

Carbon-forestry projects in the Philippines: potential and challenges

The Mt Kitanglad Range forest-carbon development

Raquel C. Lopez, Felix S. Mirasol and Rodel D. Lasco

Southeast Asia

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Working Paper no. 129



World Agroforestry Centre
TRANSFORMING LIVES AND LANDSCAPES

Correct citation

Lopez RC, Mirasol FS, Lasco RD. 2011. *Carbon-forestry projects in the Philippines: potential and challenges: the case of Mt Kitanglad Range forest-carbon development project*. Working Paper 129. World Agroforestry Centre (ICRAF) Southeast Asia Program. DOI: 10.5716/WP11054.PDF

This research project was carried out under an agreement between the World Agroforestry Centre (ICRAF), Nairobi, Kenya, and the Ecology and Natural Resources Division, Center for Development Research (ZEF), Bonn, Germany.

Titles in the Working Paper series disseminate interim results on agroforestry research and practices to stimulate feedback from the scientific community. Other publication series from the World Agroforestry Centre include agroforestry perspectives, technical manuals and occasional papers.

Published by the World Agroforestry Centre (ICRAF)
Southeast Asia Regional Program
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Indonesia

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Working Paper no. 129

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Abstract

The proposed Mt Kitanglad Range forest-carbon development project aims to allow participation in the carbon market by increasing the permanent forest cover of the Mt Kitanglad Range National Park ('the Park') by reforesting the grassland areas within its buffer zone. The project will enhance the ecological services of the Park while promoting socio-economic development activities for the forest occupants who depend on marginal agricultural cultivation within the Park. The project proposes an agroforestation scheme on 300.34 hectare as a carbon forestry project initiative. This is made up of 198.29 hectare of purely forest trees as permanent protection forest and 102.05 hectare of agroforestry farm development to support the livelihoods, food sources and timber needs of participating landholders.

The study was conducted to assess the potential of, and challenges for, the proposed project to participate in carbon trading and rewards for environmental services mechanisms. One of the key strengths was the political will of the intermediary entity in helping the project participants, the occupants of deforested and degraded land. This manifested in the formulation of the project development plan.

The proposed project can potentially participate in the carbon market. There are constraints, but with the necessary technical and logistical support to achieve a final project proposal and/or project design document and subsequent operations, the Mt Kitanglad Range forest-carbon development project could potentially be a viable participant in the carbon trading and environmental services rewards mechanisms.

Keywords: Carbon market, climate change, forest-carbon development, mitigation, Mt Kitanglad Range, agroforestation scheme

Acknowledgements

The authors would like to thank the World Agroforestry Centre, Center for Development Research (ZEF), Bonn, for their financial and technical contributions involved with this publication.

We would like to thank the management of Mt Kitanglad Range Natural Park and the staff of the Community Environment and Natural Resources Office of Bukidnon for providing the needed information. Also, to Dr Paul LG Vlek of ZEF for his technical contribution and comments and Robert Finlayson for editing and Josef Arinto for design, both of the World Agroforestry Centre Southeast Asia Program.

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1. Introduction

Rationale of the study

Climate change brought about by massive greenhouse gas emissions is one of the most pressing environmental concerns the world is facing. To address climate change, the United Nations Framework Convention on Climate Change (UNFCCC) established an international policy for the reduction of greenhouse gas emissions.

With the 1997 Kyoto Protocol, developed countries (also referred to as Annex 1 countries) committed to reduce their carbon emissions below 1990 levels in the period 2008 to 2012. To fulfil this commitment, three mechanisms were agreed upon: Emission Trading, Joint Implementation and the Clean Development Mechanism (CDM). The CDM is the only flexible mechanism that involves developing countries. Under the CDM, developed countries could invest in carbon emission reduction projects that also helped address sustainable development in developing countries.

Land management by reforesting denuded forests and degraded forest lands, integrating trees on marginal croplands and grazing/grasslands can reduce atmospheric carbon stocks by removing and sequestering carbon from the atmosphere and storing it in the biomass and soil. As such, this implies the sustainable management of natural resources.

To address the impact of climate change, both mitigation and adaptation are necessary and interdependent. Forest-carbon development by agroforestation is one of the ways of achieving reduction. Aside from the carbon sequestration and storage, agroforestation addresses other ecological concerns such as land-soil quality improvement, habitat restoration, watershed rehabilitation and enhancement of a landscape's scenic values. However, to undertake this development, institutional capacity, investment capital, technological know-how, appropriate incentive mechanisms and political support (local, national and international cooperation) are all needed.

The inclusion of afforestation and reforestation (A/R) in the CDM as carbon sequestration activities for trading of greenhouse gas emission offsets created interest in the Philippines (Lasco et al. 2008) because there are millions of hectare of open, denuded and degraded forest lands and marginal, if not degraded, cultivated areas needing rehabilitation with any form of re-vegetation to improve ecosystem functions.

The emerging carbon markets and the mechanism of rewards for ecosystem services are seen as an opportunity for the Philippines to obtain financial support, especially for the sustainable use and management of its natural resources, in particular, the forests. However, there are

many challenges, especially for smallholder farmers to participate in carbon trading and be able to benefit.

This project case assessment set out to identify the institutional approaches, technological innovations and policy reforms necessary for carbon forestry projects in the Philippines to participate in the carbon market and other mechanisms and to discover ways to reduce barriers for smallholders and small-scale projects. We have used the proposed forest carbon development within Mt Kitanglad Range Natural Park ('the Park') as an example for the purposes of this research.

Objectives of the study

This study aimed to identify the potential of, and challenges for, the Park's proposed forest-carbon development project, based on the draft project plan. Specifically, three objectives were set.

1. Identify the strengths and limitations of the proposed forest-carbon development project to engage with carbon markets and other rewards for environmental services schemes.
2. Identify the key issues associated with carbon-forestry project's development and implementation.
3. Determine the actions needed for project management and policy development to institutionalise the proposed project in relation to the carbon market and other environmental services rewards schemes and identify the research focus.

Background

The Mt Kitanglad Range has unique ecological features—connected landscapes, immense diversity of flora and fauna—combined with a unique interplay of cultural communities, all of which contribute to the national economy and heritage. However, ecologically important features are threatened. To provide a legal basis for conservation and protection, the area was proclaimed a national park by Presidential Proclamation No. 667 on 14 December, 1990. It was reclassified as a natural park by Presidential Proclamation No. 896 in 1996. It became a fully fledged protected area, designated as Mt Kitanglad Range Natural Park, through congressional action under the Republic Act 8978, known as the Mt Kitanglad Act of 2000. The Park covers a total area of 47 270 ha, which includes the protected area (31 236 ha) and buffer zone (16 034 ha) area.

Forest destruction in the Mt Kitanglad Range was the result of logging during the 1960s and 1970s. Before the imposition of a logging moratorium in the province of Mindanao in 1989, several thousand hectare, particularly on the southwestern slopes of the range, were subjected to commercial logging. The access provided by logging roads, aside from assisting massive timber poaching, paved the way for migrants to conduct *kaingin* (slash-and-burn cultivation), widening the cleared areas. Upland cultivation is prevalent up to the present time. The El Niño phenomenon in 1982–83 and again in 1998 also contributed to forest destruction and grassland increase.

In 1994, however, Mt Kitanglad Range was selected as one of the ten pilot sites for the Integrated Protected Areas System covered by the Conservation of Priority Protected Areas Project (CPPAP)¹.

Forest carbon development project are proposed within the buffer zone of the protected area. Long time degraded areas that turned into grasslands. The proposed project started its initial activities in 2009. These include reconnaissance survey, community awareness raising, inventory and consultation with potential participating landholders and claimants. In 2010, drafting of the project development plan, further consultations, mapping and delineation of project area, presentation of project strategies to stakeholders were conducted. Also, the possibility of expanding the project area to include other municipalities surrounding the Park is explored. For 2011, the Protected Area Superintendent's office ('superintendent's office) plans to survey, delineate and map the potential parcels in the municipality of Lantapan, Bukidnon for inclusion in the project area coverage. The project plan will be presented for official approval and endorsement of the Protected Area Management Board ('the Park board').

¹ Funded by the Global Environment Facility of the World Bank in 1994, the CPPAP enables the Government to implement its national integrated protected area system (NIPAS) with an initial core of ten protected areas, establishing the rules which recognised and attempted to reconcile the multiple objectives of biodiversity conservation, sustainable livelihoods for local populations and tenure rights of indigenous cultural communities. Most directly, the system protected ten sites of recognised indigenous importance, which were previously unprotected and subject to degrading forces. Through CPPAP, the ten selected NIPAS sites initiated the full implementation of the NIPAS program. Anchored on the preamble of the NIPAS law, the CPPAP sites operate according to the NIPAS enabling legislation, implementing rules and regulation. NIPAS-related legislation is designed to remedy the deficiencies of previous legislation for natural resource protection in the Philippines. This is undertaken in accordance with the recommendations of the Philippines strategy for sustainable development.

2. Methodology

Sources of data and method of data collection

The study used primary and secondary data for the assessment. Key informant interviews were conducted with the personnel in-charge and field team members involved in preparation of the plan. We also participated in a mini-workshop during the formulation of the plan wherein the strengths, weaknesses, opportunities and challenges (SWOC) were identified. Furthermore, we conducted field visits and unstructured, informal interviews with local people's organizations, households and individual participants and others. The documents sources of information include the drafted project development plan for the proposed 300 ha area forest-carbon development project, the overall Park's management plan, and other related reports concerning the Mt Kitanglad Range Natural Park development.

Method of analysis

With reference to the overall framework (Appendix 1) developed for the research project entitled 'Overcoming barriers to smallholder forest-carbon development in the Philippines', we analysed the potential for, and challenges to, the carbon forestry project against three measures: effectiveness of institutionalising the proposed project; efficiency of resource use and mobilisation; and the impact of the proposed project.

We based our assessment on the project development plan, focusing on site development, resource use and mobilisation, socio-economic management and environmental services management.

The SWOC analysis is based on the draft project plan and other report documents related to the proposed project, the experience of the intermediary entity (Protected Areas Superintendent's office Ad Hoc Team) in undertaking the planning process and formulating and documenting the project plan.

The key issues of the project were identified in the SWOC analysis, specifically, the weaknesses and constraints of the technical management (site selection, definition of project area, implementation strategy in ecological services provision) and administrative management (project administration, resource use and mobilisation, socio-economic management).

3. Results and discussion

Description of Mt Kitanglad Range proposed forest-carbon development project

Site description

The Mt Kitanglad Range is located in the southern region of the Philippines in the north-central area of the province of Bukidnon, Mindanao Island (Figure 1). Encompassing the Range are the seven municipalities and one city of the province of Bukidnon. The municipalities are Baungon, Impasugong, Lantapan, Libona, Manolo Fortich, Sumilao, Talakag, and Malaybalay city (Figure 2).

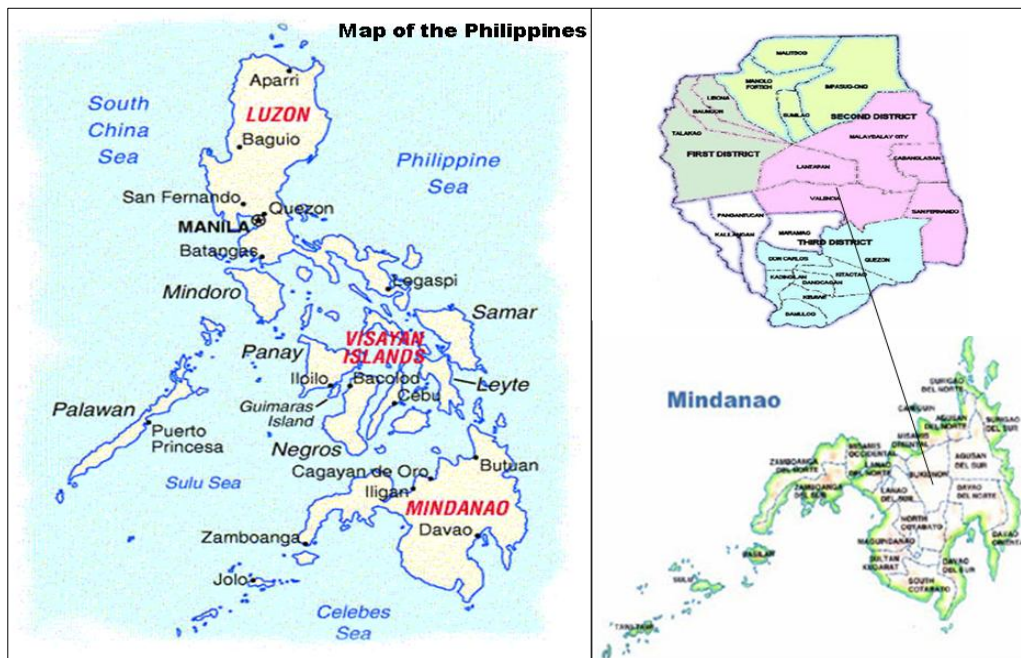


Figure 1. Location of Mt Kitanglad Range

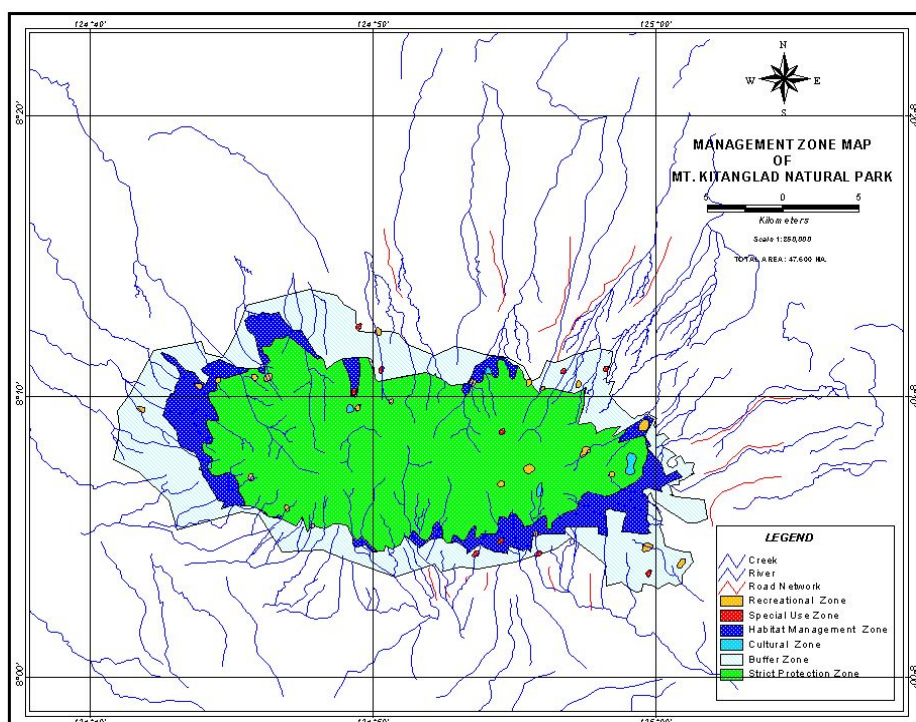


Figure 3. Mt Kitanglad Natural Park

Table 1. Land-cover status of Mt Kitanglad Range in 2005

Land cover	Area (hectare)		
	Protected area	Buffer zone	Total area
Mossy forest	24 391	6 880	31 271
Primary forest	585	896	1 481
Secondary forest	3 631	2 942	6 573
Other land with tree cover	519	1 420	1 939
Shrubland	1 870	2 896	4 766
Grassland	206	827	1 033
Corn and other crop cultivation	4	73	77
River	26	34	60
Other land-use cover	4	66	70
Totals =	31 236	16 034	47 270

Project objectives

The proposed forest-carbon development project aims to increase permanent forest cover in the protected area by reverting open forest lands, grassland areas to forest, initially in the buffer zone. At the same time as enhancing the ecological services of the Park, the projects aims to promote the socio-economic development of the indigenous communities who depend on marginal agriculture within the Park. Specifically, to

1. Restore or rehabilitate 300 ha of grassland and open areas eligible for carbon-emission reduction crediting.
2. Provide alternative sources of income for the upland communities dependent on marginal agriculture.
3. Enhance biodiversity conservation values of the protected area through habitat restoration, especially in degraded habitat.
4. Stabilise headwaters for continuous supply of potable water downstream by reforesting the denuded areas.
5. Improve the entire landscape of the Park and soil quality of degraded grasslands and marginal cultivation areas.

Area

The proposed forest-carbon development project will cover an aggregated total of 300 ha consisting of 62 parcels. Forty-four parcels are landholdings under a Community-Based Forest Management Agreement (CBFMA) while eighteen parcels have no tenure instrument yet. These parcels are within the deforested portions categorised as grasslands (Figure 4) in the buffer zone. The majority of individual household participants are indigenous people who are widely distributed within the buffer zone of the Park. The individual parcels of landholdings comprising the project area are located in different barangays⁴ within the three municipalities: Impasugong, Sumilao and Libona (Figure 5).

⁴ A barangay is the smallest administrative division in the Philippines.

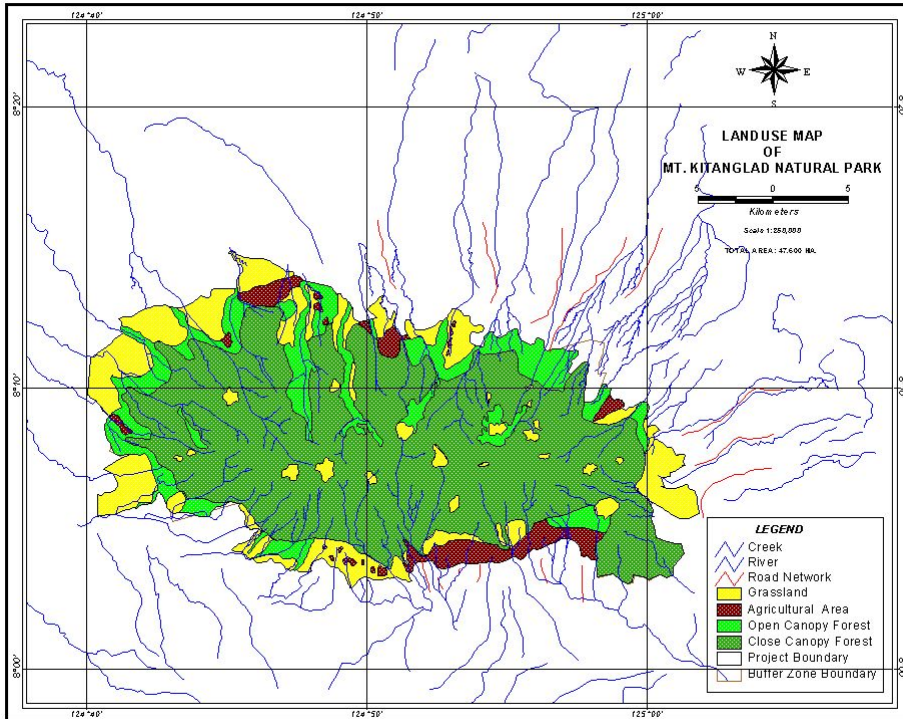


Figure 4. Land-use map of the Park

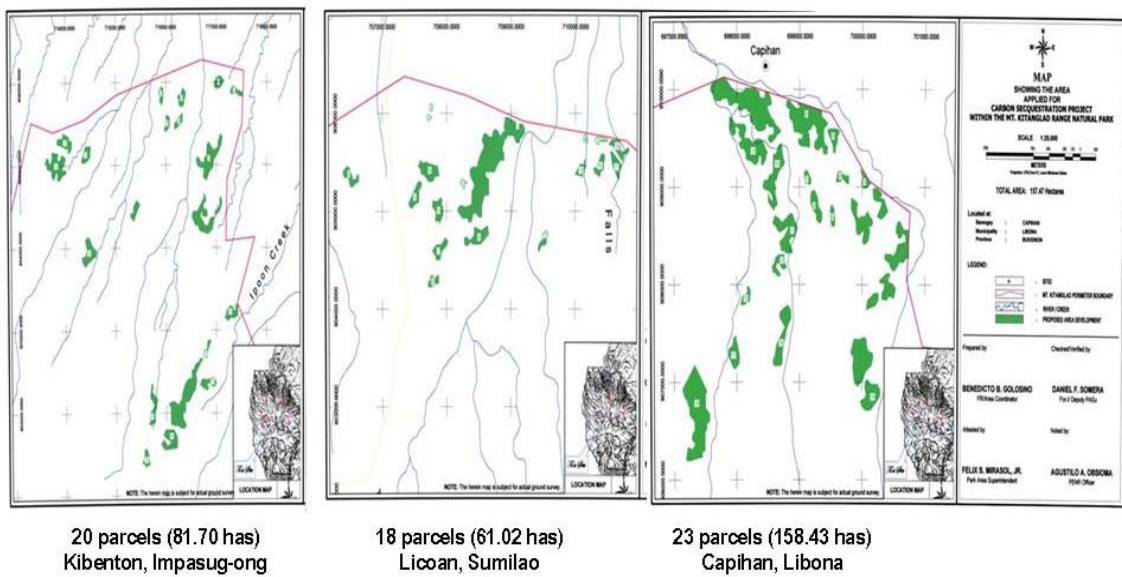


Figure 5. The 62 land parcels within the three municipalities (Impasugong, Sumilao, Libona)

Technical operation

Strategy of implementation

The proposed project will employ an agroforestation⁵ scheme (Appendix 2), which will consist of two components.

1. 'Rainforestation' farming on 198 ha will be carried out by planting endemic, native forest tree species to ensure that the biological composition will enhance and restore the protected area. Established forest tree plantation area shall be set aside as permanent protection forest.
2. Agroforestry farming on 102 ha to support the livelihoods and food needs of participating landholders. Fruit-bearing trees as the primary tree component. Agricultural crops will be planted between fruit trees during the trees' infant stage (first few years). After which, the perennial crops such as coffee (*Coffea arabica*) and abaca (*Musa textilis*) will be planted. Forest tree species shall be planted along the boundaries (perimeter planting), which will be 'reserve' trees for future household use. While bamboo will be planted along waterways.

The land management for forest-carbon development will be designed as shown in Figure 6.

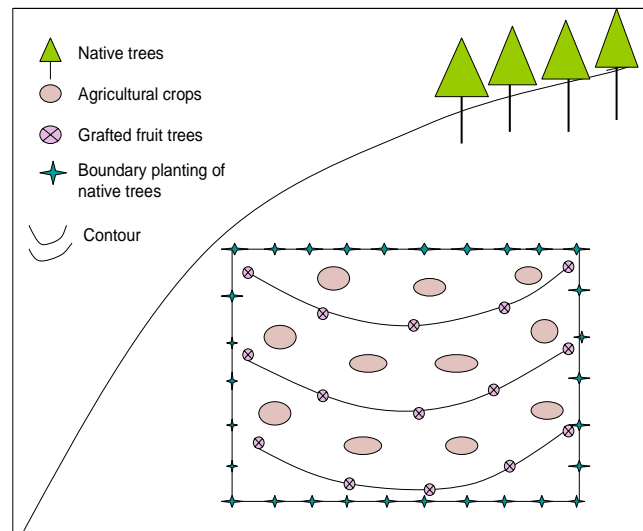


Figure 6. Land area design

Field activity implementation is presented in Box 1.

⁵ Agroforestation implies a land rehabilitation scheme with establishment of purely forest tree species (reforestation component) and agroforestry farm development.

Field activity operation for MKR proposed forest-carbon development

Nursery operation

Satellite nurseries will be established in the three municipalities (Impasug-ong, Sumilao, Libona) which shall be managed by the Tribal Women's Association. Seedlings of indigenous/endemic forest tree species shall be propagated and in case to case wildlings shall be collected depending on the proximity and availability. The Tribal Women's Association will be paid for the propagation, care and maintenance of the planting materials and managing the nurseries. Forest-tree species seedlings/wildlings can be raised also within the backyard of individual participants. Fruit trees seedlings shall be procured from registered and accredited seedling growers.

Field/land preparation

Manual method like strip slashing and the use of manual hoeing shall be employed.

Forest Carbon Planting

Planting will be conducted at the onset of the rainy season probably on the last week of June to the month of August. Spacing may vary depending on the type of species/crops planted. In areas with more than 18% slope, soil and water conservation measures such as contour farming shall be employed. Organic fertilizers (*vermicast, chicken dung, compost*) and traditional pesticides (*e.g. mixture of pepper & organic soap*) will be used to enhance soil fertility and pest control.

Forest Carbon Maintenance

Regular maintenance will be conducted every quarter within three years and bi-annual during the fourth and fifth year of operation. These consist of brushing, ring weeding/cultivation, and fertilizer application within plants. Replanting will be undertaken three months after planting and thereafter when necessary to ensure optimum stocking per hectare. Silvicultural treatment (pruning, thinning/culling of infested/defected trees) will be conducted only whenever necessary to attain the maximum volume of carbon capture of trees per hectare.

Monitoring and Protection

Establishment of firelines/firebreaks will be conducted yearly during dry months to prevent forest fire over the plantation. 'Routing' and regular monitoring and protection works shall be conducted to ensure the maintenance of established plantations. Warning signs (informative billboards pertaining to the project development in the area, and caution again used of fires) shall be imposed.

The Community based forest protection arm of the park called the Kitanglad Guard Volunteers (KGVs) shall assist the protection activities. KGV shall be tapped to conduct routine monitoring and protection works, as they are the permanent resident and dwellers within the buffer zone of the park. Plantation monitoring and protection shall form part of the activities under the biodiversity monitoring system regularly conducted every quarter.

Box 1: Field activity for the forest-carbon project

Project development approach

Forest carbon will be developed by adopting a community-based approach. Public consultation and consensus building will be conducted to ensure community involvement and participation in the decision-making process of the project. The project will be sensitive to the traditional beliefs and practices of the indigenous people. It will respect and recognise prior consent and consensus-building mechanisms as provided by law. Likewise, it will consider the environment-friendly norms and traditions of the indigenous people to ensure a smooth relationship and effective collaboration.

The initial plan will be agreed by all involved (landholders, Mt Kitanglad Federation of People's Organizations, tribal groups and the Protected Areas Management Bureau of the Department of Natural Resources) and sealed with a formal, traditional ceremony.

A core team will be formed, consisting of representatives of the tribal chieftains and officials from the respective people's organizations, to conduct the initial planning and consultation for specific project activity. Promotional and educational material, such as information boards and signs, pamphlets and comics, will be used to raise awareness among the greatest number of constituents, particularly those residing in remote areas.

Technical arrangement

Forest and fruit-bearing trees for areas intended for permanent forest will be provide while bamboo, coffee seedlings, and other agri-crops planting materials will be produced by the participants.

Forest-tree species seedlings can also be raised within the backyard of the individual participants while fruit tree seedlings (grafted) will be sourced-out/purchased from registered good quality raisers/producers.

Planting materials (e.g. forest and fruit-bearing trees) that shall be raised by respective project beneficiaries or participating landholders will be channelled to the municipal LGU for payment out from its annual support fund to PAMB operation.

Field activities (land preparation, planting and maintenance) for the reforestation component on areas with claimants but intended for permanent protection will be conducted by the individual participants using "family approach" to ensure participation and instil a sense of ownership among the family members.

Socio-economic arrangement

The proposed sharing arrangement of the benefits that can be derived from the project is presented in Box 2.

PROPOSED BENEFIT SHARING ARRANGEMENT					
SOURCES	PO FEDERATION (%)	PEOPLES ORGANIZATION (%)	INDIVIDUAL PARTICIPANTS (%)	PAMB/ PASu Office (%)	REMARKS
<u>Rainforestation area (200 has)</u>					
Payments from Carbon Emission Reduction (CER)	2	6	90	2	Cash or in kind
Other Payments of Environmental Services (PES)	5	5	75	15	Cash or in kind
<u>Agroforestry farm area (100 has)</u>					
1. Carbon Credits (CER)	10	10	50	30	Cash or in kind
2. Agroforestry Products					
2.1 Fruits	5	5	90	-	Cash income
2.2 Cash crops	-	-	100	-	Cash income
2.3 Bamboo poles & shoots	5	5	90	-	Cash income
2.4 Coffee, Abaca, etc	5	5	90	-	Cash income
3. Timber/firewood	-	-	100		Cash income
4. Others (PES)	10	10	50	30	Cash or in kind

Box 2: Proposed benefit-sharing arrangement

Management operation

Administrative support

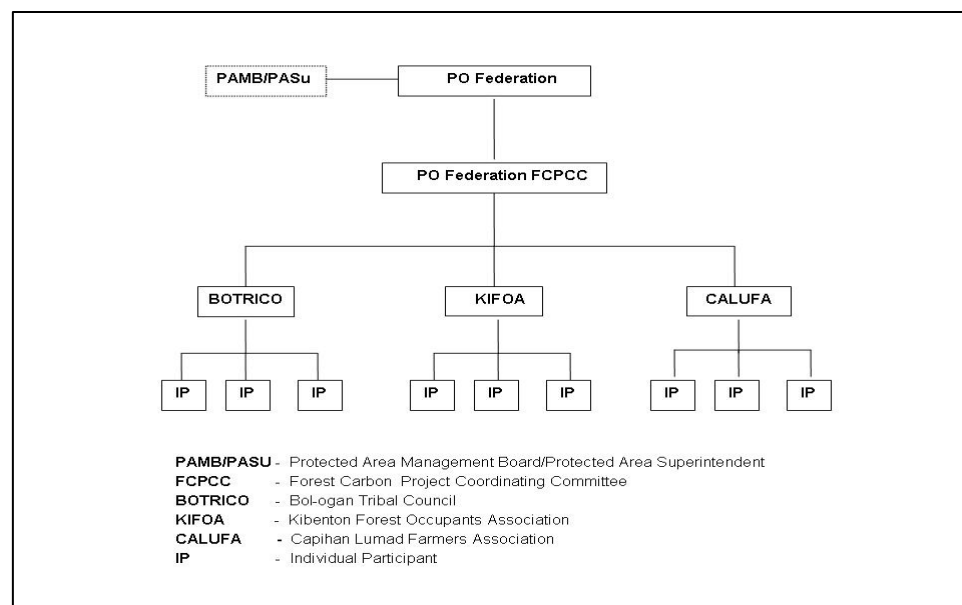


Figure 7. Organizational set-up of the proposed forest-carbon project

The Protected Area Superintendent's office will initiate the planning and be responsible for writing proposals and documentation. The office will also be responsible for producing and disseminating information and consultation with the communities and all other stakeholders.

The Protected Area Management Board ('Park board') through the superintendent's office will provide technical assistance and capacity development to the People's Organizations Federation and partners; establish links and partnership with government and non-governmental organizations to support the project and environmental services marketing; monitor implementation in collaboration with the People's Organizations Federation; formulate policies; assist, coordinate and facilitate carbon-credit registration and other environmental services market mechanisms; and conduct Information and Education Campaign (IEC) and submit progress reports to the Department of Environment and Natural Resources.

The People's Organization Federation will be the project proponent, responsible for all aspects of project implementation.

The People's Organization Federation Forest Carbon Project Coordinating Committee will coordinate and monitor implementation by the respective people's organizations and tribal communities.

The people's organizations—Capihan Lumad Farmers Association, Kibenton Forest Occupants Association, Bologan Tribal Council—will be responsible for day-to-day operations in accordance with the approved work and financial plans.

Individual participants will be responsible for the day-to-day implementation of farm-based and other project activities with active participation of their family members in accordance with the approved work and financial plan.

Technical support

The superintendent's office staff of Mt Kitanglad, in collaboration with other technical personnel from the Department of Environment and Natural Resources, will provide technical assistance to the project. The College of Forestry and other academic institutions will be engaged for technical advice if there are problems, such as pests and diseases, and for silvicultural treatment.

Generally, technical support to the project will be arranged by the superintendent's office in partnership with the relevant local government unit (city or municipal agriculture office) and other organizations.

- Academic institutions
 - Bukidnon State University: information and education campaign; advocacy
 - Central Mindanao University: technical assistance with forest plantation establishment and maintenance, agroforestry farm establishment and maintenance and capacity building
- NGOs: community organizing and strengthening, cultural values formation
- Private companies: provision of additional planting materials and other farm inputs, assistance with plantation protection
- Local government units: provision of planting materials and other farm inputs
- Department of Environment and Natural Resources: land tenure security issues; technical assistance with plantation establishment and maintenance, site and species matching
- Technical Education and Skills Development Authority: technical assistance with skills training such as for cottage industries, product value adding
- Department of Agriculture: technical support with appropriate planting, agro-crop suitability in combination with trees, soil quality, capacity building
- Fibre Industry Development Authority: source of high quality planting material for abaca; technical support with abaca planting, processing and marketing
- The World Agroforestry Centre Philippines will assist the superintendent's office in providing technical guidance. Through its research-for-development activities, the Centre will be consulted for technical assistance related to forest-carbon development procedures as an innovative strategy to support land rehabilitation; facilitate technical guidance, for example, technological innovations in agroforestation; institutional approaches; and provide policy briefings based on scientific research.

Financial support

About Php 25 233 925 (\pm USD 630 848) (Appendix 3) is needed for the entire project, which is divided into two stages.

- 1) Pre-implementation phase, which is the mapping, community awareness-raising, consultations, project planning, project proposal documentation (Php 1 260 000), and registration/transaction costs including application submission, evaluation and validation (Php 1 045 725).

- 2) Implementation, which is the construction of three nurseries (Php 150 000), forest tree planting (Php 14 238 200) and development of multi-cropping agroforestry farms (Php 8 540 000).

To provide financial support, the project will seek carbon buyers or institutions from developed countries that are looking for emissions-reduction offsets either under the CDM, voluntary carbon markets or other environmental services rewards mechanisms. Meanwhile, that there is no buyer that will provide up-front costs, support will be sought from the local government units' 20% development fund for the environment and from national government agencies, for example, Department of Agriculture (DA) and Local Government Unit Municipal Environment and Natural Resources Office (LGU-MENRO).

Resource mobilisation will include establishing links with local government units, other government agencies, NGOs, private companies and other institutions. The commitment of support will be stipulated in the annual investment plan in the case of local government units, through memoranda of agreement in the case of NGOs and private companies, and approved project proposals in the case of other organizations.

Potential and challenges of the proposed project

The potential and challenges of the Mt Kitanglad Range project are presented in Table 2.

Table 2. Potential and challenges of the forest-carbon development project

Indicators	Potentials	Challenges
(1) Effectiveness of institutionalising the project		
Site suitability	It can pass the eligibility criteria and fulfill the 'additionality' condition of the CDM A/R project activity. The project total area coverage is categorized as grasslands within the buffer zone.	Absence of 1990 land-cover map to provide proof of its non-forest status even way back in 1980's. Also, there is no land-use assessment conducted to indicate no change of grassland status until at present.
Development operation	Drafted project plan can serve as the basis for preparing a full blown project proposal (PP) or the project design document (PDD) following the standard template for the carbon market.	Need technical and funding support to be able to submit a project proposal or the project design document (PDD) for DNA evaluation and DOE validation
Environmental services marketing	The superintendent's office was able to mobilise the initial activities needed for soliciting project support and ES marketing	No identified potential buyer.
(2) Efficiency of resource use and mobilisation		
Technological	Presented agroforestation scheme as strategy of implementation	Feasibility of the project development approach
Social	Community based project activity: It enjoined the participation of indigenous people and migrants in the buffer zone. Presented the technical and socio-economic arrangement of the field activity as well as the administrative management structure of the project operation	Convincing all the Park's occupants whose landholdings are the targets for rehabilitation. Drawing the legal binding agreement with all the concerned stakeholders
Financial	As innovative mechanism, it has generated funding support for its initial activities.	No upfront funding.
(3) Impact of the proposed project		
Social acceptance	Engaged the participation of 62 households and three local people's organizations	Total involvement of main stakeholders and target landholders within the Park's buffer zone as project participants
Political/public	Presented a multi-stakeholder	Project proposal is yet to

response	collaboration for engaging support (technical, funding, policy measures)	be officially approved by the Park board
Economic consideration	Leakage can be avoided. The project provide opportunity to landholders to develop their idle landholdings or enhance productivity of their marginal cultivations	Low fertility level of grasslands. Ensuring the economic viability of agroforestation scheme
Environmental services provision	Increase carbon sequestration and storage potential of the grasslands as the current land cover/use. Rehabilitation of denuded forests and degraded lands can support habitat restoration, watershed functions, improved land-soil quality, and enhance scenic beauty of the entire Park	No actual baseline measurement and carbon/environmental services' estimation conducted

Effectiveness of institutionalising the project

Site suitability

This is whether the proposed projects meets the eligibility criteria and fulfils the 'additionality' condition under the CDM A/R project activity criteria/standards, but does not comply with the standards of the voluntary market. The standards of CDM A/R project activity follow the EB 35 report Annex 18: 'Procedures to define the eligibility of lands for afforestation and reforestation (AR) project activities'.

The proposed 300 ha area is a portion of the total grassland (827 ha) within the buffer zone. It can be considered eligible under the forestry CDM criteria since the parcels are already dominated by *Imperata cylindrica*, *Saccharum spontaneum* and other weed species.

In the 1980s and, even before that, these were the sites of logging activities (both legal and illegal), encroachment and conversion for agricultural cultivation. Although there are forests patches near the site to augment natural regeneration this has not happened owing to aggressive weed species. During the El Niño phenomenon in 1982 the areas were ravaged by fires. If not abandoned or fallowed, aandholders and claimants have tried to use the land again but under marginal cultivation.

It can fulfill the 'additionality'⁶ condition since the 62 parcels are within Park's deforested buffer zone since way back in 1980's or even before. The area remained grasslands until the

⁶ The concept of additionality addresses the question of whether the project would have happened anyway, even in the absence of revenue from carbon credits. Only carbon credits from projects that are 'additional to' the business-as-usual

present although there are forests nearby to supposedly cause its natural regeneration. The identified parcels were not part of any funded Park reforestation activities. Generally, owing to limited funds for Park management, activities concentrate more on protecting the remaining forests. If there are efforts to rehabilitate denuded forest areas or degraded land, these are concentrated on open, deforested and degraded land within the strictly protected zone (31 236 ha) of the Park.

To provide proof, the project needs aerial photographs or satellite imagery showing the land cover of the Park before 1990, especially of it plans to register under the CDM A/R project activity

Land-cover maps showing the land-use/-cover change (for example, 1990, 2000 and 2010), particularly in relation to deforestation and forest degradation in areas of the Park is important to have baselines. Currently available maps and images are from 2005. Land-soil characterisation is also important to indicate that the land degradation status of the proposed project area has not improved over time. Justification is needed of why seeds dispersed from forest remnants into the grassland portions of the buffer zone were not able to cause re-vegetation.

Development operation

To institutionalise the project in order to participate in the carbon market requires endorsement and approval of voluntary participation. This includes project application submission for evaluation by the Department of Environment and Natural Resources (Philippines Designated National Authority) and third-party validation by a designated operational entity.

The project was initiated in the later part of 2009 when the World Agroforestry Centre Philippines through its research activities explored the possibility of the Park developing plan for a forest-carbon development project. That project development plan was drafted in 2010. It can be used as a basis for preparing a full project proposal for designated national authority

scenario represent a net environmental benefit. Carbon projects that yield strong financial returns even in the absence of revenue from carbon credits; or that are compelled by regulations; or that represent common practice in an industry are usually not considered additional, although a full determination of additionality requires specialist review.

Source: http://en.wikipedia.org/wiki/Additionality#Additionality_and_its_importance

evaluation⁷ or project design document following the standard template either under CDM A/R project activity or voluntary carbon market standards for designated operational entity validation⁸. It can also provide as basis for exploring REDD+⁹ mechanisms by having the entire Park as the project area.

The main challenge of the project developer is to secure all the documents needed, for example, aerial photographs or satellite imagery complemented by ground reference data; or land-use or land-cover information from maps or spatial datasets; or ground-based surveys. Also, proof is needed of the land-use change over time reflecting the non-changing character of degradation, an assessment of the land-soil quality must be made, baseline and potential carbon levels established and economic feasibility estimated. To undertake these initial activities technical assistance and funding are required.

Environmental services marketing

The project must be able to negotiate an agreement for support with potential carbon and environmental services' buyers either under the CDM process or the voluntary carbon market and/or source support for its operations, including field implementation, through innovative mechanisms.

In the beginning, the superintendent's office was able to mobilise support for activities (for example, community consultations, surveys and parcel delineation, mapping, field-activity

⁷ To prepare the project application document for designated national authority evaluation, the project proposal must be finalised, describing how the proposed activity will contribute to the Philippines' sustainable development agenda. As prescribe by the designated national authority technical evaluation committee for A/R projects, the proposal should indicate the economic dimension (economic opportunities, proper safety nets and compensatory measures for affected stakeholders, technically sound and environmental-friendly technology, financial resources), environmental dimension (comply with the environmental policies and standards set by the Philippines, improve the quality of the environment, promote sustainable use of natural resources) and the social dimension (build the capacities of local stakeholders, provide local resources and services to vulnerable groups, encourage local participation project activity).

⁸ For designated operational entity validation, before any project can produce certified emission reductions that could be credited as offset to the targeted emission reduction, the project developer from the host country must first submit the project design document using the standard template.

⁹ Reducing Emissions from Deforestation and Forest Degradation (REDD) is a set of steps designed to use market/financial incentives in order to reduce the emission of greenhouse gases from deforestation and forest degradation. Its original objective was to reduce greenhouse gases but it can deliver 'co-benefits' such as biodiversity conservation and poverty alleviation, hence the '+'.

Source: http://en.wikipedia.org/wiki/Reducing_Emissions_from_Deforestation_and_Forest_Degradation

planning, and documentation). Also, it was able to undertake the project planning process and to formulate the project plan. The project plan was presented to the Park board for official support and technical assistance.

Currently, there is no potential buyer identified that provides the upfront costs, particularly for proposal preparation and the registration process. Marketing and/or project registration for the global environmental services carbon market depends upon the approval and endorsement of designated national authority and validation from the designated operational entities.

Efficiency of resource use and mobilisation

Technological

Conducting A/R project activity on deforested lands (for at least 50 years or before 1990), where 'deforested' means the vegetation on the land has been below the thresholds adopted by the host country for definition of 'forest'.

The Philippines Government defines 'forest' as land having trees with tree-crown cover or equivalent stocking level of > 10%, an area of more than > 0.5 ha, and the trees should be able to reach a minimum height of 5 m at maturity in situ. The 'forest' consists of either closed forest formations with trees at various storeys and undergrowth cover of a high proportion of the ground or open formation with continuous vegetation cover in which tree-crown cover exceeds 10%.

The forest-carbon development will be conducted on 300 ha, which is about 36% of the total grassland within the buffer zone of the Park. Agroforestation scheme as an A/R activity will be undertaken as two land-use management systems. A detailed work plan and budget estimate for both the forest tree establishment (198.26 ha) and agroforestry farm development (100.02 ha) are presented in appendices 4 and 5.

The 200 ha forest-tree plantation area will have a potential tree stock of 330 500 (1667 trees per hectare), intended for permanent forest protection. Thus, the issue of 'permanence' for the entire crediting period can be addressed. The 100 ha agroforestry farm area will have a potential stock of 20 040 fruit trees (200 per hectare). Referring to the potential stocking level of the forest tree area as reforestation component, the agroforestry farm will also have an equivalent stocking level of fruits trees of >10% even excluding forest trees that will be interspersed. The agroforestry component can still be considered as an A/R project activity when referring to the Philippines' 'forest' definition.

The carbon sequestration and storage potential of the two land-use management schemes would be different, favouring the forest tree area if only aboveground biomass is included in measurements.

For the purely forest tree plantation component, choice of indigenous/native species still depends on the accessibility and availability of the seed sources if wildlings are collected, if not propagated, and the planting materials survival in the nursery and when planted. Regarding the use of indigenous species, the Wildlife Resources Conservation and Protection Act (RA 9147) requires that collected wildlings shall be planted only within the natural range of the species habitat to enhance its wild population. The collection of wildlings should follow appropriate and acceptable collection techniques with least or no detrimental effects to the wildlife population and their habitats.

For the agroforestry component, it is still a question whether this can be considered as 'permanent' and reach a 'forest' status, particularly given that grafted fruit trees will be used that may not be able to reach a minimum height of 5 m at maturity. Also, the feasibility of the tree-crop combinations, as well as the sequence of planting is still to be assessed and needs to take into consideration the size of the land parcel, its legal and environmental status and land-soil characteristics.

The project will also need the landholders to be trained in new land management techniques. Thus, proper information, field training, logistic and financial support are essential.

Social

This is referring whether the project enjoined local people's involvement, particularly the main stakeholders (people dependent on the land) involvement – addressed the issue that there should be no people displaced (in case the land area is currently occupied or has settlers); set-up the technical and socio-economic arrangement as well as the administrative management structure for project operation and field activity implementation.

The local community participation is adopting the community based forest management (CBFM), which is the national strategy in the Philippines in managing the country's forest resources by virtue of E.O. No. 263, 1995.

This ensures from the start that the project will be undertaken as a local community effort. In the proposed forest-carbon development, local communities and other local partners will be involved in all stages of project development, implementation and monitoring. The roles and function of each stakeholder are defined. The superintendent's office acts as the intermediary on behalf of the Park board, which is the governing body of the entire Park. But the main

project proponent is the People's Organizations Federation, who will be responsible and accountable for all aspects of the project's implementation. Field operation will be facilitated through the People's Organizations Federation Forest Carbon Project Coordinating Committee, which is responsible and accountable to the People's Organizations Federation. The respective local people's organizations will manage (assist, supervise and monitor) the actual implementation with the individual and household participants on their respective landholdings.

There are two land tenure instruments within the Park: a stewardship contract under the CBFMA, which can be used by migrants; and a certificate of ancestral domain title for indigenous people (Appendix 6).

Within the Park, proof of occupancy by indigenous residents is generally not based on written documents but on actual occupancy and evidence of some physical activities (improvements) on the land. Inheriting the land is also considered a proof of occupancy. The majority (70%) of the actual occupants, and even absentee claimants in the buffer zone, claimed that they had been in the area and occupied farm lots before 1987, while the rest came after 1987. In most cases, the area being cultivated is smaller than the area claimed. Average cultivation area size is 1.6 ha but often less than 1 ha.

The technical and socio-economic as well as the proposed benefit sharing arrangements are presented. However, these are still to be agreed formally by all. A legally binding agreement is crucial, especially since socio-economic benefits will not be immediate. Logistical support for project operations still needs to be sourced and is dependent on funding.

Financial

The project needed to have generated funding support for its operations and field implementation and/or negotiated with potential buyers of carbon credits or environmental services.

While there is no upfront funding available from a buyer, the project has planned for innovative mechanisms to fill the gap, specifically, seeking in-kind technical assistance and start-up funds from the Park board, government agencies (for example, the Department of Environment and Natural Resources, Department of Agriculture and local governments) and private companies.

The strategy involves preparing a shopping list of activities and financial requirements and lobbying for support (in kind or cash) from all stakeholders in an official forum.

Impact

Social acceptance

For a holistic approach to rehabilitation, conservation and sustainable development, the participation of the whole community within the buffer zone and the entire Park has to be ensured.

The proposed project is in line with the Park's program goal, which is to enhance the ecological services of the Park while promoting socio-economic development activities with the indigenous people and migrant communities who depend on marginal agricultural.

The local communities' interest in the proposed project manifested in the 62 households' willingness to include their landholdings as part of the 300 ha project area and participation by the three local people's organizations. All the municipalities and 28 *barangays* encompassing the Park approved their respective forest land-use plans and the watershed management planning framework. Thus, the project area could expand and include more landholders or claimants' participation.

Appropriate and adequate information should be well disseminated and the information provided should not give false hope. Information about the potential benefits need to be understood by the stakeholders. Full involvement of the main stakeholders or target participants can only be expected if they understand the purpose, have a sense of ownership, and can derive economic benefits.

Many landholders or claimants are still looking for easy and direct money, such as land rental for agricultural crops (for example, contract growing of banana and pineapple). It will remain a challenge to involve all the owners and claimants within the grassland part of the buffer zone (827 ha), including those parcels that are under marginal annual crop cultivations, while there are yet no clear, direct benefits or assured returns comparable to what they can receive from contract growing.

Political/public response

The project needs to have enjoined cooperation from all sectors to provide technical and logistic support, including policy measures.

Support (technical, funding and policy measures) for the project will be arranged by the superintendent's office, being the frontline intermediary on behalf of the Park board. This will be in partnership with the local government unit of the municipalities covered by the project and will solicit support from others such as educational institutions (Bukidnon State University and Central Mindanao University), non-government organizations (Kitanglad

Integrated NGOs), national government agencies (Department of Environment and Natural Resources, Department of Agriculture, Fiber Industry Development Authority and Technical Education and Skills Development Authority), local government units and the World Agroforestry Centre Philippines.

The Park management board encourages collaboration and the board meeting is a place where conflicting issues can be resolved. The chief executive of each of the local government units down to the *barangay* level is a member of the board. This arrangement gives stakeholders firsthand knowledge and allows them to become part of the planning and decision-making processes in management.

The development plan or full proposal for the proposed forest-carbon development project is yet to be formally approved and officially endorsed by the Park management board to foster legal binding agreements from various sectors.

Economic considerations

The project needs to provide sources of income aside from the carbon payment or environmental services incentives.

The project will provide an opportunity to landholders to develop their idle landholdings or enhance productivity of marginal cultivation. Aside from a share of carbon payments, planting materials (fruits trees and other inputs) and sale of products harvested from the agroforestry farms are expected to provide additional income sources.

Although land is left idle, not cultivated or under marginal cultivation (because considered degraded land), the question remains whether landholders undertaking the reforestation component (forest tree establishment) will consider the carbon payments a sustainable source of income and whether investing in an agroforestry farm (planting abaca and coffee in combination with fruits) is economically viable.

Areas eligible for carbon forestry projects are those considered marginal or degraded lands. Given the low fertility level, plant species (purely trees or trees in combination with food crops) that can be planted will be limited, thus, potentially will have low productivity.

Ecological services provision

Carbon sequestration and storage potential (actual net greenhouse gas removal by sinks) and other co-ecological benefits are essential elements of the project.

On the grasslands, it is expected that carbon sequestration will improve if the land is revegetated as forest. Lasco and Pulhin (2003) indicate that grassland has the lowest stocks of carbon (< 50 tC/ha) compared to stocks found in primary and secondary Dipterocarp forests (> 250 tC/ha).

Rehabilitating the area through an agroforestation scheme will provide opportunities to sequester carbon from the atmosphere. Aside from carbon sequestration, the rehabilitation of deforested and degraded land is expected to support the rehabilitation of watershed functions, support biodiversity conservation through habitat restoration, improve the land-soil quality and enhance the scenic beauty of the entire landscape of the Park.

Purely tree-based systems and agroforestry farms have different carbon sequestration potential. Currently, there are no actual baseline measurements and environmental services estimations conducted yet. To estimate, measure or value the environmental services that can be provided by the proposed project is not within the technical and financial capacities of the superintendent's office, Park board or project proponent.

Strengths and limitations of the proposed project

It is assumed that the technical and administrative management plans of the project reflect the institutional capacity of the proponent to undertake the project and ensure its sustainability. The strengths and limitations (Table 3) of the operational aspects are extracted from the SWOC analysis.

Table 3. Strengths and limitations of the proposed forest-carbon project

INDICATORS	STRENGTHS	LIMITATIONS
A. Site development		
1. Area identification	The 62 parcels consisting the project area coverage are already delineated	Area coverage is not contiguous
2. Strategy of implementation	Adopting the agroforestation scheme as A/R project activity	No valuation and measurement of the economic benefits and viability of agroforestation scheme
3. Project development approach	Community-based initiative and involving the local household landholders as project participants	Limited capacity of people's organizations to manage the operation
B. Resource use and mobilisation		
1. Administrative	People's organizations as the main	Composition of coordination committee and People's

support	project developers Creation of forest-carbon development coordination committee Protected Areas Superintendent's office as intermediary	Organizations Federation is yet to be clarified and formalised Lack of knowledge and information about the project and its benefits
2. Technical support, public and private	Protected Areas Superintendent's office as technical provider and advisor Enjoin technical support from academic institutions, NGOs, government agencies and research organizations Tap the private and local government units for logistic support in implementation Encourage general public involvement	No formal binding agreement yet
3. Political support	Park board through the local chief executives can commission the support of local government units	No formal binding agreement yet
4. Financial support	Park board can tap funding from local government units and private entities	No formal binding agreement yet
C. Socio-economic		
	Technical and socio-economic provision as well as the proposed benefit-sharing agreement among stakeholders is presented	No formal binding agreement yet
D. Environmental services management		
	Increase carbon sequestration and storage potential Co-benefits: - Support habitat - Watershed restoration - Soil conservation - Landscape beauty enhancement	No actual carbon baseline measurement and environmental services estimation conducted

Site development

This pertains to area coverage (land-cover status of the identified project sites, delineated area coverage for the project development), the strategy of forest-carbon implementation (specific land management scheme), and the project development

approach (how the project development operation and specific field activity implementations are to be carried out).

Strengths

- 1) The boundaries of the 62 parcels of individual landholdings that make up the project area (300.34 ha) are already delineated. The parcels have Certificate of Stewardship Contract (CSC) issued under the CBFMA and are target areas for rehabilitation.
- 2) The 'family approach' is emphasised to ensure the proper care, maintenance and protection of the plantation and to instil a sense of ownership and camaraderie among household participants.
- 3) The proposed project will be managed by the community, involving the three local people's organizations (CALUFA, KIFOA and BOTRICO) as the main participants. The 62 households or individual landholders and claimants who are the actual occupants are the direct field activity implementers. The People's Organizations Federation is the project proponent. Initially, the proposed project will be facilitated by the superintendent's office acting on behalf of the Park board.

Limitations

- 1) The project area is not contiguous. Generally, the parcels are located on scattered hills and some parts are on steep slopes that are poorly accessible. The aggregate total area is only about 36% of the total grassland within the buffer zone. The land tenure status, specifically the tenure instrument involved, is important. To be viable to enter the carbon market, the project has to clarify land tenure status, particularly the validity of the land-tenure instruments. This should coincide with the crediting period.
- 2) There are no economic benefits valuations and carbon/ES measurements conducted as yet and presented to the project participants and field implementers. The potential benefits (economic and ecological) that can be derived in undertaking the purely forest tree establishment and agroforestry farm development are not quantified nor clearly understood.
- 3) Management of the project is not within the capacity of the People's Organization Federation. The Park board through the superintendent's office has yet to formalise the People's Organization Federation as a local institution and build its capacity to manage the project (technical and administrative management). This also applies to the local people's organizations that will facilitate the field implementation and the participating landholders who will undertake the field activities.

Resource use and mobilisation

This pertains to the administrative support (administrative set-up of the project, including the rules and functions of each stakeholder), technical support (who will obtain and provide the technical support), public and private support, and financial support (how financial support is sourced or what are the innovative funding schemes), and political support (if the operational plan considers the existing policies as well as identifying the needed policy support for its implementation).

Strengths

- 1) The People's Organizations Federation will be the project proponent, responsible and accountable for all aspects of the project's implementation. A committee will be formed that will coordinate and monitor implementation by the concerned people's organizations and tribal communities in each municipality. The local people's organizations in three municipalities will be responsible for supervising the specific field activities that will be conducted by the participating individuals and household landholders.
- 2) Technical support will be arranged by the Protected Area Superintendent, who is at the same time the Community Environment and Natural Resources Officer. This will be in partnership with the local government unit concerned (city or municipal agriculture office). The Park board, through the superintendent's office, will facilitate technical assistance by establishing links and partnerships with government and non-government organizations.
- 3) The Park board, through the local chief executives who are members of the board, can spearhead the passage of local ordinances. There is strong local government representation on the Park board, which assists with developing policies for the Park management. Since 2002, local government units (*barangay*, municipal and provincial governments) surrounding the Park have provided support for Park management.
- 4) Resource mobilisation is part of the project's strategy plan. Through the Park board, the project can potentially obtain funding from local government units and the private sector, especially from companies that are stakeholders in the Park (for example, telecommunications, water users, eco-tourism).

Limitations

- 1) The composition of the People's Organizations Federation has yet to be clarified and formalised. It is not yet clear whether it will only include representatives from participating people's organizations or ones from the entire Park or within the buffer zone. The administrative structure for the project is still to be officially approved by the Park board.
- 2) There is no formal agreement among the stakeholders. A formal agreement has to be established in an official forum.
- 3) To ensure political support, the proposed project needs official approval from the Park board.
- 4) Assured funding from carbon and environmental services' buyer is vital to facilitate the project management operation and field activity implementation. The project proposal is not yet ready to serve as the basis for a binding agreement for logistics and funding support from various stakeholders.

Socio-economic management

This pertains to the field-level technical arrangement and socio-economic provision (how these are facilitated) and benefit-sharing arrangement (identification of the potential benefits that can be derived from the project and how these will be distributed among the participants).

Strengths

- 1) The technical and the socio-economic provisions as well as the benefit-sharing arrangements among stakeholders have been specified in the plan. The role of tribal women and the provision of incentive payments for the nursery operations are emphasised. The family approach of undertaking all field activities in each landholding is designed to encourage a sense of ownership.
- 2) The binding agreement for technical and socio-economic arrangements is yet to be drawn up and likewise the funding needed to fulfil such arrangement is still to be generated.

Environmental services management

This pertains to carbon sequestration potential for ecological benefits. How watershed rehabilitation and protection, habitat restoration and biodiversity

conservation management, land-soil quality improvement, and landscape scenic beauty enhancement is considered in the project development planning and field-plot design.

Strengths

- 1) Baseline carbon storage of grasslands is zero considering that it is prone to burning. Thus, grassland and other open forest land within the buffer zone that could be rehabilitated by establishing purely forest tree plantation and/or agroforestry farms will increase the carbon sequestration and storage capacity. Assuming growth of 5 tC/ha/yr, the 300 ha will generate about 15 000 tonne of carbon in ten years.
- 2) The project initiative is designed not only to sequester and store carbon, but also support habitat, watershed restoration, land-soil quality improvement of the degraded lands, and landscape beauty enhancement.

Limitations

There are no carbon and environmental services' baseline measurements yet conducted, making it impossible to demonstrate the value that can be added by the project. This is due to non-accessibility of technical knowledge and logistics to undertake these activities.

4. Conclusion

Generally, the barriers to the project are linked to a lack of financial support and technical know-how, from the project proponent to the direct implementers. The political will of the government to provide support to the project developers, the proponent and the direct implementers, is equally important. These are the key factors to the institutionalisation of the proposed project and its subsequent full operations.

The forest-carbon development project to rehabilitate deforested and degraded land is potentially viable for participation in the carbon market and other environmental services rewards mechanisms. It has the support of the primary stakeholders.

It is a local-level community project within the Park. After the Conservation of Priority Protected Areas Project in 1994, the Park management embarked on self-reliant project management. Thus, its experience in establishing active stakeholders' involvement and partnerships with communities, non-government entities, local government and other government agencies, can potentially guarantee the successful implementation of the proposed project initiative.

A functional Park board governs the management and supervision of development activities within the Park. The superintendent's office would be instrumental in facilitating the proposed project, acting as intermediary for the local community on behalf of the Park board. To undertake the proposed project, the People's Organization Federation has very limited capacity. It needs to be officially institutionalised to act as the project proponent. Thus, an intermediary (Protected Areas Superintendent's office) that has the technical knowledge and management capacity to facilitate the project's development is necessary.

To institutionalise the proposed project in order to eventually participate in the carbon market is dependent upon the compliance of all required supporting documents and approval and endorsement from Designated National Authority (DNA) after evaluation and from designated operational entities (DOE) after validation.

Project operation will only be possible if support (technical and financial) can be generated through innovative mechanisms or an upfront payment can be provided by a carbon buyer.

5. Recommendations

Management

Administrative concerns

- The Protected Areas Superintendent's office has to present the draft project development plan to the Park board for logistical support and to finalise the project proposal and/or prepare the project design document.
- Through the Park board, the superintendent's office has to lobby for clear provision of subsidies from government agencies (Department of Environment and Natural Resources, Department of Agriculture, Fiber Industry Development Association, Technical Education and Skills Development Authority etc) as an innovative mechanism to support the development. This could be in the form of technical assistance and financial support.

Technical

- To avoid competition and conflict over who will control or have ownership of land once financing schemes are available, an inventory of potential target households and individual participants in CBFMA areas within the Park, and especially within the buffer zone, should be created. Land tenure certificates (as to the actual holders, validity of the stewardship certificates, particularly on CBFMA-CSC beneficiary project participants) need to be validated. This is in line with an existing policy directive from the Department of Environment and Natural Resources to conduct a census and registration of forest occupants within the protected area and buffer zone (DMC 34 and DAO 13 issued on 28 October 1993).
- Conduct a land-use assessment with land-soil and landscape characterisation. This is to avoid the possibility of converting natural or original landscapes (tropical forest stocks) to fast-growing trees or commercial plantations to maximise carbon credits/payments.

Policy

- The Park board should push for support, especially in establishing a land-cover or baseline map that reflects the vegetative-cover status of the project site as of 1989 in order to locate eligible areas. Institutions to be responsible for such activities (for

example, Department of Environment and Natural Resources, National Mapping and Resources Information Agency local government units) need to be identified.

- Strictly require comprehensive (forest land and alienable and disposable areas) land-use plans of each *barangay* and municipality in line with the overall Park plan. Delineate suitable or eligible areas for forest-carbon development within forest land boundaries and/or alienable and disposable land classification in their respective jurisdictions.
- Clarify legal framework for adopting agroforestation for rehabilitating land, especially under the forest-land classification and for those abandoned or unutilised lands under alienable and disposable classification.
- As an innovative mechanism, push for the local payment of environmental services to support implementation of the project. But there should be a differentiation of what are subsidies, incentives and rewards.
- Ensure the tenure status of the landholdings included in the project. This includes provision of clear land-tenure instruments (securing the validity of the instrument) to those who are involved in the project and imposing strict measures on the selling, mortgage and usufruct of lands under the forest-land classifications, especially those who have already entered into legally binding agreements with the project.
- For coherence, assess existing laws and harmonise those with conflicting provisions. Emphasis should be placed on clarifying that in forest management, especially for this project, adaptation and mitigation are not separate issues in climate discussions. Effectively link locally and nationally appropriate adaptation and mitigation actions (LAMA-NAMA).
- Ensure that carbon prices would recover the actual costs of investment. This includes the cost of developing, operating and managing the project.

Research direction

- Determine what types of sites, or which specific locations, will forest tree establishment and agroforestry farm development is most feasible. This is considering the land-soil characteristics, characteristics and ecosystem functions of the whole landscape.
- Prepare information about commonly adopted tree-farming techniques and/or agroforestry systems within the Park.

- Conduct an economic valuation of the two proposed land-use management designs (purely tree-based plantations and agroforestry farms) to be deployed as the agroforestation scheme.
- Examine the viability of selected forest tree and fruit tree species, including integrated crops, considering the land-soil characteristics and the whole landscape characteristics of the Park.
- Carry out a land assessment, including soil-quality analysis of the parcels, to determine the feasibility of the multi-cropping agroforestry farms.
- Conduct an assessment of forest tree species plantations and agroforestry farm performance to determine whether they are biophysically and economically viable. Include the adoption of Landcare technology (for example, contour farming, soil and water conservation measures, use of nitrogen-fixing trees and use of only organic fertilisers).
- Establish baseline or reference data that will serve as the basis of claim for carbon credits for the specific scheme to be deployed. Use simplified methods of carbon estimation based on the proposed agroforestation scheme (purely tree-based plantations and agroforestry farm system). For carbon sequestration potential, establish a database on the biometrics of the tree species (for example, biomass and carbon content at certain ages) to be planted and registered for carbon credits.
- Develop low-cost and effective systems for monitoring and verifying carbon sequestration that is farm specific and with landholders' participation.

6. Lessons learned

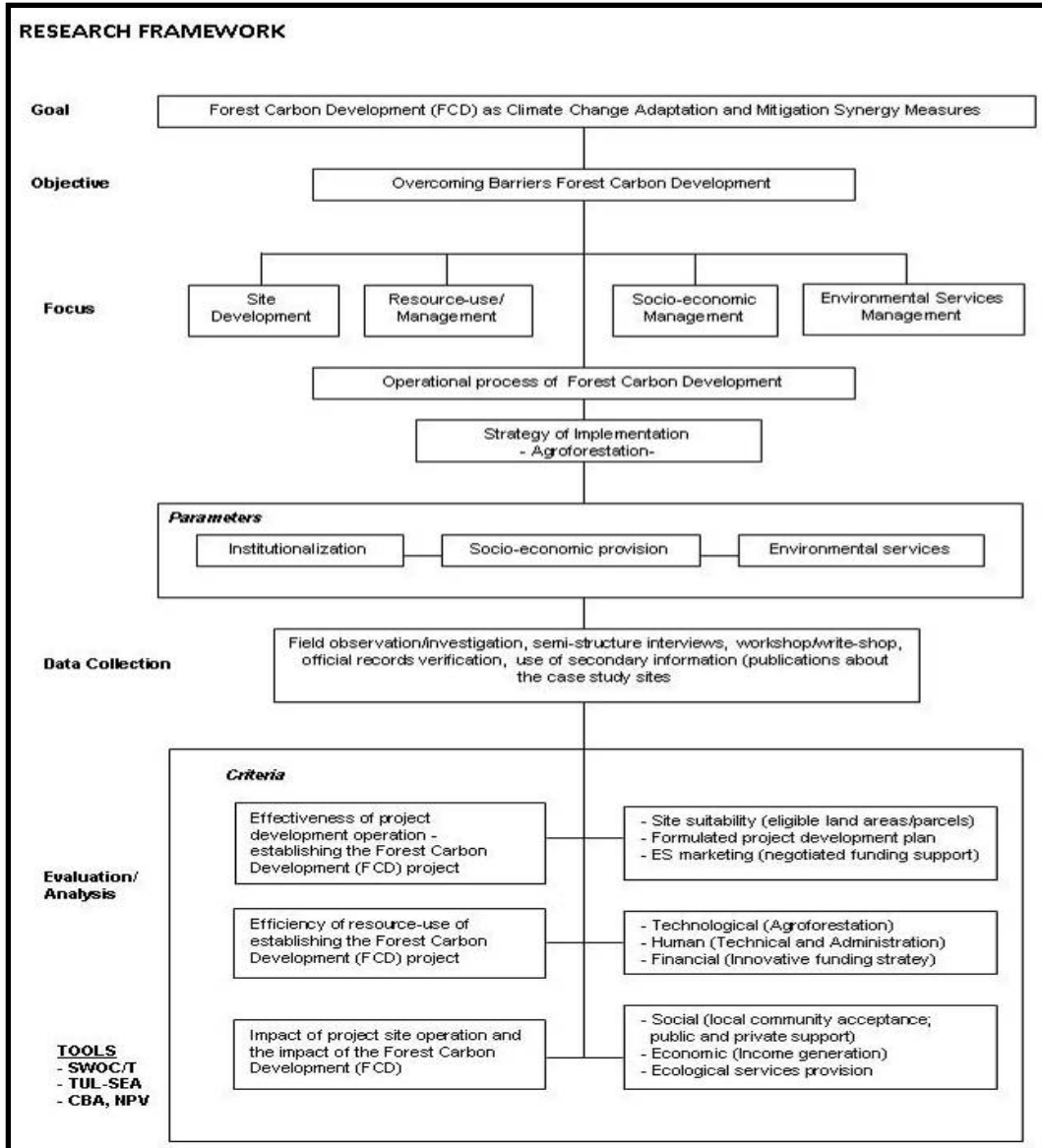
- Proper information and understanding of project development process, including rules and guidelines of the carbon and environmental services rewards market, is crucial.
- Since not all people, even technically qualified people, have firsthand information about carbon and environmental services rewards mechanism, it is a primary concern of service providers (governments, international and research communities) to widen public knowledge. It is only when information is properly disseminated about this mechanism can we expect acceptance from the target constituencies.
- There is a field-based intermediary that has been working for a long time on the project, particularly with the local community, especially the landholders and occupants. The capacity of the intermediary to mobilise resources is important.
- The involvement of the potential participants (landholders/occupants) in the initial planning of the proposed project initiative is important, in particular, ensuring a sense of ownership of the project at the start of developing the project.
- Land (forest) resource management can be directed at realising other environmental services as well as socio-economic objectives, not only as pure carbon forests.

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Appendices

Appendix 1. Research project framework: ‘Overcoming barriers of smallholder forest carbon development in the Philippines’



Appendix 2. Agroforestation scheme proposed for the forest-carbon development project

Project scheme	Area (ha)	Spacing/Design = seedlings required	Species	Remarks
Mixed forest tree spp (Rainforestation)	200	2m x 3m 1667/ha + (20% mortality allowance = 2000 seedlings/ha = 400 000 seedlings	Bitanghol (<i>Calophyllum blancoi</i>) Katii (<i>Castanopsis philippensis</i>) Pangnan (<i>Lithocarpus sulitii</i>) Kalingag (<i>Cinnamomum zeylanicum</i>) Malakawayan, Igem (<i>Podocarpus imbricatus</i>) Kalawkalaw, (<i>Pouteria macrantha</i>) Other endemic species	On slopes, to be planted following the contours
Multi-cropping agroforestry farms	100	5m x 10m 200/ha + (20% mortality allowance = 240 seedlings/ha = 24 000 seedlings 10 m distance between plants	Fruit-bearing trees: Rambutan Lanzones Jackfruit, Santol, Avocado Forest tree species: Selected species Agricultural annual crops: Corn Cassava Eggplant Sayote sweet potato String beans Okra Gabi Ginger Agricultural perennial crops: Abaca Coffee Bamboo	On slopes, to be planted following the contours 150 forest tree spp/ha Interspersed (boundary planting at 3m interval) Planted in between trees during early years of growth Planted between fruit trees replacing the annual crops Single line along the waterways (creek/river), and 1m away from the highest water level

Appendix 3. Total costs estimate

Activities	Costs estimate (M Php)	Source
1. Pre-implementation phase		
1.1 Field activity pre-project operation from mapping, community awareness, consultation, project field designing to project proposal documentation	1 260 000	DENR/ LGU/Park board Carbon buyer
1.2 Transaction (registration application, evaluation, validation)	1 045 725	DENR/ LGU/Park board Carbon buyer
2. Actual project field activity implementation		DENR/ LGU/DA/FIDA
2.1 Nursery construction (3 nurseries @ 50 000 Php/nursery)	150 000	DENR/LGU/PAMB
2.2 Establishment of 200 ha purely forest tree species plantations	14 238 200	DENR/ LGU/Park board/private companies
2.3 Development of 100 ha multi-cropping agroforestry farms	8 540 000	DA/ LGU/Park board/private companies
3. Monitoring, verification and validation (GHG/carbon)		Carbon buyer
	25 233 925	
	-USD 548 563.59	

Appendix 4. Reforestation component: Establishment of purely forest-tree species on 200 hectare

WORK AND FINANCIAL PLAN					
ACTIVITIES	UWM	UNIT COST	TARGET	TOTAL	Innovative source of funds/ in-kind support
I. Seedling Production/Procurement					
(Including 20% mortality allowance)	sdlg.	5	400,000	2,000,000.00	LGU/DENR/Private companies/ DA
Subtotal				2,000,000.00	
II. Site Preparation					
Brushing	hectare	2,500.00	200	500,000.00	Landholder counterpart
Staking and hole digging	Stake/hole	2	333,400	666,800.00	Landholder counterpart
Outplanting	sdlg.	2	333,400	666,800.00	Landholder counterpart
Subtotal				1,833,600.00	
III. Plantation Maintenance and Protection					
Ring weeding and cultivation	sdlg.	2	333,400	666,800.00	Landholder counterpart
Replanting (20% mortality)	sdlg.	3	66,600	199,800.00	LGU/DENR/Private companies/ DA
Procurement of organic fertilizer (vermicast)	bag	400	1,000	400,000.00	LGU/DENR/Private companies/ DA
Hauling of Organic Fertilizer	bag	200	1,000	200,000.00	Landholder counterpart
Organic fertilizer application	bag	150	1,000	150,000.00	Landholder counterpart
Fireline construction and maintenance	sq.m.	.35	880,000	308,000.00	Landholder counterpart
Fireline prevention and patrol works	ha.	2,400	200	480,000.00	Landholder counterpart
Sub-total				2,404,600.00	
IV. Plantation Maintenance (year 2-5)	ha.	40,000	200	8,000,000.00	DENR/LGU/Private companies
Subtotal				10,404,600.00	
TOTAL AMT				14,238,200.00	

Cost/ha = Php 71,191.00

Spacing: 2m x 3m

Species: Indigenous/endemic forest tree species

Appendix 5: Establishment of agroforestry farms on 100 hectare

WORK AND FINANCIAL PLAN					
ACTIVITIES	UWM	UNIT COST	TARGET	TOTAL	Innovative source of funds/ in kind support
I. Procurement of planting materials					
Fruit trees (grafted)	sdlg.	60	20,000	,200,000.00	LGU/ DA
Forest Trees (potted)	sdlg.	5	15,000	75,000.00	LGU/DENR/DA/P rivate company
Contour Hedgerows (coffee)	sdlg.	10	20,000	200,000.00	LGU/DA
Abaca	Sucker	8	20,000	160,000.00	DA/FIDA
Bamboo	Propagule	25	1,000	25,000.00	From Private company
Agri-crops (assorted seeds)	var.	1,500.00	100	150,000.00	DA/ LGU/NGO
Subtotal				1,810,000.00	
II. Procurement of Inputs					
Organic Fertilizer (vermicast)	bag (50 kg)	400	3,600	1,440,000.00	DA/LGU
Pesticides	Liters	1500	200	300,000.00	DA/LGU
Subtotal				1,740,000.00	
III. Site Development					
Land Preparation (Staking and Hole digging):					
Fruit trees	No.	4	20,000	80,000.00	Landholder counterpart
Forest trees	No.	2	15,000	30,000.00	Landholder counterpart
Bamboo		2	1,000	2,000.00	Landholder counterpart
Abaca		2	20,000	40,000.00	Landholder counterpart
Coffee		2	20,000	40,000.00	Landholder counterpart
Out planting					
Fruit trees species (10m x 5m)	No.	2	20,000	40,000.00	Landholder counterpart
Forest tree species(Boundary planting at 3m interval)	No.	2	15,000	30,000.00	Landholder counterpart
Bamboo		2	1,000	2,000.00	Landholder counterpart
Abaca		2	20,000	40,000.00	Landholder counterpart
Coffee		2	20,000	40,000.00	Landholder counterpart
Agricultural crops	Seed	50,000		50,000.00	Landholder counterpart
Fertilizer (organic) application	Spot	2	76,000	152,000.00	Landholder counterpart

WORK AND FINANCIAL PLAN					
ACTIVITIES	UWM	UNIT COST	TARGET	TOTAL	Innovative source of funds/ in kind support
Establishment Of contour hedgerows	Linear meter	1	75,000	75,000.00	Landholder counterpart
Subtotal				621,000.00	
III. Maintenance and Protection					
Ring weeding:					
Fruit trees	Spot	5	20,000	100,000.00	Landholder counterpart
Forest trees	Spot	1	15,000	15,000.00	Landholder counterpart
Bamboo	Spot	2	1,000	2,000.00	Landholder counterpart
Abaca	spot	2	20,000	40,000.00	Landholder counterpart
Coffee	spot	2	20,000	40,000.00	Landholder counterpart
Fertilizer application (organic fertilizer)	spot	2	76,000	152,000.00	Landholder counterpart
Pesticide application (bio-chemical)	var.	200	100	20,000.00	Landholder counterpart
Plantation Maintenance (Year 2-5)	hectares	40,000/year	100	4,000,000.00	Respective NGO counterpart/LGU / Landholder
Subtotal				4,369,000.00	
IV. Monitoring and Protection (6-30 years)	hectares	40,000/year	100		PO/DA/LGU/DEN R Federation counterpart
TOTAL AMT				8,540,000.00	

Cost/ha = Php 85,400.00

Area = 1 ha. Agroforestry Farm Development (Fruit trees, 10m x 5m spacing; with inputs of high-value crop seeds)

Species = forest and fruit trees, fuel wood, cash crops, hedgerows and nitrogen-fixing trees.

Appendix 6. Land tenure instruments within the MKRNP

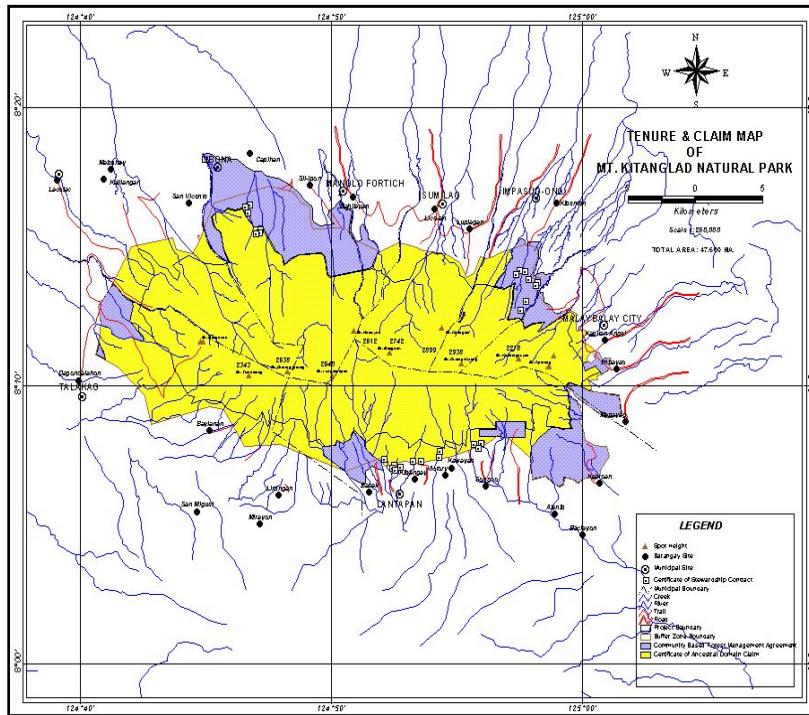


Figure 6: CBFMA and CADC area of MKRNP

Appendix 7: Overview of project development at other sites

Case Study 2: Assessment of Arakan forest-carbon development project

- 2004 With assistance from the Foundation of Philippine Environment (FPE), the Philippine Eagle Foundation (PEF) initiated the Forest Corridor Development (AFCD)¹⁰ program in Arakan.
- 2005–2006 With support from the United Nations Development Programme, the Arakan Forest Corridor was surveyed and program development was initiated. There was no plan yet to include forest-carbon development as a CDM A/R project activity for climate-change mitigation.
- 2007–2008 FPE introduced the idea of a CDM forestry project within the Arakan Forest Corridor. A forest-carbon development project on denuded and degraded lands within the Arakan Forest Corridor would be one mechanism to protect the remaining forest fragments in Arakan. Conceptualisation and project design document preparation following the CDM template for A/R project activity occurred from 2007 until 2008.
- In April 2008, the project design document was drafted supposedly for validation by a Designated Operational Entity (DOE) to be contracted by the FPE in the third quarter of 2009. However, after three years the consultants hired by the World Bank have not finished yet the document. It was relayed to PEF personnel that the Bank and FPE opted to go for the voluntary carbon market instead of pursuing the carbon market under the CDM standards.
- 2009 The World Agroforestry Centre Philippines presented the framework of the research project and the research case study. As an outcome of the project assessment/review in the second half of 2009, PEF instituted corrective activities on the loopholes of the draft project design document, particularly the project area and the methods of community engagement.
- 2010 Proposed area of 216 ha and documenting the plan for the forest carbon development project is undertaken. Project design document is revised while field activity implementation is on-going.

¹⁰ AFCDP is the umbrella and flagship initiative for forest restoration programs in the Mtain ranges in Arakan to particularly benefit the critically endangered Philippine Eagle *Pithecophaga jefferyi* and other wildlife that share this forest habitat.

Case study 3: Assessment of the proposed forest-carbon development project in the Ikalahan Ancestral Domain

- 2003 The Ikalahan Ancestral Doman (IAD) was selected as World Agroforestry Centre's RUPES¹¹ pilot site for testing a rewards for environmental services mechanism with carbon sequestration as the main environmental service.
- 2004–2005 Initiated the carbon-forestry project to participate in the carbon market under CDM. Focussing on carbon sequestration as the environmental service, IAD was evaluated as qualified for rewards for environmental services mechanisms.
- 2006–2007 Preparation of project idea note for the proposed 900 ha started in 2006 and was finalised in 2007 to find interested investors for the proposed forest-carbon project.
- 2008 Kalahan Educational Foundation (KEF) signed (9 June 2008) a one-year agreement for consulting services with Mitsubishi UFJ Securities Co. Ltd. for developing a project design document for the proposed 900 ha forest-carbon project in IAD.
- 2009 Started data gathering needed for the project design document. Activities included boundary survey and delineation of parcels as well as formulation of the project plan and specific land-management activities for the proposed project. Likewise, rapid agro-biodiversity and rapid carbon stock appraisals were conducted to provide essential baseline information for the IAD to provide a base for negotiations of carbon credits and to assess the applicability/feasibility of environmental services rewards mechanisms other than carbon markets.
- 2010 Processing data of ground survey, mapping of the delineated parcels and documenting the initiated activities and project development plan continue.
- KEF is exploring and targeting carbon buyers through the CDM A/R project activity, the voluntary carbon markets and REDD+ mechanisms.

¹¹ Rewarding Upland Poor for Environmental Services (RUPES) is an Asian network for facilitating environmental service agreements between the upland poor and downstream beneficiaries. One focus is on carbon storage as a key environmental service. In the Kalahan, Philippines' RUPES is helping local communities build capacity for entering the international carbon market.

Case study 4: Assessment of forest-carbon development in Quirino, Sierra Madre Biodiversity Corridor

- 2003–2005 Conservation International Philippines and the World Agroforestry Centre Philippines collaborated to conduct a feasibility study of forest-carbon projects in the Sierra Madre Biodiversity Corridor. The World Agroforestry Centre Philippines was commissioned to conduct a carbon-stock assessment of the land uses in the proposed site for a carbon sequestration project.
- 2006–2007 Conservation International Philippines established the 20 ha pilot area of the forest-carbon project in Quirino, a reforestation and agroforestry farm area.
- 2008–2009 Conservation International Philippines were able to catalyse a donor (moreTrees Inc¹²) for the forest-carbon development project of 41 ha, consolidated by the Memorandum of Agreement among project partners. In 2009, prepared two project design documents for the full 177 ha following the standard template for CDM A/R project activity and standard template for Climate Change and Biodiversity Standards. The first version of the project design document (May 2009) was submitted to the Rainforest Alliance for validation audit in June 2009.
- 2010 Rainforest Alliance conducted a reassessment audit of the document and established that the project proponents were able to meet all the required criteria. Validation of the document was finalised on 17 June 2010 under CCB Standards as Gold level.

¹² MoreTrees Inc is a Japanese entity with its principal office in Tokyo

Case study 5: Assessment of Laguna de Bay Community Watershed Rehabilitation Project as a forest-carbon development project

The Watershed Rehabilitation Project consists of two elements:

1. The Laguna de Bay Community Watershed Rehabilitation Project 1 covers an aggregate total of 140 ha covering ten *barangays* within the Caliraya-Lumot watershed, further subdivided into two sites (site 1 = 40 ha; site 2 = 100 ha).
2. The Laguna de Bay Community Watershed Rehabilitation Project 2 covers an aggregate total of 217 ha located in four sites in Laguna province. Each site is equivalent to a small-scale forest-carbon project bundled into one project.

2004 The project initiative started. The Community Development Carbon Fund (CDCF) and the BioCarbon Fund (BIOCF) are the target buyers of the carbon emission reduction credits. Both are represented and managed by World Bank.

2006 Emission Reduction Purchase Agreements (ERPA) was signed between the project and the World Bank. The ERPA were for the CDCF and another for the BIOCF.

2007 The first project design document, the Laguna de Bay Community Watershed Rehabilitation Project 1, was prepared in July 2007, and the second document, the Laguna de Bay Community Watershed Rehabilitation Project 2, was prepared in November 2007.

2008 It was expected that in 2008 the institutionalisation of these two projects as component of the Carbonshed project would be finished.

2009 The two project design documents were submitted by the project for validation by an independent third party (TUV SUD). Of all the selected sites proposed for the forest-carbon development project, only one site, the 5 ha located in the municipality of Siniloan, was considered by the validator to satisfies the eligibility criteria under CDM A/R project activity.

2010 While continuing reforestation activities, the project is looking for additional areas to meet their ERPA commitment, revising their project design document and looking at other market mechanisms.

Glossary

Adaptation

A process where strategies and actions to avoid, moderate, cope with and/or take advantage of the consequences of climate events are developed, enhanced and implemented.*

Ancestral Domains

Areas generally belonging to indigenous cultural communities, including ancestral lands, forests, pasture, residential and agricultural lands, hunting grounds, worship areas and lands no longer occupied exclusively by indigenous communities but to which they had traditional access, particularly the home ranges of indigenous cultural communities who are still nomadic or shifting cultivators.

Baseline (also called project baseline)

A description of current conditions, including existing or needed information on socio-economic conditions, climate risks and hazards, and known system vulnerabilities and adaptations.*

Biodiversity

Biodiversity is a contraction of biological diversity. Biodiversity reflects the number, variety and variability of living organisms. It includes diversity within species (genetic diversity), between species (species diversity), and between ecosystems (ecosystem diversity).*

Buffer zones

Are identified areas outside the boundaries of and immediately adjacent to designated protected areas that need special development control in order to avoid or minimise harm to the protected area.

Climate change

Any change in climate over time, whether due to natural variability or because of human activity.*

Environmental services

The benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services such as nutrient cycling that maintain the conditions for life on Earth.*

Land cover

The physical coverage of land, usually expressed in terms of vegetation cover or lack of it. The human use of a piece of land for a certain purpose (such as irrigated agriculture or recreation) influences land cover.*

Impacts

Changes induced in a system (physical ecological or social) resulting from climate change or climate variability which have significant deleterious effects for its composition, resilience and/or productivity.*

Indigenous people

A group of people or homogenous societies identified by self-ascription and ascription by others, who have continuously lived as an organized community on communally bounded and defined territory; who have under claims of ownership since time immemorial, occupied, possessed and utilized such territories, sharing common bonds of language, customs, traditions, and other distinctive cultural traits; who have, through resistance to political, social and cultural inroads of colonization, non-indigenous religions and cultures, became historically differentiated from the majority of Filipinos.

Land degradation

A reduction in land productivity that affects the integrity of an ecosystem through erosion, salinisation, loss of soil fertility and the like. Prevention and control of land degradation, especially desertification and deforestation, are critical to achieving sustainable development at the national and global environmental levels.

Mitigation

Measures added to a project or activity to reduce, prevent or correct its impact;
Anthropogenic intervention to reduce the emission or enhance the sinks of greenhouse gases.*

National Integrated Protected Areas Systems (NIPAS)

Is the classification and administration of all designated protected areas to maintain essential ecological processes and life-support systems, to preserve genetic diversity, to ensure sustainable use of resources found therein, and to maintain their natural conditions to the greatest extent possible.

National park

Refers to a forest reservation essentially of natural wilderness character which has been withdrawn from settlement, occupancy or any form of exploitation except in conformity with approved management plan and set aside as such exclusively to conserve the area or preserve the scenery, the natural and historic objects, wild animals and plants therein and to provide enjoyment of these features in such areas.

Natural park

A relatively large area not materially altered by human activity where extractive resource uses are not allowed and maintained to protect outstanding natural and scenic areas of national or international significance for scientific, educational and recreational use.

Protected area

Refers to identified portions of land and water set aside by reason of their unique physical and biological significance, managed to enhance biological diversity and protected against destructive human exploitation.

Rainforestation

A reforestation strategy to bring back a rainforest to its original state by using/planting endemic/native trees.

* from UNFCCC definition of terms

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Who we are

The World Agroforestry Centre is the international leader in the science and practice of integrating 'working trees' on small farms and in rural landscapes. We have invigorated the ancient practice of growing trees on farms, using innovative science for development to transform lives and landscapes.

Our vision

Our Vision is an 'Agroforestry Transformation' in the developing world resulting in a massive increase in the use of working trees on working landscapes by smallholder rural households that helps ensure security in food, nutrition, income, health, shelter and energy and a regenerated environment.

Our mission

Our mission is to advance the science and practice of agroforestry to help realize an 'Agroforestry Transformation' throughout the developing world.



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