Faraon clay (ICRAF and CIP, 2005; RP-German CFPQ, 2003).

### **Major and Minor River Tributaries**

There are two major rivers in the area that traverse the project site; these are Addalam and Upper Cagayan River. Minor tributaries of the Addalam River composed of Angad and Tabanuang creeks; for the Upper Cagayan River are the Ngilinan River and Tungcab River. These rivers all drain towards the Cagayan River, the longest river system in the country.

### **Land Use and Land Cover**

Land use and land cover of the project can be classified into: open or grassland, brushland, plantation crops, mixed crop, cultivated area, and built-up area. See also Section G.1.2 below.

<b>G.1.2 Describe the types and condition of vegetation at the project site</b>
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Originally, the vegetative cover of the project site composed mainly of Dipterocarp-Molave forest with patches of grassland. However, through time and series of human intervention and disturbances the natural/old growth forest was converted into grassland and brush land dominated by lesser-used species, and croplands mainly for corn and banana. Grassland is

dominated by cogon, runo and bikal. See the land cover maps in Section A.7 of CDM-SSC-AR-PDD of the project.

G.1.3 Current carbon stocks at the project site(s), using methodologies from the Intergovernmental Panel on Climate Change’s Good Practice Guidance (IPCC GPG) or other internationally approved methodologies (e.g. from the CDM Executive Board):

The current carbon contents in aboveground biomass and organic soil were calculated based on field data (Table 1; ICRAF 2006 in Appendix 1). Please also see Section C in CDM-SSC-AR-PDD of the project.

**Table 1.** Carbon in biomass and soil organic carbon by land uses (Source: ICRAF 2006; see Appendix 1)

Land Use	Carbon Stored in Aboveground Biomass (Mg-C/ha)	Soil Organic Carbon* (Mg-C/ha)	Total Carbon Density (Mg-C/ha)
Tree Plantation	108.29	62.83	171.12
Agroforestry	41.66	76.41	118.07
Fruit Orchard	18.23	82.00	100.23
Brushland	13.72	77.44	91.16
Grassland	3.41	44.48	47.89
Ricefield	3.51	42.75	46.26
Cornfield	2.26	48.60	50.86

\*to a depth of 30 cm

G.1.4 Describe communities located in and around the project area, including basic socioeconomic information (using appropriate methodologies such as the livelihoods framework).

The population of Quirino Province as of the year 1995 census is 131,119, with a density of roughly 43 persons per square kilometer of land, and population growth rate of 2.81%. In comparison, in the town of Maddela where the project area is located, the total population is recorded at 28,645, which is 22% of the total population of Quirino. Sixty-nine percent of the town population lives in rural areas. Population density is 44 persons per square kilometer while population growth rate is a little bit lower than that of the province at 2.54%.

In 2006, a household interview survey was conducted, which was responded by 498 residents including 210 residents from Maddela, as well as from adjacent municipalities of Aglipay (245) and Nagtipunan (43) (the full report in Appendix 2). A majority (69%) of the respondents reported that they were native to the area, and 78% of migrants had lived in the area over 15 years. The main results relating to socioeconomic information are provided below.

Virtually all residents engage in farming as their primary occupation (Table 2). The income level is low, and 46% derived PhP 70,000 (approximately US\$1500) or less (Table3). This indicates that many people in the area lived below subsistence level. Sixteen percent (78/498) reported having secondary occupations, and 2% (9/498) having tertiary occupations.

**Table 2.** Primary occupation of the respondents from Maddela, Aglipay and Nagtipunan, Quirino Province

<b>Occupation</b>	<b>Frequency</b>	<b>%</b>
Farming	476	95.58
Carpentry	2	0.40
Store keeping	2	0.40
Furniture making	2	0.40
Concrete production	1	0.20
Teaching	2	0.40
Tailoring	1	0.20
Govt employee	9	1.81
Store owner	2	0.40
Driving	1	0.20
<b>Total</b>	<b>498</b>	<b>100.00</b>

**Table 3.** Annual income from the primary occupation of the respondents from Maddela, Aglipay and Nagtipunan, Quirino Province

<b>Annual income (PhP)</b>	<b>Frequency</b>	<b>%</b>
<20,000	12	2.41
20,000-70,000	219	43.98
70,001-120,000	149	29.92
120,001-170,000	56	11.24
170,001-220,000	15	3.01
>220,000	35	7.03
No answer	12	2.41
<b>Total</b>	<b>498</b>	<b>100.00</b>

**G.1.5 Describe current land use and land tenure at the project site.**

The parcels to be reforested or to be used for agroforestry in the Project are currently used for marginal agriculture and grazing. These parcels are not prime parcels for either agriculture or cattle grazing.

Land tenure is secured under the Community-Based Forest Management (CBFM) program. The purpose of the CBFM program is to improve well-being of forest-dependent communities and simultaneously ensure the sustainable management, rehabilitation and protection of the forest lands through the active participation of different stakeholders. CBFM Agreements are agreements between the DENR and the participating People's Organizations that provide People's Organizations with tenurial security and incentives to develop, utilize and manage the

land, in return of fulfilling the responsibility stipulated in the respective Agreements. CBFM Agreements have terms of 25 years, and renewable for another 25 years. Individuals, who have to be regular members of the participating People's Organizations, are granted with the Certificates of Stewardship that recognizes the individual rights of occupancy. The terms of the Certificate coincide with those of CBFM Agreements. Relevant DENR Administrative Order is provided as Appendix 3.

In the case of the Project, Divisoria Sur Agroforestry Farmers Association (DSAFA) and Sto. Nino Integrated Social Forestry Association (STISFA) are the People's Organization that have CBFM Agreements with the DENR. The Agreement is valid through 2013, and renewable through 2037, which covers the entire project duration.

G.1.6 Describe current biodiversity in the project area and threats to that biodiversity, using appropriate methodologies (e.g., key species habitat analysis, connectivity analysis), substantiated with reference (evidence) where possible.
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A flora and faunal survey was conducted by Conservation International Philippines in collaboration with the Department of Environment and Natural Resources between 2002 (Alviola and Duya, 2003; Conservation International Philippines, 2002) and 2003 (Alviola and Duya, 2003; Conservation International Philippines, 2003) and a faunal inventory in the lowland forest of Quirino was conducted in 2004 (Conservation International Philippines, 2004) and 2007 (Duya et al., 2007; Rico and Altamirano, 2007).

## Flora

A Rapid Variable Transect method was used to assess the flora diversity of the survey sites. The variable transect method is a fast and flexible method of variable transects that is practical for comparing composition and diversity for many distinct habitats and classes of plants. It is based on numbers of individuals to be sampled rather than area, do not require precise measurements, and can be modified for use with clonal plants, epiphytes, floating aquatics, etc. They allow investigators to make more samples and spend more time on identification of critical plants (Foster et al. 1995).

A total of 557 species of plants belonging to 108 families was recorded during the survey in Mt. Lataan in 2002 and 2003 (Appendix 4). The information generated from these two surveys conducted in the area has given us better perspective on the plant diversity of the park. Noteworthy among the documented species is the new species to *Rafflesia*, which is currently being described (Table 4). The species is found only in the lowland forest and lives as a parasitic plant of a particular vine that thrives in large Dipterocarp trees. Lowland forest in the Philippines is arguably the most threatened habitat in the country. This is mainly due to their accessibility and that most of the basic needs of the local people come from this unique vegetation type. The disappearance of the lowland forest in the country could also lead to the extinction of these species as well as other endemic species of plants.

**Table 4.** Noteworthy plants recorded during the survey.

Species	Distribution in the Philippines
Family Rafflesiaceae	
<i>Rafflesia sp.</i>	So far found only in Quirino
Family Begoniaceae	
<i>Begonia dolichotricha</i>	Previously known only in Camarines Sur
Family Melastomataceae	
<i>Medinilla pycnantha</i>	Previously found only in Mt Alacapan
Family Myrtaceae	
<i>Syzygium longipedicellatum</i>	Previously known only from Mt. Moises, Isabela province
Family Orchidaceae	
<i>Amesiella monticola</i>	Genus endemic to the Philippines

## Fauna

Mist-nets were used to capture both birds and bats. A two-kilometer transect line was also established for bird observation. Snap traps were used to capture the non-volant mammals. Direct observation of snares called (“silo”) set by local people, footprints, fecal droppings, nests, and animal remains were also noted including information on animals traded in nearby villages. When possible, trapped animals were released at the site of capture; only those with certain identification were released. In cases cryptic bird species were caught in snap traps, these were also recorded and if necessary collected. Additional bird sightings in the vicinity were also noted. All dead individuals were taken as specimens. Voucher specimens were measured, examined for reproductive condition, and preserved as complete bodies in formalin (transferred to ethanol). Vouchers will be deposited at the Field Museum of Natural History, Chicago (FMNH) for further taxonomic studies and will be eventually transferred and deposited at the National Museum of the Philippines, Manila (NMP)

A total of 130 species of birds, 29 species of mammals and 40 species of amphibians and reptiles were documented. Among the species documented 77 (39%) are endemic to the Philippines (Appendix 5, 6 and 7). The objective of series of biodiversity assessment is to provide the biodiversity information need for the proclamation of the area as a park under the NIPAS Law and the development of the management plan of the protected area. As a result of these surveys several new species, new country and distribution records and potential new species of fauna has been described endemic only to the province of Quirino. New species includes *Luperosaurus kubli* (Brown et al. 2007), a potential new species of *Chrotomys sp.*, and *Apomys sp.* (Duya et al. 2007), new distribution record for *Rhinolophus leckaguli* and *Ceolops hirsutus*, known only in the Province of Isabela, Luzon Island and Mindoro, respectively. A new country record *Kerivoula cf papillosa* was also documented during the study (Table 5). Expanding the forest through reforestation and protection of the remaining natural resources of the province particularly the lowland forest of the province protects these unique biodiversity found nowhere else in the world. These studies only show the importance of the province of Quirino and the remaining forest in the protection and conservation of Philippine Biodiversity.

**Table 5.** Note worthy species of fauna recorded during the survey.

Species	Common name	Distirbution status in the Philippines
Family Rhinolophidae		
<i>Hipposideros leackaguli</i>		Previously recorded only in Isabela province, Luzon Island and Mindoro Island
<i>Coelops hirsutus</i>	Large Asian roundleaf bat Philippine Tailless Roundleaf Bat	Previously recorded only in Mindoro and Mindanao Islands, recently in Luzon Island
Family Vespertilonidae		
<i>Kerivoula cf papillosa</i>	Papillose Woolly Bat	New Country record
Family Muridae		
<i>Apomys sp.</i>	Forest Mouse	Luzon Island
<i>Chrotomys sp.</i>	Striped Rat	Luzon Island
Family Geckkonidae		
<i>Luperosaurus kubli</i>	Sierra Madre Fringed Gecko	New species

G.1.7 List all IUCN Red List threatened species (which encompasses endangered and vulnerable species) and species on nationally recognized list (where applicable) found within the Project boundary.

Section B.1.3 provides lists of IUCN Red List species that have been observed in the region.

Biological survey restricted just to the Project’s boundaries has not been conducted, but the region as a whole has already been extensively studied. In Sierra Madre Biodiversity Corridor, 409 species of fauna (24 amphibians, 67 reptiles, 258 birds, and 60 mammals) have been recorded. One hundred fifty three these are endemic to the Philippines, and 30 are considered threatened (Heneay et al 1997, Kennedy et al 2000, Brown et al 2000, NORDECO and DENR 1998, Duya et al 2002 unpublished). On the other hand, potential and new species, new country records (Duya et al 2007, Brown et al 2000, 2007) are still being found demonstrating the potential for more species present.

Quirino Province has been identified as one of the Philippines’ biodiversity conservation priorities (Ong et al., 2002). The priority area includes the Municipality of Maddela. The area’s value for bird habitat has been highly recognized as an Important Bird Area (IBA), and subsequently as a Key Biodiversity Area (KBA; Conservation International Philippines, et al., 2006).

**G2 Baseline Projections (Required)**

G.2.1 Describe the most likely land-use scenario in the absence of the Project activity. Identify whether the scenario assumes that existing laws or regulations would have required that project activities be undertaken anyway.

The land-use and land-cover data for 1993 and 2003 indicate that forests are being converted to other land uses or covers (Table 6). The interview survey (see G.1.4) revealed that there were barriers for both reforestation and agroforestry to occur spontaneously (Table 7 and 8).

Interviews with stakeholders and land use surveys show that similar lands in the vicinity are not being converted to either commercial plantations or agroforestry.

- Investment barriers deny land holders the finances to invest in commercial timber or agroforestry seeds or necessary equipment;
- Institutional barriers prevent farmers from manipulating the chain from investment through production and sales;
- Technological barriers limit the access of farmers to either quality seed or the necessary skills for successful commercial timber or agroforestry plantations; and
- The barrier due to market risks, of new income streams, drives farmers to be conservative to maintain a constant income.

The field surveys and interviews with stakeholders indicated that the only realistic and credible alternative available to the project participants is to continue the current marginal agricultural practices. Furthermore, secondary succession of brushlands and grasslands to forest will not occur due to continuous disturbances such as vegetation burning, conversion into upland farms or kaingin-making, and grazing activities. Thus, the Project assumes that this trend will continue into the future.

**Table 6.** Changes in land use and land cover in Maddela during 1993-2003

Land use and land cover	1993 (ha)	2003 (ha)	Change (ha)	Change (%)
Natural forest	32,666	27,057	-5,609	-17.2
Remnant forest	29,626	17,106	-12,520	-42.3
Shrubs and grassland	2,030	10,823	8,793	433.2
Agriculture	10,610	7,478	-3,132	-29.5
Built-up	470	761	291	61.9
River	330	892	562	170.3
Non-vegetated/open land	0	3,387	3,387	--
Agroforestry	0	1,185	1,185	--
Tree plantation	0	6,993	6,993	--
Fish ponds	0	50	50	--
Total	75,732	75,732	0	

Source: 1993 JAFTA Map & 2003 CFPQ Vegetative Cover Map, as presented in Forest Land Use Plan of Maddela

**Table 7.** Barriers against reforestation

<b>Barrier</b>	<b>Frequency</b>	<b>Percent</b>
Lack of financial resources	406	81.53
Lack of technical expertise	139	27.91
Lack of experience	69	13.86
Lack of technology	35	7.03
Rampant illegal logging	7	1.41
Poor enforcement of forest laws	6	1.20
Demographic pressure	1	0.20
No nearby forest	1	0.20
<b>TOTAL</b>	<b>498</b>	

**Table 8.** Barriers against adopting agroforestry

<b>Barrier</b>	<b>Frequency</b>	<b>Percent</b>
Lack of technical know-how	215	43.17
Lack of capital	199	39.96
Longer period of harvesting	11	2.21
Difficult to market the products	9	1.81
Farmers are used to cash crop farming	6	1.2
Decreased area for agricultural crops	3	0.60
People are lazy	3	0.60
Not interested	2	0.40
Hard to implement	1	0.20
No demonstration of agroforestry farm	1	0.20
No answer	48	9.64
<b>TOTAL</b>	<b>498</b>	<b>100.00</b>

G.2.2a Provide a projection of future carbon stock changes in the absence of the project, based on the land-use scenario described above. The timeframe for this analysis can be either the project lifetime or the project accounting period, whichever is more appropriate.

The land inside the Project parcels will continue to degrade in the without-project scenario, and therefore carbon stocks will decrease as well. However to be conservative, the Project assumes a static carbon baseline. Please also see Section B of CDM-SSC-AR-PDD of the project.

G.2.2b If there is evidence that non-CO<sub>2</sub> greenhouse gas (GHG) emissions such as CH<sub>4</sub> or N<sub>2</sub>O are more than 15% of the baseline GHG fluxes at the project site (in terms of CO<sub>2</sub> equivalents), they must be estimated.

Non-CO<sub>2</sub> GHGs are not likely to account for more than 15% of the project's overall GHG impact. Furthermore, the CDM Executive Board agreed at its 42nd meeting held during 24-26 September in Bonn, Germany that GHG emissions in A/R CDM project activities from (i) fertilizer application, (ii) removal of herbaceous vegetation, and (iii) transportation may be considered as

insignificant and hence can be neglected in A/R baseline and monitoring methodologies (<http://cdm.unfccc.int/EB/042/eb42rep.pdf>; p.6).

G.2.3 Describe how the “without-project” scenario would affect local communities in the project area.

As described in G.1.4, half of the people in the Project area live below subsistence level. Without the Project, this poverty is expected to persist.

G.2.4 Describe how the “without-project” land-use scenario would affect biodiversity in the project area.

Present land use trend as described in G.2.1. has led to the loss of the remaining patches of native forest around the project site. Expectedly, this has resulted in the local disappearance of species of fauna that would otherwise be able to assist natural forest regeneration by seed dispersal. The loss of the natural source of seeds will impede natural reforestation that would provided habitat connectivity for wildlife.

Outside the project area, forests are also becoming severely fragmented due to land use disturbances. Newly fragmented landscape may still sustain original species assemblages, but they are expected to suffer species loss with time as studies often document timelag in extinction following fragmentation.

Disturbed sites are prone to negative impact of invasion by non-native, invasive species of plants and animals, which also lead to loss of native biotic community.

G.2.5 Describe how the “without-project” land-use scenario would affect water and soil resources.

The lack of vegetation could eventually lead to the non-renewal of ground water and further depletion of soil nutrients. This will lead to increased surface run off and sedimentation in local streams and creeks. This would in turn affect the quantity and quality of flow of the creeks and rivers draining the project area during dry and wet seasons. The continued erosion of topsoil in the project area due to cultivation and compaction of soil by grazing animals would eventually lead to even more reduced agricultural productivity with adverse effects on the local economy.

### **G3 Project Design and Goals (Required)**

G.3.1 Provide a description of the scope of the project and a summary of the major climate, community and biodiversity goals.

#### **Project Overview**

Due to its geographical and climatic characteristics, the Philippines is rich in biodiversity mainly in its tropical rainforests. However, as it happens in other countries in the Southwest Asia, increase in population has significantly reduced the rainforest cover through expansion of human habitat and agricultural lands in the forest, commercial logging. Even after the deforestation was banned, the deterioration continues. A decrease in forest cover not only results in a loss of

habitat for animals and plants but also a loss of ecosystem services that it provides, such as stable water supply and soil stability. It is necessary to protect and restore these damaged lands to secure the natural resource for regional development and conservation of biodiversity. However, it is also essential to consider the current situation that poor people rely on forests and its natural resources, including the land through unsustainable means of utilization.

In the Sierra Madre Biodiversity Corridor where the project area is generally situated, even though there has been much deforestation, there is still a large area of forest left that supports high biodiversity. The region plays an important role as it still retains the potential to maintain the complex ecosystem with diverse species. In addition, the Sierra Madre Mountain serves as a watershed for the region, supplying water for hydroelectric generation and household and agricultural use, and therefore an appropriate watershed management is essential for the livelihood of the local residents.

This project aims for ‘Triple Benefits’, namely, to create an alternative source of income for the local community, to protect and improve the habitat for plants and animals, and at the same time to stabilize the ecosystem functions of the watershed to ensure a steady supply of water and to help mitigate climate change through carbon sequestration.

In this project, the following activities will be conducted on cropland, grassland and brushland:

1. Reforest 159.3 hectares with indigenous species suitable to bring back the forest condition and appropriate biophysical requirement of the site.
2. Establish 17.7 hectares of agroforestry from which the local communities derive additional income and improve the long-term productivity of their farms.

To support the implementation of reforestation and agroforestry, community organization for planning and community capacity building will also be conducted.

G.3.2 Describe each major project activity (if more than one) and its relevance to achieving the project’s goals.

### **A. Reforestation Component**

**1. Nursery operations**--Three nurseries are established, a central nursery strategically located within the barangay core and two (2) subsidiary nurseries accessible at the farm sites where planting will be done. These nurseries will accommodate planting stocks to be produced by the communities. In case that nursery seedling production will not meet the total planting requirements, planting material deficit will be purchased from nearby local seedling suppliers.

**2. Survey and Mapping** – The proposed project site were surveyed and delineated on the ground, and project maps were produced.

**3. Compartmentalization** – The project area are compartmentalized to show the species or combination of species to be planted. Mixed planting of different tree species identified is encouraged to meet the purpose and objective of the project.

**4. Establishment of access roads and trails** – Access road and graded trails are necessary for establishing, maintaining and protecting a reforestation project considering the location, slope and terrain of the project area. Trails and roads will be constructed through manual labor discouraging the use of heavy equipment machineries to minimize CO<sub>2</sub> emission and surface disturbance.

**5. Species site compatibility** – The topographic and soil classification map will serve as basis in which to designate species location in a given area. Within the species identified, there are those species assigned depending on the exposure of a given site. Selection of other species based on site and elevation may also be dictated by the purposes for which planting is done (e.g., mere vegetative rehabilitation, food production (agroforestry), and biodiversity conservation).

## **6. Site Preparation**

**6.1. Brushing** – On areas with steep gradient and with erodible soil, extra care must be exercised so as not to induce soil erosion. The best way of conducting site preparation is the partial removal of vegetation it may be either spot brushing or strip brushing. In strip brushing, it is usually a meter wide strip preferably following the contour. Cut vegetation is laid below the strip, which also holds the soil up. Planting is done in the middle of the strip. Distance between strips depends upon the planting distance employed. Normally, 3 meters x 3 meters is the recommended distance to be employed. In spot clearing, this is done for the Agro forestry. Spots or patches area cleared usually 2 meters diameter where the fruit tree seedlings to be planted.

**6.2. Staking**- Staking should be done in order to set the location of seedlings to be planted along the strips or spot brushed areas and where to dig holes. For the purpose of checking survival, seedlings planted may easily be recognized with the stakes.

**6.3 Hole digging** –The size of the plastic bag used for the potted seedlings will determine the size of holes for digging. In digging holes, top soil is separated from the sub soil removed from the hole, and during planting the topsoil should be put back first into the hole followed by the subsoil. If possible, basal application of organic fertilizer to planted seedlings is recommended.

**6.4. Seedlings transport** – The seedlings are transported from the nursery to the planting area through the use of animal driven sledge or cart, or manually carried with sturdy container ensuring that the seedlings are not overexposed to scorching sunlight and shaking during transported to avoid severe shocking. They should not be held to the stem to prevent uprooting from the earth-ball and cause injury to the root system.

**6.5. Out planting** – This refers to the actual planting of seedlings in the field. A potted seedling is recommended. The seedling is to be removed from the container (plastic bags) by tearing or cutting with a knife or bolo. Care must be taken not to break the earth-ball. The upper part of the earth-ball must be on level with or slightly deeper than the ground surface. Soil is filled into the hole spaces and pressed firmly all around the planted seedlings.

**7. Care, Maintenance and Protection**– After planting, planted seedlings need to be cared through activities such as replanting, weeding, cultivating, mulching, fertilizing and watering if need be and control of pest and diseases, including fire prevention and control. Constant monitoring of planted area is necessary to detect needed caring and timely management intervention to ensure high survival and growth of planted seedlings.

## **B. Agroforestry Component**

**1. Preparation of planting materials** – Most of the project farmer-participants have no technical expertise and capability to produce quality fruit trees seedlings. Hence, there is a need to purchase grafted/budded or asexually propagated good variety of fruit tree seedlings from reliable and government-accredited seedling suppliers. The central nursery for the reforestation will also serve as depository for the agroforestry seedlings while waiting for the outplanting period.

**2. Survey and Mapping** - The agroforestry sites were surveyed and delineated on the ground and mapped.

**3. Compartmentalization** - The areas are compartmentalized to show the combination of agro forestry species to be planted. Mixed planting is required. Within the compartment it is not only planted solely with fruit trees, but there is also a need to integrate agricultural cash crops. At least 20% of the agroforestry area will be devoted for short-term crops. The multiple-cropping system is encouraged.

**4. Species Site compatibility** - the topographic and soil classification map has a great role to designate species location in a given area. Considering the exposure of a given site there are species assigned depending on the exposure of the site.

**5. Establishment of Access Roads and Trails** - For the agroforestry component access roads and graded trails are necessary considering the location, slope and terrain of the project area. This will be put-up through manual labor, discouraging the use of heavy equipment machineries to minimize CO<sub>2</sub> emission and surface disturbance.

### **6. Site Preparation**

**6.1 Spot Brushing** - for this component spot brushing is more appropriate. Patches are cleared/ brushed 2 meters diameter where the seedlings are to be planted.

**6.2 Staking** - Stakes will be provide for every patches cleared to determine the area where the seedlings are to be planted and likewise hole digging. Stakes should be 1 meter high or higher to be visibly seen in the area.

**6.3 Hole Digging** - Size of holes to be dug depend upon the size of the plastic bags used for the potted seedlings. In digging the hole, the top soil should be separated from that of the sub soil.

**6.4 Out planting** - this refers to the actual planting of seedling in the field potted seedlings are to be used. The seedling is removed from the container (plastic bag) by tearing or cutting with a knife or bolo. Care must be taken not to break the earth ball or disturb the root system of the seedling. During planting, the top soil should be filled up first to the base of the dug hole followed by the sub soil, filling up the spaces of the hole up to the root collar of the seedling. Soil is firmly pressed around the base of the planted seedling. The upper part of the earth ball or root collar must be on level with or slightly deeper than the ground surface. Basal application of organic fertilizer is encouraged during ring-weeding and cultivation.

**7. Care, Maintenance and Protection** - After planting, planted seedlings need to be attended to through activities such as replanting, weeding, cultivating, mulching, fertilizing and watering if need be and control of pest and diseases, including fire prevention and control. Constant monitoring of planted area is necessary to detect needed caring and timely management intervention to ensure high survival and growth of planted seedlings.

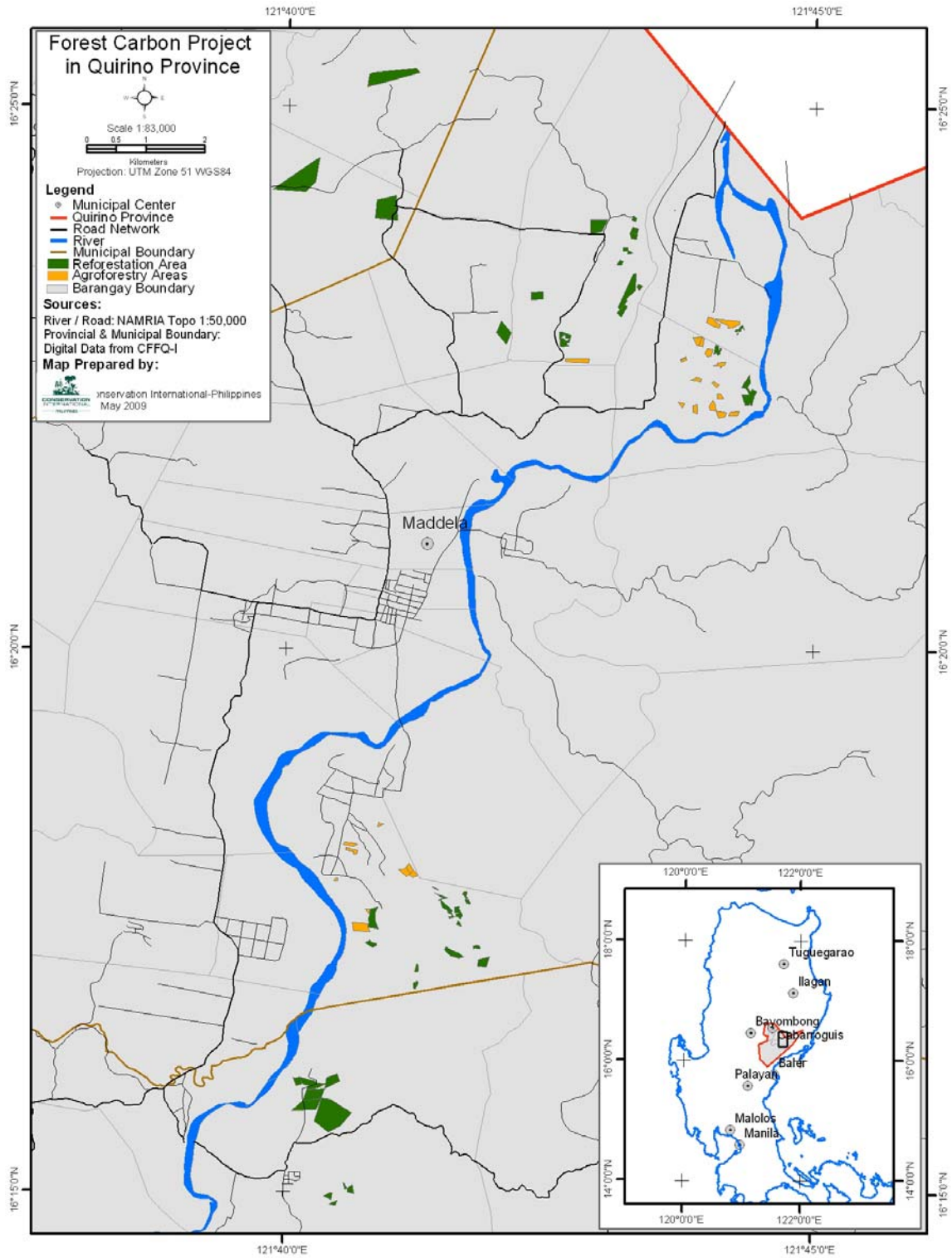
### **C. Community Organization for Planning Component**

Initial planning activities include coordination with the target communities, consultation with different stakeholders and planning workshop together with partners, such as PEDAI, DENR, LGU, and POs. This planning activity shall be conducted in the first year of the project, and periodic assessment will be conducted as part of project monitoring.

### **D. Community Capacity Building Component**

Provision of trainings for the beneficiaries to ensure that they are empowered and attain a successful project is indeed vital. Trainings will be provided in the field of financial management, technical skills, and livelihood alternatives. The participants can make use of the skills and knowledge gained through these trainings for the project and outside the project. For instance, the skill of raising seedlings may generate additional income by selling planting materials to other reforestation operations.

G.3.3 Provide a map identifying the project location, where the major project activities will occur, geo-referenced boundaries of the project site(s).



**Figure 2.** Locations of parcels participating in the Project

G.3.4 Provide a timeframe for the project's duration. Describe the rationale used for determining the Project lifetime. If the accounting period for carbon credits differs from the project lifetime, explain.

The project lifetime is 20 years. This duration is deemed reasonable for forests to be established and for necessary technical and management capacity to be well established among the local communities.

G.3.5 Identify likely risks to climate, community and biodiversity benefits during the project lifetime. Outline measures that the project plans to undertake to mitigate the risks.

One of the pitfalls in project implementation in the Philippines is the collapse of development efforts initiated by the project once the funding ends. One reason for this is the short duration of these projects (typically 3-5 years) which is not enough to institutionalize the changes introduced.

Rather than using the initial funding to cover the reforestation and agroforestry activities on the entire project area for only a few years, the Project is set up to cover all necessary operations for the part of project area for 20 years. Twenty years should allow ample time for community development to be firmly grounded. The revenue as result of successful marketing of the VCUs will be used to expand the activities on the remaining project area.

The lack of local capacity to maintain the project impact, such as forest management, could also be a risk. Thus, capacity building training occupies an important part in project management work.

Inadequate and unstable household income to support food and basic needs of the family can also lead project participants to divert their attention and abandon the project. To address this risk, project partner-institutions like the local government units at the municipal and provincial levels are encouraged to allocate resources from their development funds to support the participants in terms of complementary livelihood, technical and marketing assistance. Finally, the project will be implemented in partnership with Palacian Economic Development Association Inc (PEDAI), a local NGO based in Quirino with the mission of supporting local livelihoods by providing technical and financial support through microlending program as the facilitator for the project implementation process.

G.3.6 Document and defend how local stakeholders have been or will be defined.

All entities and individuals that have title to or jurisdiction over the project area are considered stakeholders. These local stakeholders were confirmed as such during the series of consultations with them. Thus, government units that have jurisdiction over the project area at all levels (i.e., Barangay, municipal, provincial, and national) have been identified as stakeholders. Members of the People's Organizations, DSAFA and STISFA are also considered stakeholders. The donor, moreTrees; management organization, PEDAI; and other project proponents are also considered stakeholders. There is a Memorandum of Agreement concluded among all of these entities defining their respective roles and responsibilities in the project.

#### **G4 Management Capacity (Required)**

CI Philippines will be responsible for the overall implementation of this project as a project manager establishing the project implementation mechanism with various local stakeholders. Under its Sierra Madre Biodiversity Corridor (SMBC) strategy, CI Philippines will collaborate with the Department of Environment and Natural Resources (DENR), the local government units (LGUs) within the project site and the local communities involved.

CI Philippines Country Office in Manila through its Executive Director and the technical and operations support units provide project oversight and policy support, with the responsibility for project execution being designated to the SMBC Program Manager. To provide technical backstopping are five (5) SMBC technical staff members who have accumulated actual field experience in executing the different activities of the project. As the need arises or deemed appropriate, local NGO-partners of CI Philippines who are capable as subgrantees maybe engaged to execute the reforestation and agroforestry field activities. Furthermore, CI Philippines receives appropriate technical, managerial and coordination assistance from CI-Headquarters and CI-Japan.

G.4.1 Document the management team's experience implementing land management projects. If relevant experience is lacking, the proponents must demonstrate how other organizations will be partnered with to support the project.

Conservation International has been implementing similar projects around the world, and these experiences are being shared within the organization through visits and discussions to share knowledge in different countries. Examples of CI's forest carbon projects may be found: <http://www.conservation.org/learn/forests/Pages/projects.aspx>.

Locally its pool of technical staff has rich experiences in community organizing, reforestation and agro-forestry projects and activities. It has also its own expertise on land use management and land use change analysis and has high levels of experience in protected area establishment and management.

SMBC implements similar reforestation, agroforestry and community development project in Peñablanca Protected Landscape and Seascape (PPLS) in northern Luzon Island with funding from Toyota Motor Corporation, Japan (please see for reference: [http://www.celb.org/xp/CELB/news-events/press\\_releases/091307.xml](http://www.celb.org/xp/CELB/news-events/press_releases/091307.xml)). This PPLS project, which is also seeking CCB validation within 2009, is finishing its second year and is proceeding on schedule.

The Department of Environment and Natural Resources (DENR), the project's major partner, have organized and implemented a number of national, regional and local forestry projects, accumulating rich experience in coordinating and/or implementing reforestation and agro-forestry projects. Other local partner- NGOs involved in the project have established complete and operationally effective organization/management systems, have technical capacity and rich experience in working with communities, community mobilization, project planning and implementation, and to some extent some working knowledge on forest carbon projects.

**G.4.2 Demonstrate that management capacity is appropriate to the scale of the project.**

Conservation International-Philippines (CI-Philippines) has been providing support in the last 10 years for the rehabilitation of forests within the Sierra Madre Biodiversity Corridor (SMBC), focusing on the forests of three protected areas namely: the Peñablanca Protected Landscape and Seascape, Northern Sierra Madre Natural Park, and Quirino Protected Landscape, to restore the habitat and ecosystem services that will have positive impact on local climate, biodiversity and the communities.

Oversight and policy and technical support is being provided by the office of the Country Executive Director and other technical units within CI-Philippines. The SMBC Program Manager is responsible for the project execution and is supported by 5 technical staff in the execution of different project activities. Furthermore, the project team will also be receiving additional technical, managerial and coordination assistance from CI branch offices, including the CI-Headquarters Office in Arlington, Virginia (USA) and CI-Japan.

**G.4.3 Document key technical skills that will be required to successfully implement the project and identify members of the management team or project partners who possess the appropriate skills.**

Key technical skills for this project and persons with such skills and persons in charge are presented in Table 9.

**Table 9.** Key technical skills and members possessing these skills

Skills	Members possessing the skills
Nursery operation and seedlings preparation; propagation of indigenous species	<p>&gt;<b>CIP: Guidance and Support</b></p> <ul style="list-style-type: none"> <li>• Mariano Roy Duya, in-charge</li> <li>• Leonard Co, species selection</li> <li>• Juan Acay, Jr: technical support</li> <li>• Estrella Pasion, technical support</li> </ul> <p>&gt; <b>PEDAI: Field management</b></p> <ul style="list-style-type: none"> <li>• Elizabeth S. Nicolas, in-charge</li> <li>• Ben S. Guillermo, technical field supervision</li> </ul> <p>&gt;<b>DENR: Guidance and Support</b></p> <ul style="list-style-type: none"> <li>• Alex Barayuga, Protected Area Superintendent</li> <li>• Elder Pacios, Forestry Specialist</li> </ul> <p>&gt;<b>LGU: Guidance and Support</b></p> <ul style="list-style-type: none"> <li>• Yolando B. Binag</li> <li>• Lemuel Maranion</li> <li>• Rimel C. Tolentino</li> <li>• Joey White</li> </ul>
Forest/Agroforestry establishment, care and maintenance: Seedling planting and maintenance (including activities such as weeding, forest fire/pest and disease detection and control)	<p>&gt;<b>CIP: Guidance and Support</b></p> <ul style="list-style-type: none"> <li>• Mariano Roy Duya, in-charge</li> <li>• Juan Acay, Jr: technical support</li> <li>• Estrella Pasion, technical support</li> <li>• Leonard Co, technical support</li> </ul> <p>&gt; <b>PEDAI: Field management</b></p>

	<ul style="list-style-type: none"> <li>• Elizabeth S. Nicolas, in-charge</li> <li>• Ben S. Guillermo, technical field supervision</li> </ul> <p>&gt;<b>DENR: Guidance and Support</b></p> <ul style="list-style-type: none"> <li>• Alex Barayuga, Protected Area Superintendent</li> <li>• Elder Pacios, Forestry Specialist</li> </ul> <p>&gt;<b>LGU: Guidance and Support</b></p> <ul style="list-style-type: none"> <li>• Yolando B. Binag</li> <li>• Lemuel Maranion</li> <li>• Rimel C. Tolentino</li> <li>• Joey White</li> </ul>
Agroforestry farm planning and implementation	<p><b>CIP: Guidance and Support</b></p> <ul style="list-style-type: none"> <li>• Mariano Roy Duya, in-charge</li> <li>• Leonard Co, species selection</li> <li>• Juan Acay, Jr: technical support</li> <li>• Estrella Pasion, technical support</li> </ul> <p>&gt; <b>PEDAI: Field management</b></p> <ul style="list-style-type: none"> <li>• Elizabeth S. Nicolas, in-charge</li> <li>• Ben S. Guillermo, technical field supervision</li> </ul> <p>&gt;<b>DENR: Guidance and Support</b></p> <ul style="list-style-type: none"> <li>• Alex Barayuga, Protected Area Superintendent</li> <li>• Elder Pacios, Forestry Specialist</li> </ul> <p>&gt;<b>LGU: Guidance and Support</b></p> <ul style="list-style-type: none"> <li>• Yolando B. Binag</li> <li>• Lemuel Maranion</li> <li>• Rimel C. Tolentino</li> <li>• Joey White</li> </ul>
Surveying and mapping	<p><b>CIP: Guidance and Support</b></p> <ul style="list-style-type: none"> <li>• Oliver C. Coroza, in-charge</li> <li>• Andy Alvaran, GIS support</li> <li>• Villasita T. Policarpio, GIS support</li> <li>• Juan Acay, Jr: technical support</li> <li>• Estrella Pasion, technical support</li> </ul> <p>&gt; <b>PEDAI: Field management</b></p> <ul style="list-style-type: none"> <li>• Elizabeth S. Nicolas, in-charge</li> <li>• Ben S. Guillermo, technical field supervision</li> </ul> <p>&gt;<b>DENR: Guidance and Support</b></p> <ul style="list-style-type: none"> <li>• Alex Barayuga, Protected Area Superintendent</li> <li>• Elder Pacios, Forestry Specialist</li> </ul> <p>&gt;<b>LGU: Guidance and Support</b></p> <ul style="list-style-type: none"> <li>• Yolando B. Binag</li> <li>• Lemuel Maranion</li> <li>• Rimel C. Tolentino</li> <li>• Joey White</li> <li>• Dencio A. Pagbilao</li> </ul>

	<ul style="list-style-type: none"> <li>• Homer B. Bueno</li> </ul>
Community organization for planning	<p><b>CIP: Guidance and Support</b></p> <ul style="list-style-type: none"> <li>• Mariano Roy Duya, in-charge</li> <li>• Juan Acay, Jr: technical support</li> <li>• Estrella Pasion, technical support</li> </ul> <p>&gt; <b>PEDAI: Field management</b></p> <ul style="list-style-type: none"> <li>• Elizabeth S. Nicolas, in-charge</li> <li>• Ben S. Guillermo, technical field supervision</li> </ul> <p>&gt; <b>DENR: Guidance and Support</b></p> <ul style="list-style-type: none"> <li>• Alex Barayuga, Protected Area Superintendent</li> <li>• Elder Pacios, Forestry Specialist</li> </ul> <p>&gt; <b>LGU: Guidance and Support</b></p> <ul style="list-style-type: none"> <li>• Yolando B. Binag</li> <li>• Lemuel Maranion</li> <li>• Rimel C. Tolentino</li> <li>• Joey White</li> <li>• Dencio A. Pagbilao</li> </ul>
Community capacity building	<p><b>CIP: Guidance and Support</b></p> <ul style="list-style-type: none"> <li>• Mariano Roy Duya, in-charge</li> <li>• Leonard Co, species selection</li> <li>• Juan Acay, Jr: technical support</li> <li>• Estrella Pasion, technical support</li> </ul> <p>&gt; <b>PEDAI: Field management</b></p> <ul style="list-style-type: none"> <li>• Elizabeth S. Nicolas, in-charge</li> <li>• Ben S. Guillermo, technical field supervision</li> </ul> <p>&gt; <b>DENR: Guidance and Support</b></p> <ul style="list-style-type: none"> <li>• Alex Barayuga, Protected Area Superintendent</li> <li>• Elder Pacios, Forestry Specialist</li> </ul> <p>&gt; <b>LGU: Guidance and Support</b></p> <ul style="list-style-type: none"> <li>• Yolando B. Binag</li> <li>• Lemuel Maranion</li> <li>• Rimel C. Tolentino</li> <li>• Joey White</li> <li>• Dencio A. Pagbilao</li> </ul>

**G.4.4 Document the financial health of the implementing organization(s).**

Conservation International-Philippines (CIP) is one of the 26 county offices of CI world wide. It has maintained an average annual budget of over 1 million USD for the past 10 years. CIP funds are from grant-funding private foundations, corporate businesses, foreign governments, and multilateral organizations.

Currently, CIP has 23 projects in different geographic areas in Sulu-Sulawesi Seascapes, Cagayan, Isabela, Palawan, Batangas and Mindoro provinces and cover marine works, coral

triangle initiative, reforestation, agroforestry, research, population/health & environment, human wellbeing, climate change, forest carbon, and partnership building. Walton Family Foundation and Toyota Motor Corporation are the major donors of CIP for the marine and terrestrial projects, respectively. Last year (FY08), external grant was 11% of CIP's total expenses.

CI's fiscal year starts on July 1st and ends on June 30th. CI's financial statements are audited and certified annually by a respectable firm in the auditing industry. CI strives to exercise the highest level of stewardship over donor contributions and is proud to earn accolades for our financial management. CI was listed in Charity Navigator's list, "10 of the Best Charities Everyone's Heard Of." CI also earned an "A" efficiency rating from the American Institute of Philanthropy for the 11th year in a row, with 84 percent of expenses directly supporting conservation programs and just 5 percent supporting fundraising efforts.

Funding support for this Project comes primarily as grant from moreTrees, a Japanese carbon offset provider.

#### **G5 Land Tenure (Required)**

**G.5.1 Guarantee that the project will not encroach uninvited on private property, community property, or government property.**

Project area is under the lands designated as Community Based Forest Management (CBFM) areas (see G.1.5 for details). CBFMs are led by the People's Organization in coordination with the DENR and support from LGUs, and work to ensure sustainable utilization of forestland resources, management plan implementation, and equitable sharing of benefits for the socio-economic upliftment of community members. The parcels included in the Project are under stewardship of farmers who have expressed their interest in participating in the project. The Project guarantees that it will not encroach uninvited on private property, community property, or government property.

**G.5.2 Guarantee that the project does not require the relocation of people or any relocation is 100% voluntary and fundamentally helps resolve land tenure problems in the area.**

The Project guarantees that the project does not require the relocation of people, or any relocation is 100% voluntary and fundamentally helps resolve land tenure problems in the area.

The Project is a community-based project. The People's Organizations participating in the Project, namely The Divisoria Sur Agroforestry Farmers Association (DSAFA) and The Sto. Nino Integrated Social Forestry Association (STISFA) hold tenure to the project land and are among the project proponents. They involve in direct implementation of the project. Their roles are clearly stated and agreed in the Memorandum of Agreement (see G.6.2 below).

**G.5.3 Describe potential "in-migration" of people from surrounding areas, if relevant, and explain how the project will respond.**

There is potential in-migration for land squatting in the form of upland farming within the areas classified as forestlands within the Project, but none within private lots. Land squatting being illegal, and inasmuch as the forestlands are covered by the CBFM with the project participating

POs as tenure holders, pertinent forestry laws and local forest land use plans will have to be strictly enforced with the POs in the frontline together with the assisting DENR offices and LGUs. Information dissemination to target all local sectors and barangay meetings will be conducted periodically to aid in law enforcement.

## **G6 Legal Status (Required)**

### **G.6.1 Guarantee that no laws will be broken by the project.**

The project will not break laws. On the contrary, this project will help implement the sustainable management of the land in the framework of CBFM program. Since the DENR and LGUs are project partners as well as implementors of local and national laws surrounding the project, any potential conflict with local laws will be anticipated and mitigated.

The project is consistent with local and national policies. Deforestation and upland degradation are two of the priority issues in national development. Specifically, the project is in support of the following national policies:

- (a) DENR Administrative Order No. 24 Series of 1991- This order bans logging in all old-growth forests of the country.
- (b) R.A. No. 7586 “National Integrated Protected Areas Systems Act of 1992”- This law establishes a system of protected areas nationwide one of which is the Northern Sierra Madre protected area.
- (c) Executive Order 363 Series of 1995- This presidential fiat adopts the Community-Based Forest Management (CBFM) as the national strategy in pursuit of sustainable development in the uplands and promote social justice. It provides for the issuance of an appropriate tenurial instrument for participating upland communities.

### **G.6.2 Document that the project has, or expects to secure, approval from the appropriate authorities.**

The entities with mandates over the project area—the Department of Environment and Natural Resources, Quirino Province, and the Local Government Unit of Maddela—has signed the Memorandum of Agreement (MOA) for cooperation with the Project. This MOA is a legal instrument that specifies the relationship between and respective roles of project sponsor (moreTrees), the Department of Environment and Natural Resources (DENR), People’s Organizations (DSAFA and STISFA), The Palacian Economic Development Association (PEDAI), and Conservation International. The project has been endorsed by the Protected Area Management Board of Quirino Protected Landscape (Resolution No. 2008-03) which serves as the basis for securing the host country endorsement.

This project is a positive step to promote government’s direction in climate change and forest conservation.

## **G7 Adaptive Management for Sustainability (1 Point)**

**G.7.1 Demonstrate how management actions and monitoring programs are designed to generate reliable feedback that is used to improve project outcomes.**

Prior to the project implementation, a stakeholders meeting were conducted to draw up the detailed workplan for the project implementation and monitoring plan. Furthermore, quarterly or bi-annual meetings will be conducted with the stakeholders to monitor and update the progress of the activities. These meetings will provide a venue for discussion and resolution of issues and concerns arising during project implementation. The project monitoring plan includes regular recording of the number of seedlings planted by species and the survival rate of the planted seedlings, as well as the types, amount, and date of application of fertilizer. Seedling mortalities will be replaced with new seedlings. With the monitoring information, seedling management methods will be improved. In addition, monitoring through regular patrolling and site visits to the reforestation and agroforestry areas will also be dicussed and planned with the communities, LGU and DENR to ensure that activities identified and agreed are properly implemented, and countermeasures taken.

The field management entity, PEDAI, will report formally to CI annually on the progress during the past year and issues that have been identified. CI staff will also conduct informal routine communication with the field implementers for more frequent updates and, if necessary, timely attention.

For the biodiversity and community monitoring, the project will adopt the Biodiversity Monitoring System (NORDECO and DENR, 2001). The system is designed to monitor biodiversity and land use change within a particularr area with the involvement of the local community and other stakeholders to determine trends in land use change, biodiversity and community resource use through out the year. This method includes Focus Group Discussions, Transect Walk, Field Diary and Photo Documentation (See B.3 for details on the methodology).

**G.7.2 Describe the a management plan for documenting decisions, actions and outcomes and sharing this information with others within the project team, so experience is passed on rather than being lost when individuals leave the project.**

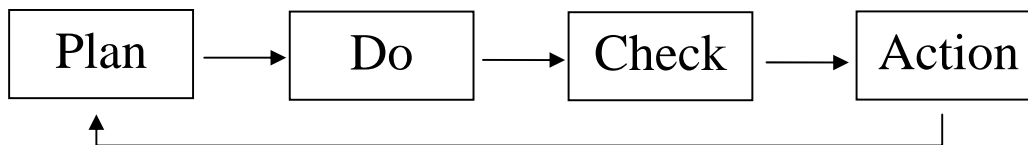
As described in G.7.1, annual reporting will be the main formal mechanism for documenting decisions, actions and outcomes. Project progress and outputs will be measured based on the detailed workplan that will be developed with the stakeholders prior to project implementation.

These reports will be accessible to all project team members throughout the duration of the project. Furthermore, the project's emphasis on the capacity-building activities will also lead to passing on experiences within the project team. Thus, the project-related experience will be retained within the project.

**G.7.3 Demonstrate how the project design is sufficiently flexible to accommodate potential changes and that the project has a defined process in place to adjust.**

The project implementation will be reviewed at least annually for higher performance and for higher benefits to community and biodiversity. With the incentive fund mechanism, all stakeholders are expected to contribute positively to the project improvement.

The project follows the PDCA cycle (below) for progress management to ensure that the project issues and concerns are properly addressed. The cycle of PDCA starts from detailed planning for the activities (the “P” or Plan phase). The plans are duly implemented (the “D” or Do phase). Progress is evaluated against the initial plan through regular reporting described in G.7.1 and G.7.2. to identify matters that require corrective actions (the “C” or Check phase). Small corrections are immediately instituted and implemented. Large corrections are considered and instituted into the plans for the next step (the “A” or Action phase). The A phase for this step becomes the P phase for the next step, and the cycle repeats. The PDCA is the project’s formal practice of adaptive management. It allows flexibility to accommodate unforeseen issues during the course of the project implementation, while maintaining coordinated, well-structured decision making and documenting.



G.7.4 Demonstrate an early commitment to the long-term sustainability of project benefits once initial project funding expires, including e.g. a new project; securing payments for ecosystem services; promoting micro-enterprise; and establishing alliances to continue sustainable land management.

The initial funding will secure all project activities for the first 41 hectares for 20 years. The donor has expressed its strong will to reinvest back to the project the net revenue from the marketing of the offset credits generated by the project, so that the project activity will expand to the entire 177 hectares that this PDD covers. This arrangement is included in the MOA.

The operationalization of the incentive fund will support long-term sustainability by supporting livelihood of participating communities. This fund is envisioned to be revolving, in that the funds that generate the fund are derived from the project activities (credit marketing, agroforestry, etc.) and the funds from the fund may be used for activities, which in turn, will bring back more funds.

There is a land use plan within the project area agreed between community, LGU, and DENR, or the CBFM (community-based forest management) scheme. In respecting this agreement, it is expected that the project continues the sustainable land use practice for a long term.

Quarterly reports by the Community, Environment and Natural Resources Officer (CENRO) of DENR (see CM.3.1) will also provide useful information for PEDAI and CI in identifying problems and necessary adjustments and improvement in the project management.

## **G8 Knowledge Dissemination (1 Point)**

### **G.8.1 Describe how they will document the relevant or applicable lessons learned.**

Through constant periodic group meetings and discussions, CI and project partners will assess progress of project implementation activities that will highlight accomplishments and identifying conditions or factors that serve to facilitate or constrain their attainment. Documentation of such monitoring meetings will form part of project monitoring as stated in G.7.1

### **G.8.2 Describe how they will disseminate this information in order to encourage replication of successful practices. Examples include: undertaking and disseminating research that has wide reaching applications; holding training workshops for community members from other locales; promoting “farmer to farmer” knowledge-transfer activities; linking to regional databases; and working with interested academic, corporate, governmental or non-governmental organizations to replicate successful project activities.**

Among the major project activities is local capacity building to include communities, DENR and government. A series of training on reforestation and agroforestry development and management will be conducted for the local communities at the onset of the project implementation. Currently, ICRAF, CI and Environmental Leadership and Training Initiative (ELTI)<sup>1</sup> is conducting series of trainings and seminars on Climate change adaptation and mitigation for government (LGU, DENR), local NGOs and Peoples Organization throughout the country. The objective of these trainings and seminars is to enhance the understanding of local partners on the processes involved in Forest Carbon Projects and demonstrate how the VCU mechanism can address the local development needs. CIP has facilitated participation of Peoples Organizations, DENR and LGUs involved in the project to attend these trainings.

The project will also facilitate cross learning visits of upland-farmer project participants to successful agroforestry projects of public and private individuals to learn more on the management and actual benefits agroforestry can provide, share their lessons, and in return promote the project for others' cross visit to the project site.

CI will continue to participate in conferences, trainings and workshops on climate change to share lessons learned and experiences in developing forest carbon projects to other local NGOs, LGUs and Peoples Organizations such as the training series conducted by ELTI.

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<sup>1</sup> The Environmental Leadership and Training Initiative (ELTI) is a joint program that combines the unique strengths of the Yale School of Forestry & Environmental Studies (F&ES) and the Smithsonian Tropical Research Institute (STRI) to enhance environmental management and leadership in the tropics by offering cutting-edge learning and networking opportunities aimed at improving biodiversity conservation and human welfare.

## II. Climate Section:

The Project's climate benefit is summarized in Table 10. For the details of CL1-CL3, please refer to the accompanying VCS Project Description.

**Table 10.** Estimate of the climate benefit generated by the Project

Year	Baseline net GHG removals by sinks (t-CO <sub>2</sub> e)	Actual net GHG removals by sinks (t-CO <sub>2</sub> e)	Leakage (t-CO <sub>2</sub> e)	Net anthropogenic GHG removals by sinks (t-CO <sub>2</sub> e)
2007	0	-3	0	-3
2008	0	142	0	142
2009	0	-363	0	-363
2010	0	2,569	0	2,569
2011	0	2,569	0	2,569
2012	0	2,569	0	2,569
2013	0	2,569	0	2,569
2014	0	2,569	0	2,569
2015	0	2,569	0	2,569
2016	0	2,569	0	2,569
2017	0	2,569	0	2,569
2018	0	2,569	0	2,569
2019	0	2,569	0	2,569
2020	0	2,569	0	2,569
2021	0	2,569	0	2,569
2022	0	2,448	0	2,448
2023	0	2,569	0	2,569
2024	0	2,149	0	2,149
2025	0	2,569	0	2,569
2026	0	2,569	0	2,569
<b>Total</b> (t-CO <sub>2</sub> e)	0	42,915	0	42,915

### CL1 Net Positive Climate Impacts (Required)

CL.1.1 Estimate the net change in carbon stocks due to the project activities. The net change is equal to carbon stock changes with the project minus carbon stock changes without the project (G2). Alternatively, any methodology approved by the CDM Executive Board may be used. Define and defend assumptions about how project activities will alter carbon stocks over the duration of the project or the project accounting period.

Please refer to Section C of CDM-SSC-AR-PDD.

CL.1.2 Factor in the non-CO<sub>2</sub> gases CH<sub>4</sub> and N<sub>2</sub>O to the net change calculations (estimated in CL.1.1.) if they are likely to account for more than 15% (in terms of CO<sub>2</sub> equivalents) of the project's overall GHG impact.

Non-CO<sub>2</sub> GHGs are not likely to account for more than 15% of the project's overall GHG impact. Furthermore, the CDM Executive Board agreed at its 42nd meeting held during 24-26 September in Bonn, Germany that GHG emissions in A/R CDM project activities from (i) fertilizer application, (ii) removal of herbaceous vegetation, and (iii) transportation may be considered as insignificant and hence can be neglected in A/R baseline and monitoring methodologies (<http://cdm.unfccc.int/EB/042/eb42rep.pdf>; p.6).

CL.1.3 Demonstrate that the net climate impact of the project (including changes in carbon stocks, and non-CO<sub>2</sub> gases where appropriate) will give a positive result in terms of overall GHG benefits delivered.

Please refer to Section C of CDM-SSC-AR-PDD.

## **CL2 Offsite Climate Impacts (“Leakage”) (Required)**

CL.2.1 Estimate potential offsite decreases in carbon stocks (increases in emissions or decreases in sequestration) due to project activities.

The leakage is considered zero. Please refer to Section C.3 of CDM-SSC-AR-PDD.

CL.2.2 Document how negative offsite impacts resulting from project activities will be mitigated and estimate the extent to which such impacts will be reduced. Estimate the extent to which the negative offsite impacts will be reduced adequately.

There is no leakage expected as a result of the Project.

CL.2.3 Subtract any likely project-related unmitigated negative offsite climate impacts from the climate benefits being claimed by the project. The total net effect, equal to the net increase in onsite carbon stocks (calculated in the third indicator in CL1) minus negative offsite climate impacts, must be positive

Please refer to Section C.5 of CDM-SSC-AR-PDD.

## **CL3 Climate Impact Monitoring (Required)**

CL.3.1 Describe the initial plan for how they will select carbon pools and non-CO<sub>2</sub> GHGs to be monitored. State if the corresponding measurements and the sampling strategy (including monitoring frequency) are set in the monitoring plan. Show that all potential pools are included (aboveground biomass, litter, dead wood, belowground biomass and soil carbon). Pools to monitor must include any pools expected to decrease as a result of project activities. Describe if relevant non-CO<sub>2</sub> gases are monitored if they account for more than 15% of the project's net climate impact expressed in terms of CO<sub>2</sub> equivalents.

Please refer to Section B.8 of CDM-SSC-AR-PDD.

**CL4 Adapting To Climate Change & Climate Variability (1 Point)**

The Project does not intend to pursue demonstrating that it fulfills this criterion. However, re-creating or creating natural and agricultural ecosystems with high diversity should provide resilience to changes caused by climate change or climate variability.

CL.4.1 Identify likely regional climate change and climate variability impacts, using available studies.

CL.4.2 Demonstrate that the project has anticipated such potential impacts and that appropriate measures will be taken to minimize these negative impacts.

**CL5 Carbon Benefits Withheld from Regulatory Markets (1 Point)**

CL.5.1 Demonstrate that at least 10% of the total carbon benefits generated by the project into regulated GHG markets will not be sold. Projects can sell these carbon benefits in a voluntary market or retire them.

The Project will market and retire all carbon benefits in the voluntary market through Voluntary Carbon Standard Registry. No carbon benefits from this project will enter into regulated GHG markets.

### III. Community Section:

#### CM1 Net Positive Community Impacts (Required)

CM.1.1 Describe the appropriate methodologies used to estimate the net benefits to communities resulting from planned project activities. Include a credible estimate of net benefits changes in community wellbeing given project activities. This estimate must be based on clearly defined and defensible assumptions about how project activities will alter social and economic wellbeing over the duration of the project. Compare the “with project” scenario with the baseline scenario of social and economic wellbeing in the absence of the project. The difference (i.e., the net community benefit) must be positive.

Household interviews were conducted using a semi-structured questionnaire to evaluate socioeconomic impacts of the Project, as described in G.1.4.

The majority (76%) of the respondents was already aware of the agroforestry system. This was expected because agroforestry system had long been introduced in many parts of the country for many years. Many seminars and trainings related to agroforestry system were conducted in most parts of the country. Also, this strategy was one of the integral components of social forestry program launched by the government such as the Community Based Forest Management which has become the flagship program of the government towards sustainable forest management.

The majority (71%) of respondents expected agroforestry to be an additional or main source of income (Table 11). Results indicated that most of the farmers in the area believed that they would mainly get economic benefit from the agroforestry system. Aside from goods, the respondents were also able to identify that agroforestry system could provide environmental services. For instance, about 20% of the total respondents mentioned that agroforestry system help prevent occurrence of excessive soil erosion because trees or woody component of the system reduce the impact of raindrops to the soil. Likewise, there were respondents who said that forest or fruit trees improve fertility of the soil and that it could preserve water or make water supply more stable.

Despite these perceived benefits of agroforestry, barriers stand in the way of achieving them (see G.2). The lack of technical know-how and the lack of capital were the barriers that were most frequently identified by the respondents (see G.2.1). The project will create community benefits by removing some of these barriers; the project funding will remove the capital barrier and technical capacity building activities will remove the technical barriers.

The Project has integrated several activities to provide benefits to local communities, specifically in restoration of the watershed and creation of income from sale of agroforestry products. Spin-offs economic activities and benefits are also expected to be generated by the project that will spur sustainable economic development.

Compared to the baseline of persistent poverty, the creation of additional income source contributes positively to the community well-being. To prove this point, the project will undertake the periodic monitoring program to compare the economic situation of local

community before and after the project. Specifically, as the government-mandated body, the Community, Environment and Natural Resources Officer (CENRO) of DENR will document the POs' activities and outputs pertaining to their organizational, social and economic development and the corresponding influence or impact towards the promotion of sustainable resource use and development. Lessons learned, issues and concerns will be put into quarterly summary reports.

**Table 11.** Benefits of agroforestry perceived by respondents

<b>Item</b>	<b>Frequency</b>	<b>Percent</b>
Additional/Source of income	355	71.29
Source of food	38	7.63
Prevent soil erosion	17	3.41
Protect the environment	11	2.21
Improve soil fertility	5	1.00
Multiple benefits	3	0.60
Ensured income	2	0.40
Source of fuelwood	1	0.20
Preserve water	1	0.20
No answer	65	13.05
<b>TOTAL</b>	<b>498</b>	<b>100.00</b>

CM.1.2 Document local stakeholder participation in the project's planning. If the project occurs in an area with significant local stakeholders, the project must engage a diversity of stakeholders, including appropriate sub-groups, underrepresented groups and women living in the project vicinity. Describe how stakeholders in the project's area of influence will have an opportunity before the project design is finalized, to raise concerns about potential negative impacts, express desired outcomes and provide input on the project design. Project developers must document stakeholder dialogues and indicate if and how the project proposal was revised based on such input.

Project planning and development initially focused on a 13,000 hectare project with AR-CDM that includes a biofuel, tree farm and forest protection components, then evolved and redefined to its current design as dictated largely by funding potential for its implementation.

A series of stakeholders' consultations were held by the Management team over a period of three years, starting with the initial consultations during the feasibility study phase in 2002 and in 2004, and succeeding consultations during the project design development phase from 2006 to 2009. The stakeholders who provided inputs to project design development and refinement include the Quirino Protected Landscape's Protected Area Management Board, the Local Government Units of Quirino at the barangay, municipal, and provincial levels, the local communities and peoples' organizations involved, the Department of Environment and Natural Resources at the community, provincial, regional and national levels, and some NGOs and the Quirino State University. The local consultation has been equally attended by all the sub-groups of community including women in the project vicinity.

The following is the chronology of major events of project planning and development through which stakeholders participated and provided inputs:

- Feasibility studies: 2002 and 2004 by CIP, CELB and ICRAF through funding from CI
- Formulation of PDD in 2006 to 2007 by CIP, CIJ, MRI, CELB and ICRAF through funding from the Global Environment Center of Japan resulting to producing the initial draft of 13,000 ha project (CDM-A/R-PDD and CDM-SSC-PDD for biofuel/Jatropha in March 2007)
- PDD Refinement in March 2008 and finalization of project boundary (satellite image analysis and ground validation) in August 2008
- Presentation of the 20-hectare Pilot Reforestation and Agroforestry Project with the Peoples Organization of Maddela and Maddela Municipal Council in 2008.
- On-going implementation of pilot 20-hectare reforestation and agroforestry (2008-2009)
- Full PDD refinement and detailed planning for 177-ha project in June 2008 to April 2009, which includes finalization of project boundary (satellite image analysis and ground validation), drafting of the MOA involving all the project partners and donor (moreTrees)

In the selection of participating parcels to the Project, the owner's willingness to participate was reconfirmed. Those who were willing to participate indicated their preference towards reforestation or agroforestry. Both the project boundaries and proportion of reforestation / agroforestry changed, reflecting the local interest.

The DENR Region 02 clarified that People's Organizations had the ownership of carbon removal credits. To make it efficient to market the carbon credits via VCS and reinvest the revenue back to the Project, a series of consultations were held between CI and the People's Organizations, Local Government Unit of Madella and Governor of Quirino Province. As the result, the carbon rights were agreed to be transferred to the donor, who will register the project with VCS Registry, market the credits and reinvest the revenue back to the project for expansion. This arrangement was entered into the Memorandum of Agreement.

CM.1.3 Formalize a clear process for handling unresolved conflicts and grievances that arise during project planning and implementation. Include a process for hearing, responding to and resolving community grievances within a reasonable time period. This grievance process must be publicized to local stakeholders. Describe how the project management will attempt to resolve all reasonable grievances raised, and provide a written response to grievances within 30 days. Document Grievances and project responses.

During the planning stage, all issues and concerns from the project participants were deliberated upon and resolved through multiple consultation meetings and workshops.

During project implementation, resolving conflicts/issues/concerns will be incorporated into the project operational guidelines and protocols. Conflict and grievance resolution will be guided by the detailed implementation and monitoring plans together with the arrangement specified in the Memorandum of Agreement (MOA) signed among the project participants. The MOA indicates that the Local government Unit of Maddela and the Barangay Council will lead in resolving conflicts such as those related to land tenure and land ownership by the local community during project implementation or any issues and concerns that may arise during project implementation.

DENR will provide technical support to resolve such conflicts. PEDAI, the Partner-NGO, as well as CI will help facilitate these meetings and discussions as the project's lead implementors.

Additional mechanisms of resolving conflicts are already in place at the community level that include the "Katarungang Pambarangay" or the barangay justice system under the Local Government Code of 1991 [RA 7160, Book III, Chapter 7], and the Alternative Dispute Resolution Act of 2004 [RA 9285 or ADR Act].

## **CM2 Offsite Community Impacts (Required)**

### **CM.2.1 Identify potential negative offsite community impacts that the project is likely to cause.**

Potential negative impacts to offsite communities include:

#### *a) Migration and conflict*

The Project could attract people from the outside to the project area. Migration of people from outside to take advantage of project opportunities (e.g., jobs) could deprive the communities of their origin of needed labor resources.

#### *b) Price dampening due to oversupply of fruits*

With fruit tree farms, there could be an over supply of certain fruits being marketed to offsite communities producing the same fruit products. Thus, oversupply will dampen prices in those markets and adversely affect farmer-producers in those areas.

### **CM.2.2 Describe how the project plans to mitigate these negative offsite social and economic impacts.**

#### *a) Migration*

One way to avoid conflicts arising from migration is to ensure that local communities are given priority in employment opportunities involving PO under CBFM. This will discourage entry of people from the outside as well as strengthen local communities. Also, by involving DENR regional office, it is expected that the concept of project will spread and is pursued widely in other parts of the region where people shows such interests or demands.

#### *b) Price dampening due to oversupply of fruits*

Market study will be conducted to ensure that there is no oversupply of certain fruits in the surrounding markets. The possibility of marketing fruits to larger market, such as Manila, could also be explored to minimize over supply in local markets.

### **CM.2.3 Evaluate likely unmitigated negative offsite social and economic impacts against the social and economic benefits of the project within the project boundaries. Justify and demonstrate that the net social and economic effect of the project is positive.**

The identified negative offsite social and economic impacts of the project can be mitigated as explained in CM 2.2. On the other hand, the Project is expected to bring positive impacts to the communities within the project area, as presented in CM 1.1. Thus, the project provides overall net positive community benefits.

### **CM3 Community Impact Monitoring (Required)**

CM.3.1 Define the initial plan for how they will select community variables to be monitored, and the frequency of monitoring. Potential variables include income, health, roads, schools, food security, education and inequality. Include in the monitoring plan, community variables at risk of being negatively impacted by Project activities.

In the early design phase in 2006, a socio-economic questionnaire survey was conducted. It was responded by 498 people from the project area and its vicinity. The survey recorded information on land use, demography, occupation, types and sizes of agricultural operations, livelihood alternatives, etc. (Appendix 2). These survey items constitute candidate set of monitoring variables.

As stipulated in the Revised Rules and Regulations for Implementation of Community-Based Forest Management Strategy (DENR Administrative Order No. 2004-29), participatory monitoring and evaluation will be conducted annually by a team composed of representatives from project partners (DENR, LGU, NGOs, POs) and other concerned sectors. The monitoring and evaluation report will highlight the problems, opportunities and recommendations.

As the government-mandated body, the Community, Environment and Natural Resources Officer (CENRO) of DENR will document the POs' activities and outputs pertaining to their organizational, social and economic development and the corresponding influence or impact towards the promotion of sustainable resource use and development. Lessons learned, issues and concerns will be put into quarterly summary reports.

### **CM4 Capacity Building (1 Point)**

CM.4.1 Explain how the capacity building is structured to accommodate the needs of communities, not only of the project.

Please see G.3.2. The capacity building efforts also aims to enhance community empowerment by way of providing learning opportunities covering the aspects of organizational strengthening, livelihood development and community resources mobilization.

CM.4.2 Explain how the capacity building is targeted to a wide range of groups, not just elites.

The main target of the training is the members of the participating People's Organizations. Since the objective of the training is the empowerment of beneficiaries for the project's long-term success, the training will be open to all relevant persons, regardless of income level, social status or gender.

CM.4.3 Explain how the capacity building is targeted to women to increase their participation.

See above, CM 4.2.

CM.4.4 Explain how the capacity building is aimed to increase community participation in project implementation.

The capacity-building activities are expected to generate understanding and appreciation of the project by the local communities. In turn, such appreciation will contribute and lead to wider community participation in project implementation.

First, knowing the roles and functions of each project components and how they are inter-related will lead to understanding and acceptance of the project. Also, it is a way of the project directly reaching out to the community.

Second, as increasing number of participants materializes, better livelihood and income through involvement in the project implementation and outreach, it is expected that the visibility and credibility of the project will rise within the community that encourages others to join.

#### **CM5 Best Practices in Community Involvement (1 Point)**

**CM.5.1 Demonstrate that the project was developed with a strong knowledge of local customs and that, where relevant, project activities are compatible with local customs.**

The project is designed based on community consultation meetings which highlighted project activities that are appropriate to the local setting in terms of its socio-economic, demographic, technical, cultural, institutional and political conditions. For instance, the consultations were conducted which recognized the authority, concern and participation of local government units' leaders throughout the duration of project planning.

Conservation International Philippines has been involved in conservation activities in the Sierra Madre Biodiversity Corridor, which include Quirino, since 1999. The experience and local knowledge acquired during the past activities have been integrated in the plan of the Project.

**CM.5.2 Show that local stakeholders will fill all employment positions (including management) if the job requirements are met. Explain how stakeholders will be selected for positions and where relevant, must indicate how traditionally underrepresented stakeholders and women, will be given a fair chance to fill positions for which they can be trained.**

Reforestation, agroforestry, community organization for planning, and community capacity building are four main components of the Project. Specific activities regarding reforestation and agroforestry include: nursery operations (facility development, seedling raising), planting (site preparation, seedling transportation, planting), maintenance (fertilizer application, weeding, replanting dead seedlings, patrol and monitoring), and infrastructure development (construction of graded trails and footpaths, fireline construction and maintenance). Community organization for planning component involves such activities as coordinating with Barangay officials, People's Organizations, Local Government Units; holding planning workshops with stakeholders at the onset; holding quarterly meetings with Barangay officials and People's Organizations; offering livelihood trainings to local stakeholders; and having meetings/workshops with PEDAI, Local Government Units, and DENR. Community capacity building component targets skills development for project implementation and awareness raising for environmental issues.

When hiring personnel, the Project place prime consideration to maximizing the efficiency and sustainability of the operations. No other restrictions are placed. In addition, PEDAI has

established a mechanism of hiring local farmers, workers (including also women), younger and older generations. With PEDAI's support, the project aims to effectively reach out its program activity to various groups of community and provide a fair chance of participation along with capacity building program and socio-economic development program offered by PEDAI and CI Philippines.

Given that there are much more areas to be reforested and sustainably managed beyond the initial parcels targeted by the project (within and outside the project boundaries), expansion of activities is an important consideration. If personnel are available to take over the CI's or PEDAI's role partially or entirely and manage the project effectively, CI and PEDAI can devote its resource to other sites. At the same time, if persons who "graduate" from the project after capacity training and experience can replicate the project activities elsewhere toward the common goal of achieving the triple benefits, and CI will support such actions.

CM.5.3 Show that the project will inform workers about their rights, and that the project complies with international rules on worker rights.

Labor laws in the Philippines are closely observed, enforced and monitored. Project workers' recruitment, skills training, compensation/benefits and other worker hiring-related matters are to be based on existing labor laws. Philippine laws comply with international rules as the Philippine government is a member of the International Labor Organization (ILO). The Philippine Labor Law for instance provides for fixed 8 hour per day work duration and pay rates, medical insurance and other benefits.

CM.5.4 Comprehensively assess situations and occupations that pose a substantial risk to worker safety. A plan must be in place to inform workers of risks and to explain how to minimize such risks. Where worker safety cannot be guaranteed, project proponents must show how the risks will be minimized using best work practices.

No major risks to worker safety have been identified. This assessment is based on the fact that all workers of the reforestation and agroforestry components are local farmers who are fully knowledgeable of the area's climate and necessary precautionary measures for working on the field. Should the project identify new job/occupational hazards later on, the project will disseminate relevant information at regular meetings, as part of the hiring process, or in the process of starting different project components.

#### **IV. Biodiversity Section:**

The Sierra Madre Biodiversity Corridor, covering approximately 1.7 Million hectares, is one of the most biologically important areas in the Philippines. It includes 15% of the remaining closed canopy dipterocarp forests in country as well as 47% of the remaining mossy forests. Aside from the diverse habitat types, the corridor is also home to the endangered Philippine eagle and Philippine crocodile.

Part of the Sierra Madre Biodiversity Corridor is the Northern Sierra Madre Natural Park, the largest protected area under the National Integrated Protected Area System (NIPAS) of the country. The Park is one of the few areas in Asia that contain a high concentration of threatened species. A total of 70 globally threatened or near-threatened species of wildlife have been recorded in the Park. In addition, it harbors the largest remaining lowland forest in the Philippines.

There are no systematic studies on the threats to the natural forests and the biodiversity resources of the target project area. However, experience in the Northern Sierra Madre Natural Park in nearby Isabela province shows that the main causes of forest destruction are logging (large and small-scale), shifting cultivation, agricultural development, land tenure issues, and land speculations (NORDECO/DENR, 1998). Interviews with local people reveal that the same causes are operating in the project area.

Brushland and grassland areas, which are main parts of the project area together with cropland, are the end result of deforestation and decades of upland farming. They are usually of small trees and grasses such as *Imperata cylindrical* (*cogon* in the Philippines and Satan's tail in the US) and *Themeda sachharum* (*talahib* in the Philippines). They have low soil fertility and high erosion rates. For years, the government has been trying to rehabilitate them through reforestation activities. However, government efforts have had little success due to several technical and socio-economic factors. One of these is that lack of incentives by the various stakeholders to keep the trees alive which in turn is partly due to the lack of participation of local people.

The Sierra Madre mountain range is also an important watershed, providing water for power, domestic use and irrigation. Reforestation and consequence poverty reduction will result to the maintenance and expansion of tree cover in the watershed which in turn will cause a more stable water supply in the long run.

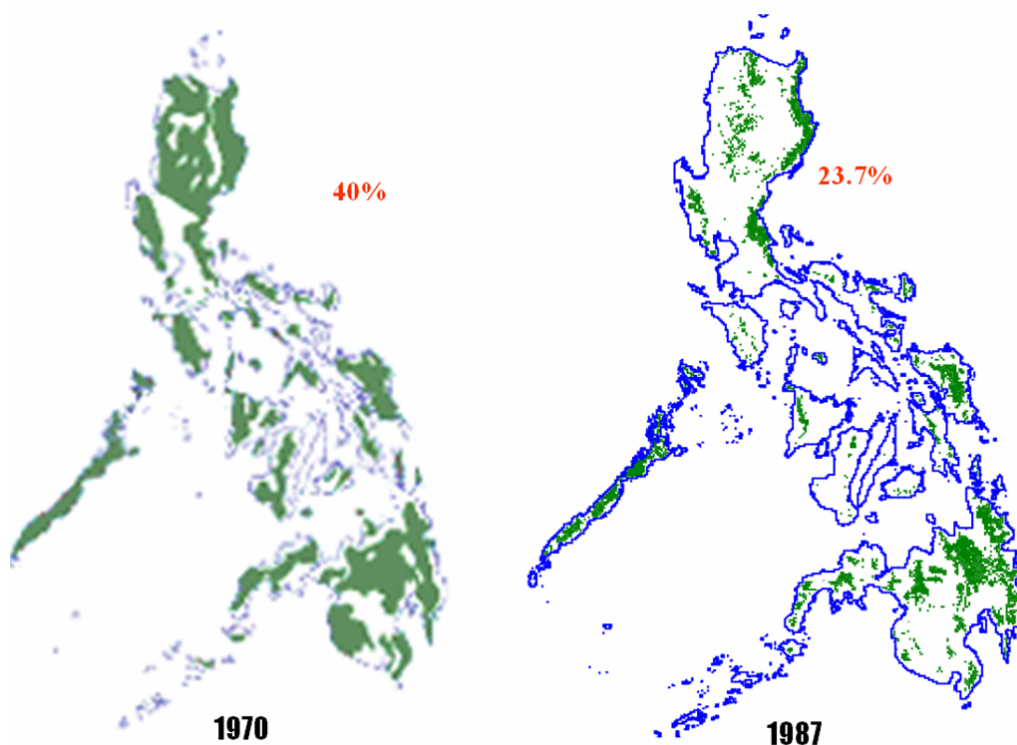
In addition, reforestation of barren lands will significantly reduce the rate of soil erosion and degradation in the watershed. The soil conservation benefits of tree plantations and agro-forestry systems are well-documented in the Philippines (Cruz, 1992; Lasco, 1987).

#### **B1 Net Positive Biodiversity Impacts (Required)**

B.1.1 Use appropriate methodologies (e.g., key species habitat analysis, connectivity analysis) to estimate changes in biodiversity as a result of the project. Base this estimate on clearly defined and defensible assumptions. Compare the "with project" scenario with the baseline

“without project” biodiversity scenario completed in G2. The difference (i.e., the net biodiversity benefit) must be positive.

The project site was once covered with continuous forest until 1970s, and then the forest cover rapidly declined (Figure3). Hunting, habitat loss and fragmentation are identified as the major causes of biodiversity loss, as seen in assessment of the threatened species. Recovering the forest using native tree species means restoring the habitat conditions for the assemblages of species, which may be indicated by the recovery of threatened species. On this basis, the project will bring additional positive biodiversity benefit in comparison to the baseline scenario. Table 12 summarizes the biodiversity benefits of the project.



**Figure 3.** Changes in forest cover in the Philippines. Drastic deforestation occurred in 1970s and 80s.

**Table 12.** Net biodiversity benefits projected under ‘with-project’ scenario.

Without-project scenario	With-project scenario	Net effect
The loss of the remaining patches of native forest leading to local disappearance of seed-dispersing wildlife that would otherwise help natural forest regeneration as well as refuges and habitat of the identified threatened and endemic species	Remnant, fragmented forest patches will be connected with new planted forest, forming continuous larger patch of forest. Wide range of species being threatened by loss of forest, from Philippine eagle, to Ashy ground thrush and Pygmy forest frog, will benefit from this change.	Positive
Increase in disturbed sites are prone to negative impact of invasion by non-native, invasive species of plants and animals	Forest will provide more stable conditions, making it harder for pioneer-type invasive alien species to become established.	Positive

B.1.2 Describe possible adverse effects of non-native species on the area’s environment, including impacts on native species and disease introduction or facilitation. If these impacts have a substantial bearing on biodiversity or other environmental outcomes, the project proponents must justify the necessity of using non-native species over native species.

The project will plant only species that are found in the forest of this region. The seedlings to be planted will be raised locally, which minimizes the risk of introduction or facilitation of new diseases. Thus, no adverse impacts of non-native species are expected for this project.

B.1.3 Identify all IUCN Red List threatened species and species deemed threatened on nationally recognized lists that may be found within the project boundary. Project proponents must document how project activities will not be detrimental in any way to these species.

Tables 13 and 14 provide the list of IUCN Red List species and match category under the Philippines’ National Red List that have been observed in Quirino Protected Landscape adjacent to the Project area. They may be found within the project boundary as well, and it is one of the Project’s objectives to provide better habitat conditions for these species through forest restoration.

**Table 13.** List of threatened species of fauna within the Quirino Protected Landscape (CR Critically Endangered, EN= Endangered; VU=Vulnerable, OTS=Other Threatened species, OWS=Other Wildlife Species)

Species	IUCN	National Red List*
<b>Mammals</b>		
<i>Sus philippensis</i>	VU	VU
<i>Rusa marianus</i>	VU	VU
<b>Birds</b>		
<i>Oriolus isabellae</i>	CR	OWS
<i>Spizaetus philippensis</i>	VU	VU
<i>Bubo philippensis</i>	VU	VU
<i>Ceyx melanurus</i>	VU	VU
<i>Pitta kochi</i>	VU	VU
<i>Ptilinopus marchei</i>	VU	VU
<i>Hypothymis coelestis</i>	VU	VU
<b>Reptiles</b>		
<i>Varanus olivaceus</i>	VU	VU
<i>Pelochelys cantorii</i>	EN	EN
<b>Amphibians</b>		
<i>Kaloula kalingensis</i>	VU	
<i>Platymantis sierramadrensis</i>	VU	

\* DENR- Department Administrative Order 15-2004

**Table 14.** List of threatened species of flora found within Quirino Protected Landscape. (CR Critically Endangered, EN= Endangered; VU=Vulnerable, OTS=Other Threatened species, OWS=Other Wildlife Species)

Species	IUCN	National Red List*
<i>Mitrephora fragrans</i>	VU	VU
<i>Agathis philippinensis</i>	VU	VU
<i>Terminalia nitens</i>	VU	
<i>Dillenia philippinensis</i>	VU	OWS
<i>Dipterocarpus validus</i>	CR	
<i>Hopea acuminata</i>	CR	CR
<i>Shorea contorta</i>	CR	VU
<i>Shorea guiso</i>	CR	
<i>Shorea negrosensis</i>	CR	VU
<i>Shorea palosapis</i>	CR	
<i>Shorea polysperma</i>	CR	VU
<i>Macaranga caudatifolia</i>	VU	OWS
<i>Macaranga grandifolia</i>	VU	
<i>Lithocarpus ovalis</i>	VU	OTS
<i>Pterocarpus indicus</i>	VU	CR
<i>Aglaiia costata</i>	VU	OTS
<i>Horsfieldia ardisiifolia</i>	VU	
<i>Guioa discolor</i>	EN	EN
<i>Palaquium bataanense</i>	VU	

\* DENR- Department Administrative Order 2007-1

B.1.4 Identify all species to be used by the project and show that no known invasive species will be used.

Tree species to be used for planting have been determined by consultation of the farmers and expert judgment of local DENR, CIP and LGU taking into consideration of soil and climate conditions, the value of associated forest products, biodiversity enhancement and carbon sequestration rates. The chosen species are:

For reforestation:

1. Narra (*Pterocarpus indicus*)
2. Mahogany (big-leafed) (*Swietenia macrophylla*)
3. Molave: (*Vitex parviflora*)
4. Dao (*Dracontomelon dao*)
5. Tuai (*Bischofia javanica*)
6. Palosapis (*Shorea palosapis*)
7. Balakat-gubat (*Sapium luzonicum*)
8. Kalantas (*Toona kalantas*)

For agroforestry:

1. Citrus family (Citrus spp)
2. Lanzones (*Lansium domesticum*)
3. Rambutan (*Nephelium lappaceum*)

Furthermore, other indigenous species present in the nearby forest areas will also be collected from the wild and used for reforestation. Collection of seeds and wildlings by the local communities will be encouraged and will be raised in established nurseries for future use as reforestation planting materials. Increasing the diversity of indigenous species to be planted will supplement the number of seedlings needed by the project.

The following provide description of the species to be used for reforestation and agroforestry. None of these are known invasive species.

#### SPECIES FOR REFORESTATION

##### **1. Narra (*Pterocarpus indicus*)**

Narra attains the height of 35 meters with a diameter up to 200 centimeters. It is a deciduous tree with a fluted trunk and somewhat pronounced buttresses, usually with a wide spreading crown and sometimes with lower bunches dropping and touching the ground. Narra is adapted to flat, coastal plains behind mangrove swamps, sites along streams in the low hills near coasts or inland valleys and primary and secondary forest. It is generally found in calcareous soils or thus not deficient in calcium. It prefers moist sandy loam or clay loam soil. The tree is used as shade for abaca crops in Bicol regions and for coffee crops in Mindanao. It is planted along roads and in yards. The value of its wood, it is a plantation species for sawn wood.

*Seed collection:* There are 1200 to 1300 seeds per kilogram and 140 seeds per liter. Seeds are collected during the months of February, March and April in the forest. Seed pods can be picked up from the ground underneath the trees and can be stock in open container.

*Establishment:* Seeds (in winged spots) can be sown in a flood bed (lowered bed) for germination. Germination averages 24% to 40% 4 to 15 days after planting then pricked off to a pot and tended to grow for 3 to 4 months at the nursery before out planting.

## **2. Mahogany (big-leafed) (*Swietenia macrophylla*)**

Big leafed mahogany is a large tree with normal height of 30 to 40 meters and girth of 3 to 4 meters. It can attain a 60 meter height and 9-meter girth. The trunk has buttresses at the base and a straight cylindrical bole. A deciduous tree shed its leaves in February and March. Fruits are long (12 to 16--cm.) conical capsules 5 to 7 cm. wide, each containing numerous oblong winged seeds 3 cm. long. The dark brown bark is smooth when young, ridges and flakes form later.

Mahogany is native to Central America, down to Northern Peru and Brazil and to the Antilles. It was introduced in the Philippines in 1914 and is a common reforestation species. Big leafed mahogany adapts to a variety of soils but has a distinct preference for well-drained, sandy clay slopes. It does well on rather shallow, as well as deep alluvial soils. Big leafed mahogany is found in areas having temperatures ranging from 11°C to 32°C; seedlings require shading to become established, and then outgrow the competition to dominate the canopy. Shoot boners are a serious problem in the Philippines even on good sites.

Big leafed mahogany is used in various multi-storey system in the Philippines. At Mt. Makiling, Laguna, it is used as a shade for coffee and cacao. In Benguet Tugi (*Diocorea esculenta*), pineapple, ginger and banana are grown under the mahogany. Elsewhere the tree is used in taungya system.

*Seed collection:* Seeds are available in January and February in Laguna and December through February in the Ilocos and Isabela. Remove seed from pods for storage. There are approximately 1,600 to 2,300 winged seeds/kg or 96 winged seeds /liters. Without wings there are 3,500 seeds/kg or 200 seeds/liters. Seeds begin to lose viability after 2 or 3 months but may be kept for up to a year if mixed with sawdust and kept in airtight containers.

*Establishment:* Up to 95% germination is reported. Larger seeds germinate better and produce bigger seedlings than small seeds: Direct seedlings gives good results only on rich soil in a very humid climate and only if shading is available, as the seedlings cannot tolerate direct sunlight. In the field, plant seeds 8cm. deep. In nurseries, the seeds are sown in rows 10cm. apart. Break off seed wings, plant with rounded tip down, completely cover with soil or leave the broken wing partially uncovered. Keep the soil moist but no water logged. Germination occurs in 14 to 28 days. The shade can be reduced progressively when the seedlings are 4 months old. Outplant when 6 to 8 months old (60 to 70 cm high) as stumped, balled or bare rooted seedlings. For small planting, trees 2 to 4 m. tall may be used. The seedlings do not tolerate being planted in the open: some shade is necessary during the first 5 years. Out planting on 2 m. center is recommended.

## **3. Molave (*Vitex parviflora*)**

Molave is a medium to large tree, which can attain heights of 20 to 30 m. and diameters of 1 to 1.5m. It has an open, widely spreading crown. Tall trees have pronounced buttresses. On less favorable sites where the forest has been cut, the tree is small to medium sized with very ragged shape and crooked, short bole. The tree is deciduous, dropping some or all leaves during droughts. Fruits are small, globular drupes, 5 to 10 mm. in diameter and purple to black when

ripe. They contain storey seed about 5 to 6 mm. in diameter. The fibrous bark is smooth or thinly flaked and grayish ochre. When cut the bark is yellow with darker yellow rings, turning brown on exposure.

Molave grows best on limestone, litho and volcanic soils but occurs elsewhere. It is suitable for very dry and rocky sites with a southern exposure. It occurs in regions with distinct dry seasons (6 to 7 months) and in some places with close to desert conditions. It grows best in areas with rainfall that is evenly distributed.

*Seed Collection:* Flowering occurs at 5 to 6 years or age in May to October in Laguna, October to December in Cebu. Seeds can be stored for up to 1 year if fruit pulp is thoroughly removed and seed well dried. There are approximately 10,000 to 11,000-dried seeds/liter and 19,000 per kg.

*Establishment:* Molave is directly seeded on 1 by 1 m. spacing. Fruits are planted in a cleaned area 2 or 3 or more per hole, 2 cm. or less deep. Or cleaned seeds can be broadcast after grass and weeds are cut short or burned. In nursery beds, seeds maybe planted 1 cm. by 15 cm. apart germination occurs in about 10 days.

#### **4. Dao (*Dracontomelon dao*)**

Evergreen tree commonly 12-18 m in height, with dense, rounded head, smooth branches, and milky sap. Leaves alternate, long-petioled, trifoliolate (3 leaflets); leaflets shiny, bronze-toned, oval-elliptic, 15-20 cm long, with margins small toothed. Flowers tiny, without petals, greenish-yellow, in manyflowered clusters (racemes) at leaf axils; male and female flowers on separate plants (dioecious). Fruit pea-sized, berrylike, fleshy, to 9 mm in diameter, brown or reddish or blue-black, 3-celled.

Fast-growing from seed or cuttings, thriving best in moist soil. Leaves deciduous in times of drought. Also root suckers. Limited to areas with average minimum temperatures of 1.6 to -1.1°C. Flowers in spring. Fruits copiously in Florida, with seeds dispersed by birds. Seedlings can grow in sun or shade and adapt quickly if light conditions change.

#### **5. Tuai (*Bischofia javanica*)**

Widely distributed Indo-Malayan species extending into the Philippines Korea, and Polynesia. Common along streams at low and medium altitudes. May reach a height of 30 m but bole seldom attaining a length of 7.5 m; trunk diameters of 90 cm and more are common, reaching 150 cm; without buttresses.

*Economic Importance:* The wood of *B. javanica* is red, heavy, hard, and fine grained, making it useful material for building flooring and furniture components. Good quality Kraft and soda pulp were prepared from this wood. The fruits are used in winemaking. Containing 30-54 percent oil, the edible seeds are used as a source of lubricant. The bark is a source of red dye. The roots are used medicinally.

#### **6. Palosapis (*Shorea palosapis*)**

Also called Philippine Mahogany or White Lauan. A species of the Dipterocarpaceae family. It is endemic to the Philippines. It is threatened by habitat loss. Commonly 30 to 45 m in

height sometimes reaching 60 m; 90 to 150 cm in diameter; boles are well formed and with or without buttresses depending on species.

#### **7. Balakat-gubat (*Sapium luzonicum*)**

Found in primary and disturbed Dipterocarp forest, bamboo forest, secondary forest, mixed deciduous forest, also along streams and on hills and slopes; in Selangor (Malaya) it is very common and forms a distinctive forest community of the late succession with *Endospermum malaccense*, poor in Dipterocarps. Soil: brown and yellow clay and loam, sandy loam, over limestone, granitic and volcanic bedrock. Altitude 15--1,800 m. Flowers collected in Dec.--Sep.; fruits collected in Jan.--Oct. The flowers with a sweet smell.

#### **8. Kalantas (*Toona kalantas*)**

An endemic species found in primary forest at low and medium altitudes in the Batan Islands, Cagayan to Sorsogon Provinces in Luzon; Mindoro, Samar, Negros, Leyte, Cebu and Mindanao, Philippines. A large, forest tree. The leaves are alternate, oddly pinnate, and 30 to 50 cm long or longer. The leaflets are smooth or hairy along the nerves below, oblong or broadly lanceolate, about 12 cm long, and 5 cm wide. The panicles are profuse, lax, and equaling or shorter than the leaves. The fruit is 3 to 4 cm long, with a 5-ridged central column. The seeds are distinctly but unequally winged at each side.

### **SPECIES FOR AGROFORESTRY**

#### **1. Pomelo: (*Citrus decumana*)**

The pomelo tree is 5 to 10 m. high. The branches have solitary spines, but scales and scars are lacking. The tree prefers well-drained clay loam to sandy loam rich in organic matter, with a pH of 5.8 to 6.5. Trees bear fruit 3 to 5 years after planting. One crop is produced per year. Cleaned seed must be planted immediately after collection. Seed viability is rapidly in storage. There are approximately 57 seeds per fruit.

Amoy mantan, Sunwiluk and Siamese are the commercial pomelo varieties grown.

*Establishment:* Clear, plow and harrow the area if possible. Prepare the holes for planting. Plant at the on set of rainy season. Young trees are usually budded, but a seedling plants are also used.

#### **Other species of Citrus:**

Other species of citrus that are commonly grown commercially: calamansi, mandarin and orange. Calamansi has no recognized horticultural varieties. Ladu, cincum and ponkan are the leading mandarin orange varieties. The orange is cultivated over thousands of years now. It is supposed to originate from South- and indo-China. The clergyman Pierre Clement crossed a mandarin and an orange and this luckily crossing was a seedless mandarin with a looser skin thus easier to peel: the clementine. (beginning of the 20th century). The satsuma is a special crossing from Japan.

Citrus is known to thrive in both tropical and sub tropical climates. Places with well-distributed rainfall are best although those with distinct wet and dry seasons are equally suitable, especially if irrigation can be provided during the dry season. For best production, the soil should be deep, clay loam or sandy loam in texture for easy drained, slightly acidic (pH 5.5- 6.5) and rich in organic matters.

**Lanzones (*Lansium domesticum*)**

A medium to large tree, cultivated trees usually 5-10 m tall, while seedling trees can reach 27 m or more in height. The trunk is generally straight and the branched relatively open. The leaves are alternate and compound, around 23-51 cm long, with 5-7 leaflets. The perfect flowers are small and white, and borne on cauliflorous spikes 10-31 cm long that emerge from older branches. Fruits are spheroid, ellipsoid, or ovoid, around 2.5-5 cm in diameter, and occur in clusters of 4-40. The yellowish peel is easily removed to reveal whitish translucent, aromatic, juicy pulp divided into 5-6 segments. The flavor is reminiscent of sweet grapefruit. Fruits usually contain 1-3 greenish seeds.

Lanzones may be propagated by seeds, cuttings, airlayers or grafting. Seeds must be planted fresh, as they lose viability rapidly if allowed to dry out. Germination occurs in 2-3 weeks, and the seedlings are slow growing. Trees may be grafted at about 1 year of age, or when the trunk is about the diameter of a pencil. They can be grafted by cleft, side veneer, bud, or approach. Young trees should have 50% shade for the first 2-3 years. Langsat trees prefer moist, fertile soil and high relative humidity for best growth. Since they are slow growing, they are often interplanted with other fruit trees. They require tropical conditions, and will grow from sea level to 730 m elevation. Seedling trees may take 10-30 years or more to fruit, while grafts or airlayers can fruit in 5-6 years with good care. A mature tree can produce from 41-308 kg of fruit per year.

**Rambutan (*Nephelium lappaceum*)**

The tree reaches 15-25 m in height, has a straight trunk to 60 cm wide, and a dense, usually spreading crown. The evergreen leaves are alternate, pinnately compound, 7-30 cm long, with reddish rachis, hairy when young, and 1 to 4 pairs of leaflets, subopposite or alternate, elliptic to oblong-elliptic, or rather obovate, sometimes oblique at the base; slightly leathery; yellowish-green to dark-green and somewhat dull on the upper surface, yellowish or bluish-green beneath; 5-20 cm long, 2.5-11 cm wide, the 6 to 15 pairs of principal veins prominent on the underside. The small, petalless flowers, of three kinds: males, hermaphrodite functioning as males, and hermaphrodite functioning as females, are borne in axillary or pseudo-terminal, much branched, hairy panicles.

The fruit is ovoid, or ellipsoid, pinkish-red, bright-or deep-red, orange-red, maroon or dark-purple, yellowish-red, or all yellow or orange-yellow; 3.4-8 cm long. Its thin, leathery rind is covered with tubercles from each of which extends a soft, fleshy, red, pinkish, or yellow spine 0.5-2 cm long, the tips deciduous in some types. The somewhat hairlike covering is responsible for the common name of the fruit, which is based on the Malay word "rambut", meaning "hair". Within is the white or rose-tinted, translucent, juicy, acid, subacid or sweet flesh, 0.4-0.8 cm thick, adhering more or less to the ovoid or oblong, somewhat flattened seed, which is 2.5-3.4 cm long and 1-1.5 cm wide. There may be 1 or 2 small undeveloped fruits nestled close to the stem of a mature fruit.

B.1.5 Guarantee that no genetically modified organisms will be used to generate carbon credits.
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No GMOs will be used by this Project.

## **B2 Offsite Biodiversity Impacts (Required)**

The project area for reforestation and agroforestry components are under the land category of forestland of DENR which needs rehabilitation. There are no potential negative offsite biodiversity impacts of the project.

### **B.2.1 Identify potential negative offsite biodiversity impacts that the project is likely to cause.**

One potential negative offsite biodiversity impact of the project that is considered can arise from the collection of wildlings from forests located outside the project site. If not done properly by the community collectors, the negative effect of collecting wildlings would result to reducing available in situ reproductions outside of the project boundary that may delay or hinder the capacity of these forest sources to naturally regenerate themselves. Although the project will make arrangement with the project participants that they can raise planting materials, the main objective is to capacitate the community in the skills of seedling production using indigenous species for future livelihood opportunities as the use of indigenous species is the current direction in the reforestation strategy in the country. At the same time, collecting wildlings and raising it in the nursery can also augment seedling production in the project nurseries especially during the first year of reforestation if the need arises. However, we only need 28,886 seedlings of various indigenous species of trees and these are all readily available or purchased from outside nurseries within the province.

### **B.2.2 Describe how the project plans to mitigate these negative offsite biodiversity impacts.**

No negative offsite biodiversity impacts have been identified which needs to be mitigated.

### **B.2.3 Evaluate likely unmitigated negative offsite biodiversity impacts against the biodiversity benefits of the project within the project boundaries. Justify and demonstrate that the net effect of the project on biodiversity is positive.**

The project is seen to generate net positive impact to biodiversity.

Using indigenous and non-invasive species of plants for reforestation, the project promotes better the natural habitat for biodiversity than using fast growing exotic species. Wildling collection even helps accelerate forest regeneration process by helping the forest disperse its wildlings. In addition, the project also provides additional protection to the area allowing the natural succession and regeneration process to occur and eventually provides refuge to wildlife species. Furthermore, connecting forest fragments through reforestation and managed agroforestry farm landscapes will also help hasten the regeneration process as local wildlife species such as frugivorous birds and bats that help in seed dispersal will be able to move from one fragment to the other thus restoring the natural habitat of the endemic species.

By providing the favored habitat for a diverse species of insectivorous birds and bats, these species will serve as biological control for many insect pests by helping control insect population in the area and prevent them from causing damages to forest and fruit tree species. (This also helps the community in the agroforestry productions.)

### **B3 Biodiversity Impact Monitoring (Required)**

B.3.1 Describe the initial plan for selecting biodiversity variables to be monitored. Potential variables include species abundance and diversity, landscape connectivity, forest fragmentation, habitat area and diversity, etc. Clarify the frequency of monitoring. Include in the monitoring plan, biodiversity variables at risk of being negatively impacted by project activities.

The DENR-adopted Biodiversity Monitoring System (BMS; Appendix 8) will be used in the project. BMS is a field based monitoring system aimed to identify trends of biodiversity at a given time. It involves simple, cost-effective, and standardized methods (such as field diaries, focus group discussion, transect surveys, photo documentation) in monitoring the trends in population of indicator/priority species and land uses in protected areas; systematically generate up-to-date information necessary for effective and efficient management of protected areas. By design, the BMS involves local communities and other stakeholders in the generation of information, which is expected to be not only cost effective way of monitoring, but also to contribute to more sound conservation outcome (Danielsen, 2007).

The backbone of the BMS is the regular collection of data on natural biological resources and their utilization to determine trends in numbers and use of the natural resources. The intention of the BMS is to improve the information available to decision makers in order to ensure that the area is maintained in accordance with the management objectives and that biodiversity is being conserved (NORDECO & DENR, 2001).

The first step in carrying out the BMS is the identification of the resource uses and species to be monitored together with the local communities. This will help facilitate the monitoring activities as communities frequently observed these species or are resources commonly being used by the community. The four BMS methods are Focus Group Discussion, Field Diary, Photo documentation and Transect Walk. A summary of information gained from all four methods can supplement and support each other. Description of the different methods mentioned below is lifted from the BMS Resource Book for Trainers.

#### *Focus Group Discussion*

The objective of the focus group discussion is to generate data from the community on the trends in use of natural resources in the area, trends in status of selected resources, number of household benefiting from the use of resources. The information is largely based on the communities own perception but with continuous data gathering and number of participants in the discussion can provide a picture of the general trends. The method is conducted every quarter with the volunteer community monitoring group identified in each of the selected barangays.

#### *Field Diary*

The Field Diary method comprises standard recording of routine observations on resource use, habitats and wildlife following a simple data sheet during regular patrols, or whenever the areas/sites are visited. This will encourage people to be observant of changes in the use of the natural resources, threats and abundance of species identified at the beginning of the BMS establishment. Data recorded in the diary includes people encountered and their activities such as fuel wood gathering, charcoal and if possible include quantity, use, market price etc.

### *Photo Documentation*

Fix-point photography from the ground level will be conducted quarterly. It will monitor major changes in the vegetation of the area. The monitoring frequency will be reduced to once a year after significant changes are not observed quarterly. This method requires people with working knowledge on the operations of a camera. In this case, the DENR can provide the technical support for the project together with local communities.

### *Transect Walk*

The transect walk is similar to the field diary method. However, the transect line will be established permanently and at least 2 kilometers in length and will be traversed by the same person every quarter in order for the data to be comparable. This can be done by DENR staff as the lead person together with the community members to train them in identifying species encountered. Data collected in this method includes number of people, species of wildlife and their number.

## **B4 Native Species Use (1 Point)**

B.4.1 Show that the project will only use species that are native to the region, or justify that any non-native species used by the project are superior to native species for generating concrete biodiversity benefits.

B.1.4 provides the descriptions of the species used by the Project. All but mahogany (*Swietenia macrophylla*) are native to the region.

Although mahogany is not truly a native species, during close to a century after its introduction to the country, it has become widely used throughout the country (including the Project site), and has become integrated in the local natural landscape especially for reforestation, tree farming/wood production with its excellent quality as straight boled fit for use as house post. Being locally adopted and relatively fast growing this species readily provides tree cover serving as nurse crops and improving microclimate thus allowing other indigenous species to get established. The use of mahogany is justified for this biodiversity benefit.

## **B5 Water & Soil Resource Enhancement (1 Point)**

Both the reforestation and agroforestry components have been designed with the primary objective of helping restore the forest cover of the Cagayan River watershed in the Sierra Madre, reducing soil erosion and conserving soil fertility in the uplands and providing a source of potable water for local communities.

B.5.1 Identify project activities that are likely to enhance water and soil resources.

Soil and water conservation are promoted by the project principally through the major project components of reforestation and agroforestry. With the planting of trees in the reforestation and agroforestry, the plants will retain water and soil through the water and soil holding capacity of their root systems. Their canopies will serve to cushion the direct impact of rainfall to soil

erosion. With the adoption of contour planting in agroforestry including practices such as hedge rows soil erosion is further minimized (Mercado et al., 1999; 2005).

**B.5.2 Credibly demonstrate that these activities are likely to improve water and soil resource compared to the baseline, using justifiable assumptions about cause and effect, and relevant studies.**

Through reforestation and agroforestry, the forest or tree vegetation cover of the project areas will be restored. This is expected to lead to improving the water holding capacity of the project sites, minimizing soil erosion, and improving soil fertility. Under the baseline scenario where corn and banana and grasses are the typical land cover, soil erosion is higher considering that this land cover types have been found to have lower soil and water holding capacities than agroforestry and land cover with other tree species (Comia, 1999).

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