

Carbon forestry projects in the Philippines: potential and challenges

The Arakan Forest Corridor forest–carbon project

Raquel C. Lopez, Jayson C. Ibañez and Rodel D. Lasco

Southeast Asia



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Working Paper no. 130



World Agroforestry Centre
TRANSFORMING LIVES AND LANDSCAPES

Correct citation

Lopez RC, Ibañez JC, Lasco RD. 2011. *Carbon forestry projects in the Philippines: potential and challenges: the case of the Arakan Forest Corridor forest carbon project*. Working Paper no. 130. Bogor, Indonesia: World Agroforestry Centre (ICRAF) Southeast Asia Regional Program. DOI: 10.5716/WP11055.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. 130

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Abstract

The proposed forest-carbon development project in the Arakan Forest Corridor initially was planned to participate in the carbon market under the United Nations Clean Development Mechanism afforestation/reforestation component, with a total area of 3000 ha. Currently, the proponent is exploring participation in the voluntary carbon market. The project will implement an agroforestation scheme to rehabilitate 216 ha of denuded/degraded portions within the Corridor. A 'community-based conservation' approach will be adopted. The representative people's organizations (Nagkahiusang Manobo sa Datu Ladayon, Pauangdig Lumadnong Panaghiusa sa Arakan, Tumandig Lumadnong Panaghiusa and Kiandang Farmer's Association), tribal and migrant communities of Arakan that cover the area signed a binding contract called a Conservation Agreement for partnership with the Philippine Eagle Foundation and a separate Rainforestation Agreement as individual or household landholders. Incentives will be provided to the participating people's organizations and to each landholder from innovative funding sources. The Adopt a Parcel of Hope campaign is the fundraising vehicle, seeking funding from the private sector through corporate social responsibility mechanisms for every hectare (or parcel).

The proposed project can potentially contribute to mitigation efforts through carbon sequestration and storage. However, there are many challenges for project development and field implementation. Realistic work and budget plans need to be prepared and the technical and socio-economic aspects of the field work must be sustainable.

Smallholders' acceptance of the arrangements and continued cooperation is vital for the project's success. To ensure this, more ground work needs to be done to facilitate implementation in the field. A more pro-active project design must be developed using adaptive management theory and subsequently implemented. Adaptive management uses management intervention as a tool to strategically probe the functioning of an ecosystem.

Keywords: Forest carbon development, Arakan Forest Corridor, agroforestation, rainforestation farming, community-based conservation, project development approach, Adopt a Parcel of Hope campaign

Acknowledgements

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

We would also like to thank the management of the Philippines Eagle Foundation and Foundation of the Philippine Environment for providing the authors with information, Dr Paul LG Vlek of ZEF for his technical contribution and comments, Robert Finlayson for editing and Tikah Atikah for design (the latter two both of the World Agroforestry Centre (ICRAF) Southeast Asia Program).

Contents

Abstract	4
List of figures	ii
List of tables	ii
1. Introduction.....	1
Objectives of the study.....	1
Background of the study	2
2. Methodology	3
Sources of data and methods of data collection	3
Method of analysis	3
3. Results and discussion.....	4
Description of the forest-carbon project in the Arakan Forest Corridor	4
Site description	4
Project objectives.....	6
Area	6
Technical operation	7
Management operation	13
Policy support	15
Financial support	16
Private and public support	16
Other organizations' support	16
Potential and challenges of the proposed project	20
Effectiveness of institutionalising the project.....	22
Efficiency of resource use and mobilisation.....	24
Financial	25
Impact of the proposed project	26
Strengths and limitations of the proposed project.....	29
4. Conclusion	35
5. Recommendations.....	36
6. Lessons learned	39
References	40
Appendices.....	42

List of figures

Figure 1. Location map of the project	5
Figure 2. Delineation of 29 individual parcels included in the project	7
Figure 3. Ex-ante estimation of carbon sequestration per hectare based on draft PDD, 2009 carbon measurement/calculation.	10
Figure 4. The administrative set-up of the project	13

List of tables

Table 1. Pioneer species (sun-loving) for Arakan Forest Corridor rainforestation farming.....	7
Table 2: Shade-loving species for Arakan Forest Corridor rainforestation farming	8
Table 3. Costing of incentive payments to each landholder participant for their 0.25 ha area allotted for the project	12
Table 4. Funding sources to support the project operation, as of 2009	17
Table 5. Cost estimate for 5-year operation for already delineated area of 178.21 ha (29 parcels)	18
Table 6. Actual expenses incurred for the field activities, as of 2009	19
Table 7. Costs of application processing by designated national authority (Department of Environment and Natural Resources Clean Development Mechanism Secretariat)	19
Table 8. Potential and challenges of the forest-carbon development project	20
Table 9. Strengths and limitations of the proposed project	30

1. Introduction

Rationale of the study

The inclusion of afforestation and reforestation (A/R) activity in the Clean Development Mechanism (CDM) for trading greenhouse gas emissions offsets has prompted interest in the Philippines (Lasco et al. 2008) in emerging carbon markets and rewards for ecosystem services schemes. These mechanisms are seen as opportunities for the Philippines to obtain financial support for rehabilitation and sustainable management of its natural resources, in particular forests.

To address the impact of climate change, both mitigation and adaptation are necessary and interdependent. These two strategies can be implemented by rehabilitating denuded forests and degraded land. Forest-carbon development by agroforestation¹ is one of the ways of achieving reduction of emissions and other positive environmental impacts. Aside from carbon sequestration and storage, agroforestation addresses other ecological issues such as improvement of land and soil quality, habitat restoration, watershed rehabilitation and enhancement of landscape beauty. However, to undertake this development, the project needs to build institutional capacity, find investment capital, procure technological know-how, develop appropriate incentive mechanisms and garner political support (local, national and international).

This project assessment sets out to identify the institutional approaches, technological innovations and policy reforms necessary to enable 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 used the forest carbon (ForCarb) project in the Arakan Forest Corridor as a case study.

Objectives of the study

We aimed to identify the potential and challenges of the proposed forest-carbon development project in the Arakan Forest Corridor (AFC), based on the project's draft 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 the carbon-forestry project's development and implementation.

¹ Agroforestation implies a land rehabilitation scheme through establishing purely forest-tree species as reforestation component and an agroforestry farm development component

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 of the study

With assistance from the Foundation of Philippine Environment (FPE), the Philippine Eagle Foundation Inc (PEF)² initiated the Arakan Forest Corridor Development Program (AFCDP)³ in 2004. In 2005–2006, with support from UNDP, the Arakan forest corridor was surveyed and program development was initiated. There was no plan then to include forest-carbon development as a CDM A/R project for climate-change mitigation. This concept was introduced by FPE in 2007. With funding support from the World Bank and technical assistance from Institute for Economic Development experts, FPE helped prepare the project design document (PDD) for the proposed project.

The conceptualisation and PDD preparation, that followed the CDM template for A/R projects, went from 2007 until 2008 (Appendix 1). Through the facilitation of FPE, a series of workshops was conducted with technical assistance from World Bank representatives. A series of stakeholders' conferences and training sessions (for example, basic ecological awareness, biodiversity conservation, climate change, knowledge of forestry laws, watershed management, community-based resource management, reforestation farming, organizational management and enterprise development) were conducted. FPE provided funds to PEF to manage the data collection needed.

Surveying and mapping the location of mother trees of prime forest-tree species and determination of the volume of available seeds and wildlings was conducted in March 2008. One year later, the PDD draft was completed. This was supposedly for validation by a designated operational entity to be contracted by the FPE in the third quarter of 2009. Meanwhile, satellite nurseries were established and seedling production started. However, after three years the consultants hired by the World Bank were not able to provide a final version of the PDD, apparently owing to the Bank and FPE opting for the voluntary carbon market instead of pursuing the carbon market under the CDM standards.

In 2009, the World Agroforestry Centre Philippines presented the framework of a research project and case study, helping PEF to see the loopholes in the draft PDD, specifically after a project assessment and review of activities were conducted in the second half of 2009. Corrective activities began. These included a survey and delineation of land parcels for the project area. The focus on rehabilitation was to be the grassland/degraded areas along the Arakan forest corridor. Community consultations had already been undertaken. In 2010, delineation of the proposed area was finalised. Formulating the forest-carbon development project plan for the 216 ha was then undertaken. The PDD, that followed the standard

² PEF is a private, non-stock, non-profit organization dedicated to saving the endangered Philippine Eagle (*Pithecophaga jefferyi*).

³ The AFCDP is the umbrella and flagship for forest restoration programs by PEFI, particularly to benefit the critically endangered Philippine Eagle and other wildlife that share the forest habitat. It covers a wide scope in terms of area management, operational goals and stakeholder participation, also encompassing areas outside the forest corridor.

template, was being revised while field activity continued, such as nursery operations and initial planting.

2. Methodology

Sources of data and methods of data collection

Primary and secondary data were used in the assessment of the forest carbon (ForCarb) project in the Arakan Forest Corridor. The assessment started in 2009, initially by conducting literature reviews of reports and proceedings from conferences about the project initiative in Arakan. Field investigations through site visits and unstructured, informal interviews were conducted after the draft PDD was completed.

A mini-forum and workshop was conducted to

- (1) clarify the information from the draft PDD, observe field sites and gather information from unstructured, informal interviews with farmers;
- (2) verify the process undertaken for the PDD preparation and the methods used for community engagement;
- (3) ask participants' perceptions of the project and what needed improvement in the plan; and
- (4) consult the PEF personnel and field team on the process of project planning. An analysis of strengths, weaknesses, opportunities and challenges (SWOC) was conducted to identify data gaps in the draft PDD, issues with the project's operation, field implementation and any ambiguities.

A research agreement was signed between the World Agroforestry Centre Philippines and PEF to detail the process of re-conducting some activities related to formulation of the project plan. The Centre provided technical guidance for the corrective actions, project development planning and documentation undertaken by the PEF.

Method of analysis

With reference to the overall framework (Appendix 2) developed for the research project ('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:

- (1) effectiveness of institutionalising the proposed project;
- (2) efficiency of resource use and mobilisation; and
- (3) 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 was based on the draft project plan and other report documents and the experience of the direct intermediary (Philippine Eagle Foundation). The key issues were identified as

- the weaknesses and constraints of the technical management (site selection, definition of project area, implementation strategy in ecological services provision); and
- administration (project administration, resource use and mobilisation, socio-economic management).

3. Results and discussion

Description of the forest-carbon project in the Arakan Forest Corridor

Site description

Arakan is situated at the northeastern tip of the province of North Cotabato, the central part of the island of Mindanao. It is situated 7° 11" 49' to 7° 32" 36' North and 125° 15" 31' to 125° 04" 54' East; bounded in the east by Davao City, which separates Arakan from the province of Davao del Sur; on the west by the municipality of President Roxas and Antipas; on the north by the towns of Kibawe and Kitaotao of Bukidnon province; and on the south by the town of Magpet, North Cotabato, Mindanao (Figure 1).

The municipality of Arakan is composed of 28 barangays, with a total population of 34 588 in 2000 projected to increase to 59 676 by the end of 2011 (NSCB 2000). It is populated by a number of ethno-linguistic groups, predominantly of the Manobo-Kulamanon and Manobo-Tinananon tribes. The Manobo tribes are considered the original settlers of the land. Currently, there are at least eight ancestral domains that have been awarded a Certificate of Ancestral Domain Claim (CADC) within the municipality.

The total land area is 69 432.79 ha. Classified agricultural land comprises only about 14% (10 204.23 ha) of the total land area. However, about 24% (16 798.89 ha) of the total land area of Arakan is utilized for crop production. Land area classified as forest is only 4% (~2452.98 ha).

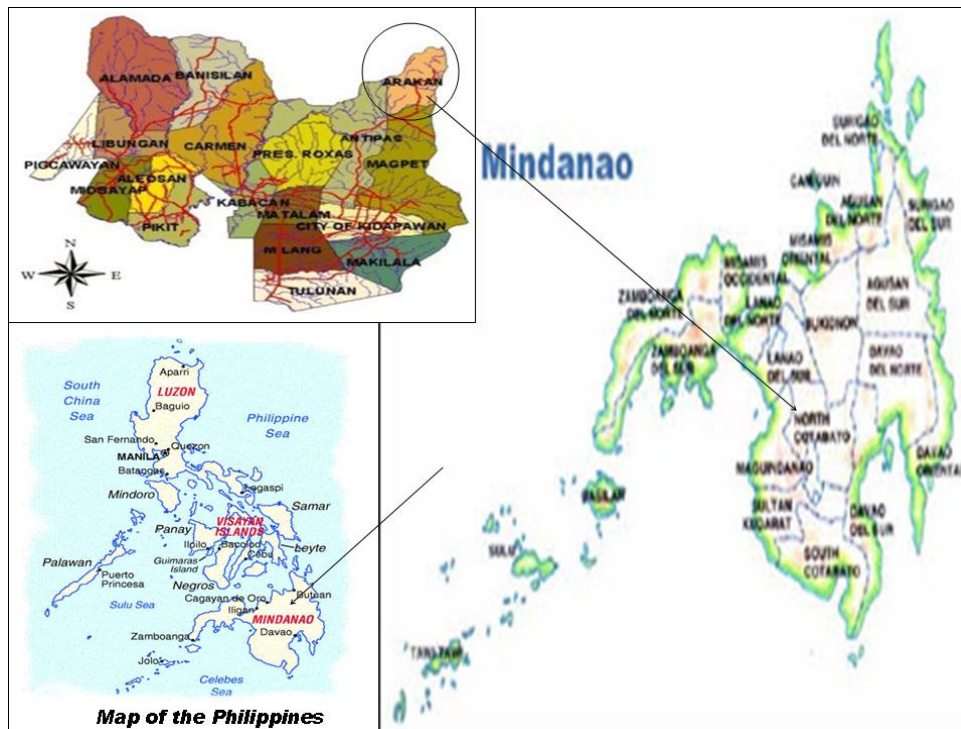


Figure 1. Location map of the project

After many years (1960s–1980s) of commercial logging and the agricultural expansion that followed and encroached on the logged-over areas, what remains of the forest cover of Arakan is only isolated forest fragments in the mountain ranges of Mahuson, Sinaka and Kabalantiian-Binoongan-Kulaman (KABIKU). Though relatively small, these mid-elevation mountains are considered biologically and ecologically important. Two wild pairs of Philippine eagles have been breeding at Sinaka and Mahuson at least since 1992. In 1993, the Philippine eagle called Kahayag was retrieved by the PEF from an old nest tree at the KABIKU forest strip. Sinaka is regarded as one of the world’s Important Bird Areas because of the relatively high proportion of unique and threatened birds it contains (CI Phil et al. 2006). Mahuson also has a unique mammalian assemblage as exemplified by a new species of bat, the Philippine large-headed fruit bat, which was collected there in 2002 (Helgen et al. 2006).

The landscape of Arakan is dominated by undulating to rolling and scattered hills, from wide to narrow valleys and mountain ranges with six rivers and various creeks that discharge to Pulangi River. These waterways are susceptible to flooding owing to the inability of the watershed to absorb heavy downpours. Fertile top soil systems in Arakan are carried by run-off to the floodplains. This is aggravated by mono-cropping short-term crops which further expose the soils. Upland farming or crop cultivation in the forest lands is the dominant source of livelihood, with corn and rice as the main products. The opening of new areas for agricultural production towards the remaining forest fragments is occurring at an alarming rate. Invasive *Imperata* grasses have colonised abandoned or fallowed swidden farms along forest edges making natural regeneration difficult. Periodic grassland fires also make natural forest re-growth impossible.

Project objectives

Under the umbrella of the AFCDP, forest carbon development has been considered as one mechanism to restore wildlife habitats. While protecting the remaining forest fragments, the project aims to

- re-establish forest on grasslands along the forest corridor between the mountains of Mahuson⁴, Sinaka and KABIKU;
- rehabilitate degraded lands, such as fallowed and abandoned farms close to habitats of threatened wildlife and critical watersheds, the source of the headwaters of the Napungan River that supplies the city of Arakan;
- participate in carbon markets to generate supplementary income for upland communities who restore degraded habitats; and
- provide incentives to both indigenous and non-indigenous community partners, particularly land owners, claimants and tenure holders who allotted land for 'rainforestation farming'.

Area

The proposed forest-carbon development project will cover an aggregate total of 216 ha. This is within the three barangays (Sitio Enamong, Barangay Datu Ladayon = 51.07 ha; Sitios Panuangdig and Makati, Barangay Ganatan = 85.03 ha; Sitio Uwayanon, Barangay Ganatan = 42.11 ha; and Sitios Kayopaton and Bagtok, Barangay Tumanding = 38 ha). About 178.21 ha, consisting of 29 parcels, is already delineated and mapped (Figure 2). This is excluding the 38 ha at barangay Tumanding, which are yet to be delineated into individual, household landholdings. All parcels are either covered by a CADC or a Certificate of Stewardship Contract (CSC) as tenure instrument (Appendix 3).

⁴ Mt Mahuson is part of the bigger Mt Apo range which covers at least 99 000 ha of forest (CI Phil et al. 2006); one of the biggest forest blocks in Mindanao. Mt Mahuson can act as a source of wildlife immigrants, which can provide a 'rescue effect' to 'sink' populations at Sinaka and KABIKU. Building connectivity to the larger Mt Mahuson could mitigate the ill effects of population isolation and the impacts of 'edge-effects' on wildlife in the small forest fragments of Sinaka and KABIKU.

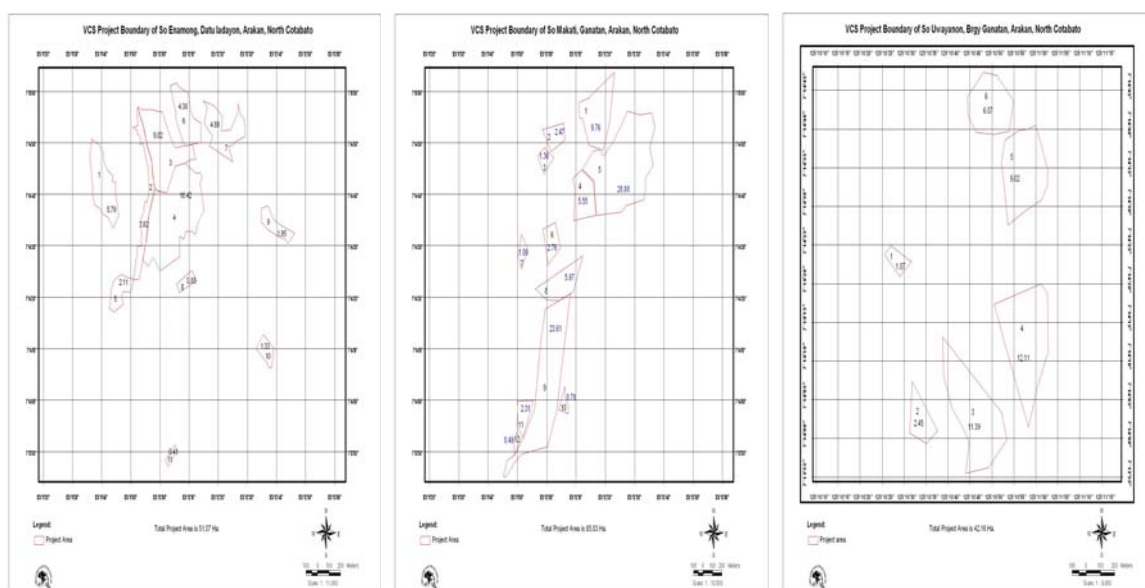


Figure 2. Delineation of 29 individual parcels included in the project

Technical operation

Strategy of implementation

The project will use an agroforestation scheme with a purely tree-based system. Specifically employing the ‘rainforestation farming’ approach⁵, tree establishment will start with pioneer species (Table 1) then introduce long-term shadow/shade-loving species (Table 2) under the canopy of grown pioneers. Field implementation is presented in Box 1.

Table 1. Pioneer species (sun-loving) for Arakan Forest Corridor rainforestation farming

	TREE SPECIES		FRUIT TREE SPECIES	
	Local Name	Scientific name	Local Name	Scientific name
1 st priority species	Mindanao gum	<i>Eucalyptus deglupta</i>	Mansanitas	<i>Zizphus jujuba</i>
	Anabiong	<i>Trema orientalis</i>	Langka (jackfruit)	<i>Artocarpus heterophyllus</i>
	Dapdap	<i>Erythrina variegata</i>	Santol	<i>Andoricum koejape</i>
	Biyante	<i>Macaranga bicolor</i>	Mangga (mango)	<i>Mangifera indica</i>
	Anitap	<i>Macaranga cumingii</i>	Rambutan	<i>Nephelium lappaceum</i>
	Balete (Banyan)	<i>Ficus Benjamin</i>	Avocado	<i>Persea americana</i>
	Alim	<i>Melanolepis multiglandulosa</i>	Bayabas (Native Guava)	<i>Psidium guajava</i>
	Inyam (Black currant)	<i>Antidesma ghaesembilla</i>		
	Hagimit	<i>Ficus minahassae</i>		
2 nd pri	Nato (Bulobankal)	<i>Nauclea junhuhnii</i>	Lukban (Pomelo)	<i>Citrus grandis</i>
	Dita	<i>Alstonia scholaris</i>	Caimito (Star apple)	<i>Cryosophyllum cainito</i>

⁵ The ‘rainforestation farming’ approach is based on the assumption that a farming system in the humid tropics is increasingly more sustainable the closer it is in its species composition to the original local rainforest (Margraf and Milan, 1994, Margraf and Milan, 1996).

Tipolo	<i>Artocarpus blanchoi</i>	Niyog (Coconut)	<i>Cocos nucifera</i>
Kalumpit	<i>Terminalia edulis</i>	Tambis	<i>Syzygium samarangense</i>
Binuange	<i>Macaranga tanarius</i>	Kamansi	<i>Artocarpus camansi</i>
Talisay	<i>Terminalia catappa</i>	Chico	<i>Achras zapota</i>
Molave	<i>Vitex parviflora</i>	Bread fruit (Kulo)	<i>Artocarpus altilis</i>
Narra	<i>Pterocarpus indicus</i>	Sampalok (Tamarind)	<i>Tamarindus indica</i>
Malapapaya	<i>Polyscias nodosa</i>	Duhat (Java plum)	<i>Syzygium cumini</i>
Aguho	<i>Casuarina equisetifolia</i>		

Table 2: Shade-loving species for Arakan Forest Corridor rainforestation farming

	TREE SPECIES		FRUIT TREE SPECIES	
	Local Name	Scientific name	Local Name	Scientific name
1 st priority species	Lauan species	<i>Dipterocarpaceae, Shorea contorta, Shorea neoroscensis</i>	Durian	<i>Durio zibethinus</i>
	Mayapis	<i>Shorea squamata</i>	Lanzones	<i>Lansium domesticum</i>
	Tangile	<i>Shorea polysperma</i>	Mangosteen	<i>Garcinia mangostana</i>
	Bagtikan	<i>Parashorea plicata</i>	Marang (Tarap, Puso-	<i>Artocarpus odoratissimus</i>
	Apitong	<i>Dipterocarpus</i>	Pili nut	<i>Canarium luzonicum</i>
	Ulayan	<i>Lithocarpus llanosii</i>		
2 nd priority species	Dao	<i>Dracontomelon dao</i>	Catmon	<i>Dillenia indica</i>
	Igem	<i>Dacrycarpus imbricatus</i>	Tabon-tabon	<i>Guettarda speciosa</i>
	Batwan	<i>Garcinia binucao</i>	Makopang-kalabao	<i>Syzygium malaccense</i>
			Tisa	
		Guyabano	<i>Anona Muricata</i>	

Box 1: Field activity operation for the project

Field activity operation of ForCarb Project in the Arakan Forest Corridor

Nursery operation

Four (4) satellite nurseries will be established in catering each locations (*Sitio Enamong, Barangay Datu Ladayon; Sitios Pan-uangdig and Makati, Barangay Ganata; Sitio Uwayanon, Barangay Ganata; and Sitios Kayopaton and Bagtok,, Barangay Tumanding*).

Each nursery is designed to accommodate at least 7,200 seedlings which will be used to reforest at least 6 hectares of in each location/community per year. Nursery operation followed the procedures for establishing and managing the nursery published by Margraf and Milan (1996), although several modifications were made as needed.

The seed collection sites are at Mahuson for Ganatan, and Sinaka for Tumanding and Datu Ladayon communities, and wildlings from riparian forests along Tinanan and Ganatan Rivers (Ganatan), Napunangan River (Tumanding) and Tinago (Datu Ladayon).

Daily collections were made until the total number of seedlings needed was met. Wildlings were handcarried to the nursery. A PEF Forester and a Community Development Officer (CDO) joined all of these expeditions. Prior to these collecting expeditions, a small team of locals with the PEF Forester scouted for and marked collection sites of suitable wildlings.

At the nursery, the collected wildlings were transplanted into polyethylene bags filled with a desirable mixture of soil and placed in a plastic recovery chamber for at least 3 months. During this period, care and maintenance activities like watering, is not required except for measures to ensure that the chambers will not be destroyed by people, stray animals, and by natural occurrences such as storms or droughts.

Field/land preparation

Areas to be planted were cleared by strip brushing of 1-m a width strip following the contours lines, marking the spot to be planted with a stick, hole-digging a one foot diameter and depth of 8 inches in each spot, separating the dug topsoil from the subsoil on the side of the hole. During planting of seedlings, the topsoil goes first in the hole followed by the subsoil.

Forest Carbon Planting operation

First to be planted are the sun-loving or pioneer species. Distance between seedlings is 2 x 5 m (surface distance). However, in the highly sloping areas, the distances between holes will farther, instead narrower when following the contour drop.

Planting of shade-loving or climax species will be done on the 2nd year in between the pioneer species, and on the 3rd year or thereafter, the fruit trees. Planting of other agroforestry crops depends on the rainforestation plan prepared by the land-owner with the help of the PEF Forester.

Planting will be done at the start of the rainy season which is normally at the month of June in Mindanao. In planting, a 3-inch soil depression in the spot/hole of the seedling will be left to serve as trap for rainwater to provide an extended supply of water and nutrients to the planted seedling. When locally available, organic fertilizers will be used. Inorganic fertilizer or pesticides will not be used.

Forest Carbon Maintenance and Protection

Land holders/owners shall have the primary responsibility for the care and maintenance of the planted seedlings.

Ring weeding, brushing along the rows and watering shall be made on a monthly basis during the first year of plantation, and quarterly during the second year.

Silvicultural practices such thinning and pruning will be conducted when already necessary. Land-owner/holder can then utilize plant parts that have been removed as firewood.

Schedule field visits will conducted by the PEF Forester to oversee the plantation site.

Adopting the reforestation scheme, we estimate that the annual net anthropogenic removals by the forest-carbon development project area would be 27 718 t CO²e. For ten years, the net anthropogenic greenhouse gases removal by sink is estimated at 27 718 t CO²e. Over a 20-year period, the net removals by sink are at 56 226 t CO²e. The total number of crediting years was set at 60.

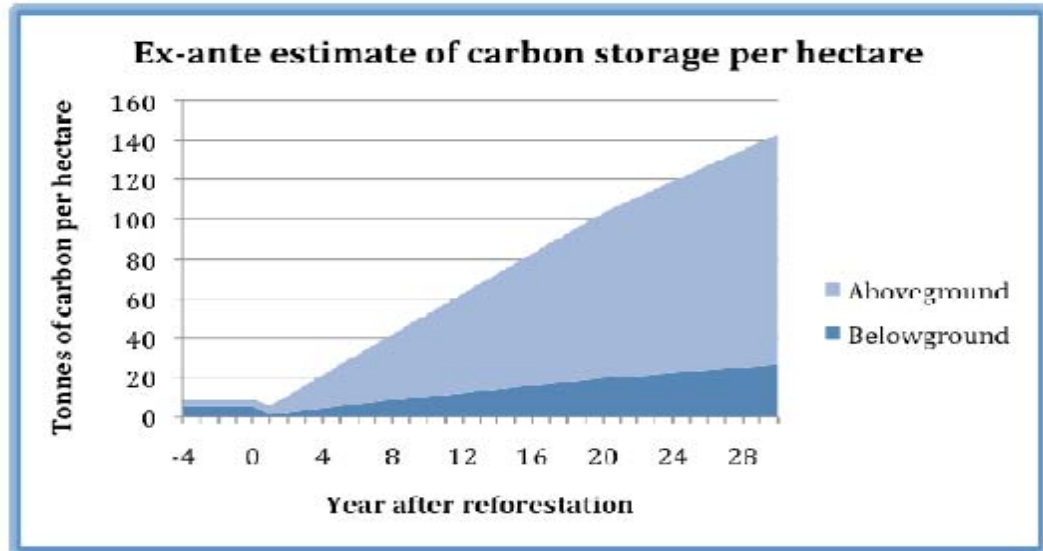


Figure 3. Ex-ante estimation of carbon sequestration per hectare based on draft PDD, 2009 carbon measurement/calculation.

Project development approach

The project will be undertaken as community-based initiative. The proponent will actively incorporate local capacity-building in preparation for the eventual total handover of project management to the people's organisations. Local community organizers shall be identified and trained in all aspects of project management and implementation. The organizers will serve as local project coordinators, who will assist the landholder/owners through their people's organization. Eventually, all people's organizations will be organized into a federation to become strong advocates for Arakan Forest Corridor sustainable resource management.

Technical arrangements

The representative people's organizations (Nagkahiusang Manobo sa Datu Ladayon, Pauangdig Lumadnong Panaghiusa sa Arakan, Tumandig Lumadnong Panaghiusa and Kiandang Farmer's Association) in the four community/barangay locations will enter a binding contract called a Conservation Agreement with the PEF. The agreement is renewable every year upon review by PEF and the people's organization.

The agreement will clearly stipulate the role and responsibilities of the PEF and the community/barangays, represented by people's organization. It will also include the specific benefit packages that will be provided to the representative people's organizations and to community/barangays in exchange for their commitment to, and support for, the project. During the project's implementation, the respective people's organizations in each community/barangay location will be responsible for the following activities.

- Establishment of nurseries and care and maintenance of nursery operations, for example, soil bagging, collection and potting of the wildlings or raising seedlings.
- Quarterly monitoring of seedling survival at the planted sites.
- Recruitment of landholders within the project site to participate.
- Together with the Tribal Council and migrant and tribal community, the people's organizations will facilitate awareness campaigns on relevant issues that affect the community (for example, climate change, indigenous peoples rights) and/or skills-related seminars (for example, backyard farming, agroforestry techniques).
- Training of landholder participants.
- Recruitment and training of a volunteer fire control team.

At the same time, a separate Reforestation Agreement will be made with the landholders/owners who have allotted portions of their land to the project. Just like the Conservation Agreement, the Reforestation Agreement will also be renewable each year after a review of the landholders' involvement. The Reforestation Agreement outlines the responsibilities of the landholders, including household members. Each participating landholder will be responsible for the following.

- Land preparation, which includes round weeding and strip brushing, marking the holes, digging and staking.
- Plantation establishment.
- Monthly maintenance of the planted areas/site (for the first year) and quarterly maintenance thereafter. This includes replacing seedlings and clearing maintenance (ring weeding, strip brushing).
- Monitoring and protection: fire occurrence and animal control.

The financial obligations and incentive package that will be provided by PEF to participating landholders will be specified in the agreement.

Socio-economic arrangements

Individual landholder/participant

Each landholder or household participating in rainforestation farming would receive Php 5150 per year for every 0.25 ha area planted with indigenous/native forest tree species (Table 3).

As an incentive for undertaking rainforestation farming activities on their landholdings, each of the household or owners will be provided with at least 36 grafted fruit trees and 36 seedlings of agroforestry crops (for example, coffee and rubber). Participating landholders would have the sole harvesting rights to any produce from the agroforestry trees and crops as well as the usable materials that can be derived from silvicultural management.

Table 3. Costing of incentive payments to each landholder participant for their 0.25 ha area allotted for the project

ACTIVITIES	AMOUNT PER 0.25 HA PER LANDHOLDER (PHP)
Land preparation (strip brushing, hole digging and staking) and planting (250 seedlings)	1750
Planting area maintenance (round weeding and strip brushing planted area)	2400
Basic assistance (to support any small project of the household)	1000
TOTAL (per year)	5150

People's organizations

For managing nursery operations, the respective people's organizations will receive Php 0.25 for every plastic bag for bagging the soil and Php 1.00 for every potted wildling and Php 1.75 for maintaining the wildlings survival in the nursery. The organizations will receive a total of Php 3.00 for each seedling that survives. For example, for every 6000 seedlings produced, the an organization will receive Php 18 000, which they can use for any project.

As an incentive, an organization will also receive 10% of the total nursery budget as a management fee upon delivering the required number of seedlings during the initial year.

Community/barangay

The conservation incentives for the participating barangays (represented by the respective people's organization), as stipulated in the Conservation Agreement with the PEF, are meant to address the pressing socio-economic needs of the community. These incentives could be in the form of basic services provision, for example, water supply, immunisation and population health or other health services, school buildings, community toilets, or daycare centres. They could also fund small livelihood projects, for example, backyard farming, handicraft making for women and youths or shade coffee farms.

Expected benefits and a sharing scheme from carbon payments is yet to be determined. The amount or percentage sharing could be divided among the partners, namely PEF, FPE, the

community organization and the individual landowners. The sharing arrangement could depend on the agreement between the World Bank and FPE.

Management operation

Administrative support

Figure 4 indicates the administrative set-up for the management of the proposed project in Arakan.

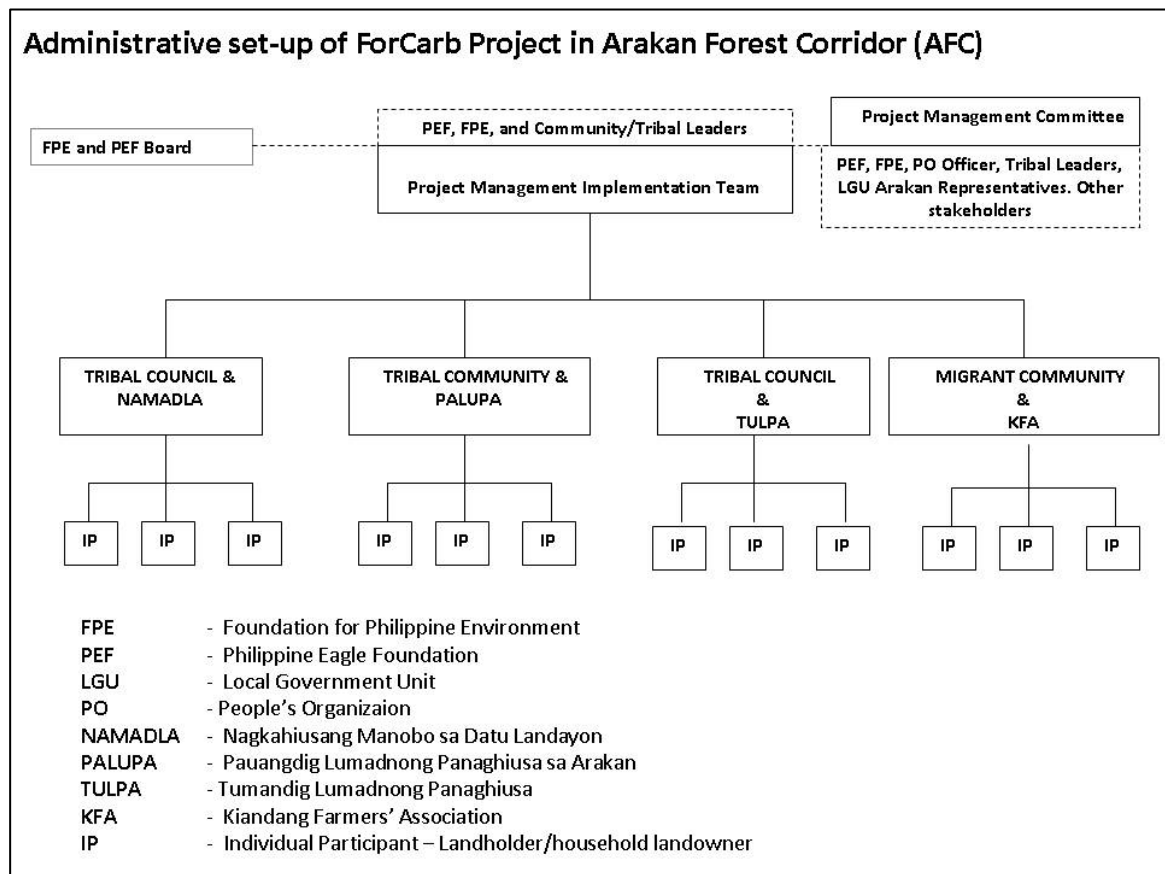


Figure 4. The administrative set-up of the project

The ForCarb project in Arakan Forest Corridor will be directly managed by the same project management team for the AFCDP. But several partners will assist through technical assistance and/or funding. Building people's organizations' capacity and confidence is one of the important objectives of the AFCDP. It is envisioned that the organizations will take more of a strategic role in project management over the next few years.

The Board Members of the FPE are the governing body of the AFCDP. It is the core administrative body that provides support and major funding to partners, which in turn supports the PEF in implementation of the AFCDP.

FPE and PEF are both co-proponents of the proposed project. PEF is the main local NGO that facilitates project implementation on the ground through its field staff.

The specific role of PEF includes gathering baseline data and mapping, community organizing and capacity-building activities, resource mobilization, networking to attract more government and civil society investment at the sites, providing technical assistance to the people's organizations and landowners, providing guidance to participating people's organizations, conducting research and documentation, project monitoring and evaluation.

The specific role of FPE includes providing funding as well as community conservation incentives, organizing donor forums as a fundraising venture for AFCDP, dealing with the World Bank, securing funding for PDD development, including data gathering and mapping. At the community/field level, PEF and FPE mainly provide facilitation and rely on the people's organizations for much of the community activities, including recruitment of landowners and field activities (for example, rainforestation farming). Since the people's organization's counterparts are just starting to build their confidence in organizational management, PEF and FPE do most of the decision making at the strategic level. Also, FPE directly works with the Research and Conservation Department of the PEF.

The Program Management Committee (PMC) acts as the consultative body for the AFCDP. The PMC's membership includes the PEF, the FPE, heads of the people's organizations, tribal leaders, representatives from the different offices of the local government of Arakan, including the barangay captains. The PMC convenes whenever a wider, landscape concern needs to be addressed. For example, the PMC is responsible for the development of the Arakan Watershed Management Plan, which will embrace the AFCDP as one of its key strategies for watershed rehabilitation.

The Project Management Team (PMT) is composed of the PEF, FPE and the community leaders. The PEF staff in the PMT includes the research and conservation director, project coordinator, two community development officers and a forester. FPE staff in the PMT includes the regional coordinator and a sole project officer. Community leaders in the PMT include the tribal chieftain and his council and the people's organization president and his officers (in the case of our sole non-indigenous partner). The partnership scheme among institutional members of the PMT is a horizontal, rather than a top-to-bottom, working relationship.

Technical support

The Department of Environment and Natural Resources will be instrumental in project registration. Also, they can either co-finance field activities or do their own reforestation project in Arakan with community partners as beneficiaries.

The Department of Agriculture will be involved, particularly as a source of conservation incentives for the community. The department has several extension projects that are aimed at upland communities, such as animal dispersal and backyard farming projects. They also give free seeds and seedlings.

The Department of Education can provide counterparts to the modest education incentives. One possible scheme could be the department providing full-time teachers in the communities

where the ForCarb project sites are located, through the Adopt a Parcel of Hope initiative that could build schools and furnish them. A similar scheme was implemented in one of the PEF communities in Davao Oriental.

The Department of Health can channel regular health services, such as infant and child immunizations, reproductive health seminars, anti-malaria or diarrhoea campaigns, to the communities.

Some forestry faculty members of Cotabato Foundation College for Science and Technology were engaged as consultants.

Chief agriculturists of the Municipal Agricultural Office of Arakan helped during training workshops on sustainable agriculture.

Policy support

The local government unit of Arakan issued a series of ordinances in support of the protection and conservation of the remaining forests in Arakan.

- Municipal Ordinance No. 1 Series of 1992: Created the Municipal Environment and Natural Resources Office, which is mandated to spearhead the development of ecological programs like forest protection and conservation.
- Municipal Ordinance No. 1 Series of 1994: Declared the three remaining fragmented forest areas as critical watershed and wildlife sanctuaries.
- Executive Order No. 01-07 Series of 2007: Created the technical working group to formulate the management plan for the protection and conservation of the remaining forests fragments that include the establishment of the forest corridor.

Financial support

The board members of the FPE as governing and core administrative body of AFCDP provide the major funding to partners, which in turn support the PEF, for example, the Mindanao Regional Unit of FPE based in Davao City, which primarily funded the activities of the AFCDP. It is also responsible for fund disbursement to PEF, monitoring and evaluation of project deliverables and for extending technical assistance when needed. They also seek partnership with other organizations that can bring resources and expertise into the program. Also, FPE was responsible for securing assistance from Anthropological Watch with building the capacity of the tribal people's organizations in Arakan for ancestral domain management.

The primary vehicle for fundraising is the Adopt a Parcel of Hope campaign, which asks for grants for every hectare (or parcel) within the proposed forest corridor. Much of the funds for these conservation incentives will come from corporate benefactors through their corporate social responsibility schemes.

Private and public support

- In 2009–2010, the Philippines Long Distance Telephone Company adopted two host communities and will provide a total of Php 500 000 worth of incentives to the community and to landowners.
- Currently negotiating for support from Sumifro Inc, a multinational banana growing and exporting company that maintains farms in Arakan, and the Philippine Banana Growers' and Exporters' Association of Davao City.
- The Cotabato Foundation College for Science and Technology based in Arakan mobilised its students to do their volunteer tree-planting activities at Datu Ladayon site.
- Personnel staff of corporate partners are also invited to plant seedlings. In March 2010, staff from the Philippines Long Distance Telephone Company Davao went to Datu Ladayon to participate in the ceremonial opening of the potable water system that the company funded and constructed and planted seedlings as part of the opening celebrations.

Other organizations' support

- The Philippine Tropical Forest Conservation Fund in 2009 provided funds for nurseries.
- Anthropological Watch funded the attendance of tribal representatives from PALUPA, TULPA and NAMADLA at a workshop on 'Tribal organizational management and conflict resolution.'
- The World Bank through the FPE funded preparing the PDD for the AFCDP as a CDM A/R project and, if that path was not pursued, then for enrolling the Arakan reforestation project into the voluntary carbon market. They will also finance the inspection of the site by an international accreditation team.

- With the research agreement, the World Agroforestry Centre Philippines provided funds for the firming up of the forest carbon development project design, particularly in refining the community organization and in engaging landholders/owners participation, the collection of baseline information, and mapping parcels included in the project area.

Investment cost

To finance the project operation and field activity implementation, the total cash amount generated as of 2009 was about Php 1 660 320 (USD 41 508 at Php 40 to USD 1) (Table 4). Rainforestation farming establishment of the delineated 29 parcels of landholdings covering an aggregated total area of 178.21 ha is estimated to cost about Php 5 912 286 (USD 147 807 at the same rate as above) (Table 5).

Actual expenses incurred as of 2009 for field activities already amounted to Php 1 830 720 (USD 45 768) (Table 6). This excludes the payment to the consultants for the PDD preparation, amounting to Php 2 400 000 (USD 60 000). This was the PDD preparation facilitated by the FPE, following the CDM template for A/R project activity, including the carbon baseline measurement and potential carbon estimations of the initial 3000 ha proposed project area. Also, the application cost for project application to the designated national authority (for evaluation and endorsement) was estimated to be Php 5725 (USD 143) (Table 7) and to the designated operating entity for third party validation was estimated to be about Php 800 000 (USD 20 000).

Table 4. Funding sources to support the project operation, as of 2009

SOURCES	ACTUAL AMOUNT (Php)	EQUIVALENT VALUE (Php)	REMARKS
PEFI		691 000	In kind counterparts (e.g. staff time, vehicle and equipment use)
FPE	1 298 720		Cash grant
People's organizations' partners		185 000	In kind counterparts (e.g. labour and cost of opportunity lost)
LGU		13 000	In kind counterparts (e.g. staff time)
EU	22 600		Cash grant for used for training of indigenous people's organizations
PTFCF	292 000		Cash grant used for the nursery establishment
		500 000	In kind as rainforestation and conservation incentives for two communities
World Agroforestry Centre Philippines	47 000		Supplemental for the research activities (mapping area coverage/delineation of parcels, community/individual landholders consultations for field planning activities)
	1 660 320 (USD 41 508)	1 389 000	TOTAL = 3 049 320 (USD 76 233) (Php 40 = USD 1)

Table 5. Cost estimate for 5-year operation for already delineated area of 178.21 ha (29 parcels)

ACTIVITIES	UWM	UNIT COST		
		(Php)*	TARGET	TOTAL (Php)
I. Nursery construction and maintenance	No.	10 000	4	40 000
II. Production/collection of planting materials (Including 20% mortality allowance)				
	No. of wldg/sdlg.			
- forest trees species		10	213 852	2 138 520
- grafted fruits trees	No. of sdlg.	30	1044	31 320
- agro-crops planting materials	No. of sdlg.	30	1044	31 320
<i>Subtotal</i>				
III. Site preparation and planting	0.25 ha	1750		
	1 ha	7000	178.21	1 247 470
IV. 1st-yr plantation maintenance	0.25 ha	2400		
	1 ha	9600	178.21	1 710 816
V. 2nd-5th yr plantation maintenance and protection (year 2-5)	0.25 ha	1000		
	1 ha	4000	178.21	712 840
		TOTAL	Php	5 912 286
			USD	147 807

Area = 178.21 ha (total aggregate area mapped/delineated on the ground)

Seedlings needed @ 2 m x 5 m (plus 20% mortality allowance) = 1200 seedlings/ha

No. of individual landholdings = 29 parcels

Grafted fruit trees and agro-crop planting materials needed @ 36 seedlings/individual landholdings = 1044 seedlings

Unit of cost is based on the costing stated in the technical and socio-economic arrangements

Table 6. Actual expenses incurred for the field activities, as of 2009

FIELD ACTIVITIES	UWM	UNIT COST (Php)	TARGET	TOTAL (Php)
1. Nursery operation				
- Nursery construction	No	10 000	4	40 000
- Collection of wildlings (28 800 wildlings @ 2.00/wildlings)	No. of wildlings	2	28 800	57 600
- Nursery seedlings care and maintenance (28 800 wildlings @ 3.00/wildlings)	No. of wildlings	3	28 800	86 400
			Subtotal =	184 000
2. Land preparation and planting (24 has)				
- Brushing, hole digging, & hauling of planting materials	No.	1.67	28 800	48 000
3. Plantation establishment				
- Planting of forest tree species (wildlings)	No.	2	28 800	57 600
- Planting of fruit tree species	No.	30	7104	213 120
			Subtotal =	318 720
4. Plantation Maintenance after planting				
- (24 hectares each in 4 sites)	ha	5 500	96	528 000
5. Conservation Incentives				
	No. of sites	200 000	4	800 000
			Subtotal =	1 328 000
			Total =	Php 1 830 720 (USD 45 768) (Php 40 = USD 1)

Table 7. Costs of application processing by designated national authority (Department of Environment and Natural Resources Clean Development Mechanism Secretariat)

Items	Cost (Php)
1. Filing fee	Application 600
2. Management review fees (DNA Sec.)	Document review 5000
3. Miscellaneous certification	Certification 100
4. True photocopy certification	Certification 25
	Total = 5725 (USD 143) (Php 40 = USD 1)

Potential and challenges of the proposed project

There are several conditions that have to be fulfilled in order to participate in the carbon market and payments for environmental services' mechanisms, especially if registering the project with the CDM A/R. The project proponent (intermediary of the smallholders or directly from the smallholders) should consider those conditions at the planning stage (IGES 2009).

The formulated and documented project development/operational plan (that is, PDD, project development plan or any documents about the proposed project and field activity reports) were primarily used in this assessment.

The potential and challenges of the project in the Arakan Forest Corridor are presented in Table 8.

Table 8. Potential and challenges of the forest-carbon development project

Indicators	Potential	Challenges
(1) Effectiveness of institutionalising the project		
Site suitability	It can pass the eligibility criteria of the CDM A/R project activity. The total project area is categorised as fallowed or abandoned, cultivated land already turned into grassland	Absence of land-cover maps to provide proof of its non-forest status before 1990. Also, no land-use assessment to indicate no change of grassland status until present
Operations	Already finalising PDD following the standard template for the voluntary carbon market	Yet to submit a project proposal for designated national authority evaluation and endorsement and/or finalise the PDD following the standard template for designated operating entity validation
Environmental services marketing	FPE was able to secure the funding for PDD preparation	Registration as carbon offset/credit supplier still depends upon the completion of the PDD following the standard template
(2) Efficiency of resource use and mobilisation		
Technological	Presented agroforestation scheme, specifically rainforestation farming, as strategy	Feasibility of the project development approach
Social	Community-based project activity invites the participation of indigenous people and migrants.	Convincing all the occupants whose landholdings are the targets for rehabilitation.

	Presented the technical and socio-economic arrangements of the field activity as well as the administrative management structure of the project's operation	There are two indigenous people's federations and groups of migrants to be consulted
Financial	Funding support for its initial activities secured. Private sector counterparting and participation as fundraising strategies (Adopt a Parcel of Hope)	Sustaining the costs and finances needs to comply with the technical and socio-economic arrangements (e.g. incentive provision)

(3) Impact of the proposed project

Social acceptance	Engaged the participation of four local people's organizations and 29 landholders	Total involvement of main stakeholders and target landholders within AFC as project participants
Political/public response	LGU passed an Executive Order (E.O.12, 2007) creating a technical working group on Arakan Forest Management and Development Plan	No specific legislation needed to garner the support of major stakeholders in the project
Economic consideration	Payments are provided for nursery operation 1 st -5 th year and carbon/plantation maintenance aside from cash and in-kind incentives	Ensuring the economic viability of rainforestation farming with and without carbon and other environmental services' payments
Environmental services provision	Compared to grassland, carbon storage will improve if the land is covered by forest vegetation	To estimate or measure and value the environmental services that can be provided by the proposed project is still not within the capacity of the project proponent. Thus, it has to rely on hired consultants

Effectiveness of institutionalising the project

Site suitability

Does the proposed project meet the eligibility criteria and fulfil the ‘additionality’ condition under the CDM A/R project standards and/or comply with the standards of the voluntary market? The standards for CDM A/R projects follow the EB 35 report Annex 18: ‘Procedures to define the eligibility of lands for afforestation and reforestation project activities’. (UNFCCC 2010)

The total 216 ha aggregated area is a portion of the delineated 3000 ha Arakan Forest Corridor, with grasslands and marginally cultivated lands. The 29 parcels selected and delineated comprising the project area are long-term open/denuded forests and degraded land that need rehabilitation, thus, they can be considered eligible under the CDM A/R project criteria.

In Arakan, upland farming or crop cultivation on forest land is the dominant source of livelihoods, with corn and rice as the main products. Invasive *Imperata* grasses colonise abandoned/fallowed swidden farms along forest edges, making natural regeneration difficult. Periodic grassland fires also make natural forest re-growth impossible. It is expected that without the project these areas will remain fallowed, if not abandoned. However, to provide proof, the project needs aerial photographs or satellite imagery showing the land cover before 1990, especially if the project is to be registered under the CDM A/R regime.

The delineated parcels are generally dominated by invasive grasses, located in high elevation areas and on steep slopes, which are poorly accessible. The entire 3000 ha of the Arakan Forest Corridor was initially targeted as the project site. However, some of the portions could not be included in the project, especially where there were isolated forest patches.

Fulfilling the ‘additionality’ condition as stipulated under the CDM A/R guidelines could be a challenge due to the presence of isolated forest fragments in the mountain ranges of Mahuson, Sinaka and KABIKU encompassing the Arakan Forest Corridor. Thus, instead of applying under the CDM A/R project activity, the project is currently targeting the voluntary carbon market.

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 (the Philippines Designated National Authority) and third-party validation by a designated operational entity (Department of Environment and Natural Resources Administrative Order No. 2005-17, DENR 2005.)

A draft PDD was available in July 2009 and supposed to be submitted for designated operational entity validation in the third quarter of 2009. By the end of 2009, FPE (as co-proponent) decided not to

pursue the submission under the CDM A/R and planned instead to pursue the voluntary carbon market. The PDD is subsequently being revised.

To register⁶, it has to submit its project application document, which is the project proposal with other required documents and/or the PDD for designated national authority⁷ evaluation and designated operational entity⁸ evaluation.

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 or the voluntary carbon market and/or source support for its operations, including field implementation, through other mechanisms.

FPE is the key funding partner of PEF that organizes donor forums as a fundraising venture for AFCDP. FPE secures the funding needed for PDD preparation, including PDD consultants/writers.

Marketing and/or registration of the project initiative as carbon offset/credit supplier still depends upon the completion of the PDD following the standard template under the voluntary carbon market. This requires the submission of all the supporting documents of the PDD for endorsement from the designated national authority after evaluation and the designated operational entity after validation.

⁶ Registration is the formal acceptance by the Executive Board of a validated project as a CDM A/R project. Registration is the prerequisite for the verification, certification and issuance of certified emission reductions related to that A/R project activity.

⁷ For approval, the project development plan or project proposal has to be consistent with the sustainable management agenda of the Philippines. When designing a project, there are three major pillars that should be considered. These are 1) the *environmental dimension* e.g. carbon sequestration as the main goods but with environmental co-benefits (watershed and biodiversity/habitat restoration); 2) the *economic dimension* provides income sources for target stakeholders (direct implementers) and the local community as a whole; and 3) the *social dimension*, ensuring that the project will not displace people who are directly dependent for their survival on the land resource.

⁸ For validation, before any project can produce certified emission reductions that could be credited as offset to the target emission reductions, the project developer from the host country must first submit the PDD following the standard template. Validation is the process of independent evaluation of an A/R project by a designated operational entity.

Efficiency of resource use and mobilisation

Technological

Conducting A/R projects on deforested land (deforested for at least 50 years or before 1990), where 'deforested' means the vegetation has been below the thresholds adopted by the host country for definition as '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%. (Forest Management Bureau Circular No. 01 Series of 2007, FMB 2007)

The project will deploy an agroforestation scheme on 216 ha, specifically adopting the rainforestation farming technique. At 2 m x 5 m spacing, the potential tree stocking will be 1000 trees per hectare, of endemic and/or indigenous forest tree species, intended for permanent forest protection. Thus, the issue of 'permanence' is addressed.

Nursery operations followed the procedures for establishing and managing nurseries described by Margraf and Milan (1996), although several modifications were made as needed. To establish 216 ha needs about 259 200 seedlings (including a 20% mortality allowance). The three satellite nurseries were already established and maintained by households and another six nurseries were established and managed by participating local people's organizations. Each nursery is designed to accommodate at least 7200 seedlings and will be used to reforest at least six hectare in each location/community per year.

The success of plantation establishment depends on survival rates in the nursery and when planted. The choice of specific tree species depends on the availability of the planting materials (that is, accessibility of the source if wildlings are collected rather than propagated). Also, to undertake the agroforestation scheme as designed still depends on the full agreement of the landholders, field training and logistic/financial support.

There are landholders who are biased towards commercial tree species (for example, rubber, oil palm) as they think they will provide easier and larger cash income.

In this project, field implementation is constrained by the slow delivery of technical and logistic support resulting in a low survival rate of wildlings and slow planting.

Social

By encouraging local people's involvement, particularly the main stakeholders (people dependent on the land), the project has addressed the issue that there should be no people displaced.

With the corrective actions already undertaken, the involvement of individual land holders/owners in the project and actual field implementation has been ensured. The participants are the indigenous people and migrant settlers within the Corridor. The technical and socio-economic arrangements have already been presented. The Conservation⁹ and Reforestation agreements ensure local people's involvement. Individual participants are also being represented by various people's organizations in each communities/barangays. The community-based conservation approach adopted is in line with the community-based forest management concept, which is the national strategy in the Philippines for managing the country's forest resources, by virtue of Executive Order. No. 263, 1995.

The parcels included in the project are portions of the CADC registered by the National Commission on Indigenous Peoples Region XII as CADC No. 006, CADC No. 011, and Certificates of Stewardship Certificates issued by the Department of Environment and Natural Resources to Integrated Social Forestry program participants/beneficiaries. Since there are two indigenous people's federations and a group of migrants to be consulted, this could slow the field operations.

As for the management set-up for the project's operational phase, the proposed forest carbon project is subsumed within the overall AFCDP. However, the administrative set-up indicates that FPE and PEF are both co-proponents of the proposed project. Initially, it was beset with administrative issues (that is, not adhering to the 'gentleman's agreement' approach: no written agreement between the co-proponents). This was because there was no levelling of expectations in the project development planning process. The overall cost of carrying out the activities is unknown to PEF. Hired foreign consultants prepared the PDD, while PEF only gathered the data, and FPE acted as an intermediary between the consultants and the donor. There has been no face-to-face meeting between FPE, PEF and the World Bank representative for the PDD preparation. There was no management follow-up to the PEF personnel doing the field activities

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.

⁹ Conservation Agreements have been promoted by Conservation International (www.conservation.org) in its community-based conservation projects across the globe.

For initial implementation the project was able to generate funds, as of 2009, totalling Php 3 049 320 (USD 76 233) from the following sources: Philippines Eagle Foundation Inc (PEFI), Foundation of Philippine Environment (FPE) , people's organizations' partners, local government unit Philippine Tropical Forest Conservation Foundation, European Union and the World Agroforestry Centre Philippines. Of this amount, Php 1 660 320 (USD 41 508) was in cash with the remainder being in-kind support with cash equivalent of Php 1 389 000 (USD 34 725). This is still excluding the payment made to the consultants hired for the PDD preparation, which amounted to Php 2 400 000 (USD 60 000). However, the total amount needed for the proposed project to be institutionalized and implemented is about Php 12 323 736 (USD 308 093).

The target area to be planted each year depends on the availability of financial support. Owing to budget limitations, for the initial implementation in 2009–2010 establishment was only 6 ha per site. Also, in order to accommodate as many households as possible, the size of the area that can be financially supported was only 0.25 ha (2500 m²) for each participant. There are currently 29 landholders participating. But with the current budget, only 24 landholders or households can benefit per year.

Building the local community, particularly local people's organizations' capacity and confidence, without assured funding will be very difficult to sustain.

Impact of the proposed project

Social acceptance

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

The proposed project is in line with the AFCDP, which is designed to combat further loss of biodiversity and for the preservation of the country's imperilled national bird by restoring its habitat. Generally, there is strong support for the AFCDP project; the FPE has been working in Arakan for more than a decade.

The local community positive response to the project is manifested in the involvement of four local people's organizations and 29 landholders. Initial activities have already been conducted on site (Appendix 4). However, to involve all parcel owners/claimants within the grassland part, including those parcels that are under marginal annual crop cultivation, still remains a challenge. Many landholders or claimants are still looking for easy and direct money. There is still a bias toward commercial tree plantations and agricultural crops.

Political/public response

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

The willingness of the local government of Arakan to support the project can be seen in the passing of the Executive Order (E.O.12, 2007). This was the creation of the technical working group on the Arakan Forest Management and Development Plan. Also, declaring Mt Mahuson, Mt Sinaka and KABIKU areas as critical watersheds through a Municipal Ordinance (MO.12, 1994) and providing implementing rules and regulations. For the private sector, the activities are in line with corporate social responsibility. While others elements needed to gather support (obligatory or voluntary) for the project are subsumed in some existing laws, specific legislation for the project is still wanting (for example, ensuring validity of tenure instruments, carbon ownership, priority for government assistance to project participants).

Economic considerations

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

The technical support and incentives could potentially provide opportunities to landholders to adopt productive land management practices. The payments for labour for nursery operation (for example, raising seedlings and collecting wildlings) from the first (replanting activity) to the fifth year, is a livelihood source. The provision of planting materials (fruit-bearing trees and/or agri-crops) that will be integrated into the rainforestation farming area can provide in-kind and cash income from sale of products. Aside from the carbon payments and other incentives for providing environmental services, enhanced land-soil quality is expected to increase farm productivity thereby improving the economic condition of the people. All of this is assumed to address the issue of 'leakage'. However, land considered eligible for carbon forestry projects is considered marginal or degraded. Thus, given the initially low fertility level of the soil, agri-crops that could be planted with trees during the early years are limited and have low agricultural productivity.

Although before the project the land was left idle or not cultivated or under marginal cultivation (since considered to be degraded land), it is still a questionable whether participating landholders doing the rainforestation consider the economic incentives sufficient and whether a sustainable income from rainforestation farming is at all possible.

Ecological services provision

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

Carbon sequestration potential

Compared to its degraded state (characterised as fallowed, if not abandoned, cultivation turned into grassland), the revegetated (by conducting rainforestation farming) project area will sequester carbon. It has been estimated that the annual net anthropogenic greenhouse gas removal into the sinks will be 27 718 t CO₂e for 10 years and will reach 56 226 t CO₂e in 20 years.

Support habitat restoration for biodiversity conservation

Rainforestation farming is expected to combat further loss of biodiversity, particularly the critically endangered Philippine Eagle and other wildlife that share this forest habitat.

Rehabilitating degraded areas of the forest corridor can provide a movement pathway to inexperienced juvenile eagles dispersing away from their parents' territories. Using radio-telemetry techniques, movements of dispersing juvenile eagles from Sinaka were studied. Two of three eagles were rescued by local farmers during an attempt to cross grasslands. One disappeared and was believed to have been shot and killed (Salvador and Ibanez 2006).

Restoring degraded areas around the forest fragments is expected to create an ecological and social buffer zone that will shield wildlife in core habitats from the various threats of the 'edge-effect'¹⁰ and human encroachment. Forest fragments with extensive buffer zones of vegetation protect core areas where most shade-loving and sensitive wildlife species are found (Lovejoy et al. 1986).

It can also create new habitats for prey items such flying lemurs, palm civets, long-tailed macaques and rodents, which form the bulk of the eagle's diet in Mindanao (Roque 2010). There is empirical evidence that flying lemurs can settle in agroforestry sites established through rainforestation techniques (Göltenboth and Hutter 2004).

Isolated fauna and flora in forest remnants are vulnerable to inbreeding owing to absence of other species/family (Turner and Corlett 1996) and eventually suffer from the ill effects of inbreeding (Mixa et al. 2005). Random environmental disturbances such as typhoons, epidemics and forest fires also result in species extirpation (Turner and Corlett 1996).

Support watershed rehabilitation

When these forests are converted into row crops, pastures or lawns, it almost always results in the deterioration of water quality. Unlike agricultural and urban/sub-urban soils, the effective capacity of forest soils to absorb and store rain water makes forests an efficient water sponge and reservoir. The high levels of organic matter in the forest floor increase the stability of soil as well as dissipate raindrop energy so that water infiltration rates are even enhanced (Neary et al. 2009). Thus, when agricultural/cultivation areas are planted with trees or reforested, soil infiltration rates increase, surface rain flow dramatically declines, sediment delivery to

¹⁰ 'Edge effect' refers to the changes occurring in previously undisturbed forest by the abrupt creation of a very sharp edge of a forest owing to forest clearing

channels drops, nutrient fluxes into streams are lowered and storm flows become less erratic (Neary et al. 2009, Jackson et al. 2005).

Improve land-soil fertility

Soil fertility decreased significantly after clearing the forest vegetation and conversion into agricultural areas with soil erosion, surface run-off and leaching (McDonald et al. 2002). Forest restoration through secondary succession during a fallow period may recover soil fertility in this environment (McDonald and Healey 2000) but takes a long time, especially when land is degraded (for example, grasslands).

Providing tree cover on open/degraded lands through rainforestation techniques can prevent landslides, soil erosion and the flow of eroded sediments into river systems. Revegetating steep hill slopes can significantly reduce landslide impacts, such as loss of soil fertility, river and reservoir sedimentation, deterioration of aquatic habitat and threat to human life. Increasing vegetation density, regardless of the species used, in steep mountain environments can slow erosion to near natural levels (Vanacker et al. 2007).

Surrounding the agricultural lowlands of the Arakan Valley are rugged hills and mountains already devoid of their original forest vegetation. With the forest-carbon development project, several environmental issues in Arakan could also be addressed: 1) reduction in the occurrences of landslides; 2) minimised soil erosion and sedimentation of river systems; 4) improved soil fertility; and 5) the regulation of local climate (rainfall).

Strengths and limitations of the proposed project

We 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 9) of the operational aspects are extracted from the SWOC analysis.

Table 9. Strengths and limitations of the proposed project

INDICATORS	STRENGTHS	LIMITATIONS
A. Site development		
1. Area identification	Identified 216 ha as the project area.	Project area is not contiguous. Also, 38 ha of the total 216 ha is still to be delineated as individual landholdings
2. Strategy of implementation	Forest-carbon development as an A/R project will be deployed as an agroforestation scheme, establishing a tree-based system specifically employing rainforestation farming	The specific tree species (pioneers/sun-loving and shade-loving) to be planted depends on the availability of the planting materials (accessibility of the wildlings) and species survival during nursery operation and plantation establishment
3. Project development approach	The project is a site-level project Will be undertaken and managed as a community-based project	The community within the Arakan Forest Corridor has no capacity yet to undertake the project development process or operations. The participating people's organizations were non-active
B. Resource use/mobilization		
1. Administrative support	Directly managed by the same project management team (PEF, FPE and community leaders). Initially, the PEF and PFE act as co-proponents while facilitating the institutionalisation of the proposed projectThe stakeholders and specific representatives involved in the project operation are identified as well as their roles and functions	The presence of two institutions may result in laddering. Facilitation of support (technical and financial) provision may slow development and field implementation
2. Technical support, public and private	The Technical Working Group for the Arakan Forest Management and Development Plan has already been created in 2007	No formal agreement has yet been drawn up for providing support to the project
3. Public and Private support	The Adopt a Parcel of Hope campaign will be used as the primary vehicle for fundraising, asking the public and private sector to provide funds for developing every hectare (or a parcel) within the project area	Support from the private sector through corporate social responsibility mechanisms is still voluntary rather than obligatory
4. Political support	Other than the PEF, FPE, heads of people's organizations and tribal leaders, the program management committee includes representatives from the different offices of the local government of Arakan, including the barangay captains	There no binding agreements as to what specific support will be provided for the project

5. Financial support	Able to undertake initial activities in 2009 by generating cash amounting to Php 1 660 320 (USD 41 508)	Funds generated are insufficient
C. Socio-economic		
	The cash payments for each activity conducted as well as the in-kind provisions are clear	No agreement yet as to how the benefits (e.g. carbon and other environmental services' payments) will be shared
	Participating landholders have the sole harvesting rights to any produce from the agroforestry trees and crops as well as the usable materials from the forest that can be derived from silvicultural management	
D. Environmental services management	Emphasise habitat restoration for biodiversity conservation at the same time aiming for carbon sequestration	To measure and value the other environmental services that can be provided by the proposed project is not within the capacity of the project proponent

Site development

This pertains to area coverage (land-cover status of the identified project sites, delineated area coverage for the project development), the strategy for forest-carbon implementation (specific land management scheme) and the project development approach (how the project development and specific field activities are to be carried out).

Strengths

- (1) Area coverage for the project has been settled, which is an aggregate area of 216 ha consisting of landholdings situated in three barangays within the Arakan Forest Corridor. The 29 parcels (178.21 ha) of the four communities (Enamong, Panuangdig, Makati and Uwayanon) within two barangays (Datu Landayon and Ganatan) are already surveyed, delineated on the ground and mapped. Landholdings included are either covered by a CADC or a Certificate of Stewardship Contract as tenure instrument. The project area is within the delineated (3000 ha) Arakan Forest Corridor with open/denuded forests and degraded lands¹¹ needing rehabilitation. Visual field observations and the local people attest the history of land use and the land-cover characteristics within the area.
- (2) The rainforestation farming technique is emphasised, which uses only indigenous, native or endemic forest tree and fruit tree species starting with pioneer (sun-loving) species followed by shade-loving tree species under the canopy of grown pioneers.
- (3) The project will be managed as community-based project involving the local people's organizations. The Rainforestation Agreement signed by the individual/household landholders encourages a sense of ownership, which could ensure the proper care, maintenance and protection of the plantation.
- (4) Initially the PEF and PFE act as co-proponents while facilitating the institutionalisation of the project.

¹¹ Degraded land is described as land dominated by grassland, which were formerly residual or degraded forests, under slash and burn cultivation and eventually fallowed, if not abandoned, as grasslands.

Limitations

- (1) Of the 216 ha, about 38 ha are not yet delineated by parcels/landholdings. This area is located in sitios Kayopaton and Bagtok, Barangay Tumanding, still within the Corridor.

Initially, the target project area was 3000 ha, the entire Arakan Forest Corridor. However, there are some portions that could not be included in the proposed project. Among the reasons are that portions are inaccessible with existing forest vegetation and might be deemed not eligible, there is no clear ownership or there are conflicting claimants. Only portions/ patches or landholdings that are already characterised as degraded land, dominated by invasive weeds, were selected. Thus, area coverage is not contiguous. Generally, the parcels are located in scattered hills and even on steep slopes that are poorly accessible.

- (2) Some landholders are secondary owners/landholders, especially those holding stewardship certificates. Although these have been long acquired by participating secondary holders (before the project) through buying the right from the original holders/ISF beneficiaries to develop the land. Whereas, for parcels/landholdings under CADCs, (RX11 CADC No. 180, CADC No.11), there are two indigenous people's federations to be consulted.

Establishing the legal right of ownership of the individual project participants could be an issue, especially when agreeing to the sharing arrangement of whatever future benefits (for example, carbon and other environmental services' payments) that can be derived from the land through the project.

- (3) Specific tree species (pioneers/sun-loving and shade-loving) to be planted depend on the availability of the planting materials (accessibility of the wildlings and seedling propagation), and species survival during nursery operations and plantation establishment. Except for the incentives provided, participating landholders do not yet fully understand the future economic value of the species that can be selected for planting.
- (4) PEF and FPE have yet to build the capacity to formalise the people's organizations federation as a local institution and to manage the overall project (technical and administration), including the local people's organizations that will facilitate the field implementation as well as the participating landholders who will undertake the field work.

A baseline map showing the land-cover (degraded) status of the area before 1990 and non-improvement of its forest cover through time is not available. Also, the extent of the land-soil degradation has still to be assessed. To fulfill the additionality of the forest-carbon development project, the project plan has to indicate that parcels included are not part of financially supported reforestation projects of the Department of Environment and Natural Resources and/or such parcels are not beneficiaries of any other development agency-assisted reforestation or any other tree plantation funds. Especially if applying under the CDM A/R

standards, the 1990 baseline map needs to be presented (for example, aerial photographs or any documented history of the deforested land-cover status), showing the degraded land-cover status of the project area and the extent of the land-soil degradation. Thus, verification of the validity of tenure instruments and clarification of property rights need to be conducted.

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 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 project will be administratively managed by the same project management team (PEF, FPE and community leaders) for the entire AFCDP. The specific representative and entity involved in the project operation has been identified as well as the roles and functions.
- (2) National agencies that can potentially provide technical support to the project, and other institutions that can assist, have been identified.
- (3) The Adopt a Parcel of Hope has been promoted as the fundraising vehicle, asking the public and private sector to provide grants for developing every hectare (or a parcel) within the project area.
- (4) The technical working group for the Arakan Forest Management and Development Plan was created in 2007. Other than PEF, FPE, heads of people's organizations and tribal leaders, the program management committee, which acts as the consultative body for the AFCPD, includes representatives from the different offices of the local government of Arakan, including the barangay captains.
- (5) The participating local people's organizations (with Conservation Agreements) and individual landholders (with Rainforestation Agreements) enter a binding agreement with the PEF. Both agreements define the specific activities to be conducted, the payments to be made, and the benefit packages that will be received by the participating local people's organizations and individual landholders.
- (6) As an innovative scheme, it was able to generate funds for its initial field activities (for example, PDD preparation and nursery operation).

Limitations

- (1) The existing local community organizations (that is, local people's organization, tribal councils) within the Arakan Forest Corridor have no capacity yet to undertake the project development process or manage the field implementation. The participating people's organizations were non-active.
- (2) There are two entities (FPE and PEF) who act as the co-proponents of the project initiative. Although this could be considered as a strength, however, the process of facilitating the support (technical and financial) is also a factor that slowed the project's development and field activity.

FPE hired consultants to create the PDD and PEF did most of the groundwork but feedback was slow and there were some issues that were not clear to the PEF. Generally, the players still lack knowledge and need more information about forest-carbon development.

- (3) No formal agreement has yet been made between the identified agencies and institutions for providing support to the project. Although there are indication of public as well as private support, the support, especially from the private sector through corporate social responsibility funds is still considered voluntary rather than obligatory.
- (4) So far, there are only two local policies identified that respond to the specific needs of the project. There are implementing rules and regulations with Municipal Ordinance No. 12 Series of 1994 declaring Mt Mahuson, Mt Sinaka and KABIKU areas as critical watersheds, and the Executive Order No. 12 in 2007 creating the technical working group on the Arakan Forest Management and Development Plan passed by the local government unit of Arakan.

Socio-economic management

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

Strengths

The technical and socio-economic provisions to implement the project have been presented. The cash payments for each activity conducted as well the in-kind provisions that will be received by the people's organizations and individual landholders have been defined in the Conservation and Rainforestation agreements. Also, the participating landholders have the sole harvesting rights to any produce from the agroforestry trees and crops as well as the usable materials from the forest trees that can be derived from silvicultural management.

Limitations

Although the binding agreements are renewable every year after review, these are still considered a short-term assurance of mutual cooperation. The cost of each activities is undervalued since payments made for the activities conducted and the provision of the benefits are only based on what can be generated (cash or in-kind) and what is available.

There is as yet no agreement as to how the benefits (for example, carbon and other environmental services' payments) will be shared.

Presuming that the incentives provision is deemed insufficient, optimum agricultural productivity consideration is being traded in favour of biodiversity in designing the land management strategy (for example, the specific selection of trees).

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 beauty enhancement is considered in the project development planning and field-plot design.

Strengths

The project is designed to combat further loss of biodiversity by rehabilitating and protecting wildlife habitat, particularly, the critically endangered Philippine eagle and other wildlife that share this forest habitat. With the forest-carbon development, degraded areas of the forest corridor could be rehabilitated, which at same time would remove about 27 718 t CO²e for 10 years or 56 226 t CO²e for 20 years. Also, the project is expected to address watershed restoration, land-soil quality improvement of degraded land, and landscape beauty enhancement.

Limitations

Other environmental services' baseline measurements have yet to be conducted owing to non-accessibility of technical knowledge and logistics.

4. Conclusion

In the development of any project, critical factors bear on the operational aspects, such as establishing the technical operations and institutional management capacity of the project developer. The proponent—be it a government entity, a non-government organization, a people's organization, or a private organization—should have the capacity to manage the project's development, particularly the ability to mobilise resources. However, the function of the project proponent should only be as an intermediary to assist the local community—specifically the local people's organization—to facilitate the project in their locality but eventually also the project's operations and field activities.

To institutionalise the project sufficiently so that it is viable to participate in the carbon market and other environmental services payments mechanisms, the proponent should be equipped with proper technical ability and information about the project development process, including rules and guidelines, as well as the standards (Harvey et al. 2010) of the markets and other relevant mechanisms. The development of the project can be treated as an iterative process: learning from the loopholes of the activities and refining the methods (for example, community engagement, project designing).

Given the right information, technical and financial support, PEF as proponent can undertake the project development process and formulate the development plan.

The project is designed to revegetate the open/denuded forests and degraded land within the Corridor, thus expanding the remaining forest fragments in Arakan for their biodiversity function at the same time as sequestering carbon.

The proposed project encourages smallholders' direct participation and local people's organizations' cooperation. But, the challenge is whether the technical as well as the socio-economic arrangements as defined in the Conservation Agreement with the people's organizations and the Rainforestation Agreement with participating landholders can be fulfilled since there is no clear financial support or budget appropriation plan.

Local communities and individual landholders' participation can be sustained if economic benefits can be realised. Thus, a more focussed project design must be developed so that it employs adaptive land management with consideration of local needs and conditions.

5. Recommendations

Management

Administrative

- As direct field proponent, PEF should invest in engaging the right people for the field work. The project is only as good as the people implementing it.
- The proponents should present the full operational plan of the project to the local government unit, government agencies, corporate sector and other potential environmental services' buyers to ensure their full and consistent support (technical and financial). This is also to ensure the budget availability for the incentive provision as stipulated in the Conservation and Rainforestation agreements.
- Strengthen partnership with the local government of Arakan and collaboration with national government agencies working in the locality.
- The project's proponents' management agreements and all technical arrangements with the local people's organizations and households and individual landholders must be transparent and well-documented. This should be included in the project plan. Since they are working directly with the local community in Arakan, PEF's role as direct proponent of the project should be clarified with transparent support from FPE.
- Conduct information education campaign to strengthen individuals and households, local community people's organizations, including encouraging other target landholders and claimants of eligible land.
- Build the capacity of local institutions, especially the existing people's organizations, to actively engage with the project. Invest in, and incorporate, local capacity building activities in preparation for the eventual total handover of project management to the people's organizations.

Technical

- Secure baseline maps (for example, 1990, 2000 and 2010) to ensure suitability of the area for the carbon market. These are the land-cover and land-use maps for all of Arakan, particularly focussing on the land-cover types of the Arakan Forest Corridor. As project proponents, PEF and FPE should coordinate and partner with the agency responsible to produce this information.
- In conjunction with the above, produce maps showing the land-cover and land-use changes (for example, 1990, 2000 and 2010), particularly in relation to deforestation and forest degradation in the Arakan Forest Corridor. Such baseline information serves as a reference for planning the overall project and specific activity. Also, understanding drivers of changes could prevent 'leakage' issues (shifting destructive activities to another location; potentially displacing farmers or landholders and claimants that would lead them to clear adjacent forests).
- Conduct land-use and soil assessments to determine the land-cover changes, if any, of degraded land over time. Justify the parcels selected to fulfil the 'additionality' condition. Characterise the extent of soil degradation, clarifying that without land management intervention the area would remain deforested and/or degraded.
- Land-soil characterisation is also important to indicate that the land degradation of the 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 revegetation.
- Knowing land-soil characteristics could help in the tree-crop-soil matching and identify what specific cultural land management is needed, along with integrating grafted fruit tree-species and agro-crops into the system.

Policy

- The government agency (for example, local government unit or Department of Environment and Natural Resources) responsible for providing information (for example, land-cover and land-use maps, land area suitability including tenure status) should be identified. This should be backed-up with specific policies to facilitate information flow between the agencies working with all potential forest-carbon development project sites.
- Relevant agencies (for example, Department of Environment and Natural Resources and the National Commission on Indigenous Peoples) ensure that the validity of land tenure instruments coincides to the crediting period. The issue of land tenure instruments and property rights should be clear.
- Assessment and verification of land tenure should be conducted. Explore whether participating in the project could serve as the legal basis for property rights or for providing the absolute tenure instrument.
- Awarding tenure instruments or recognising legal rights should be used as one incentive for participating in the project. But at the same time, policies to ban or restrict selling, mortgaging and usufruct of land within the forest area must be imposed.

- Ensure that technical, socio-economic arrangements and benefit-sharing are established before project implementation, agreed by the main stakeholders with binding contracts, and in accordance with the agreement.
- Before embarking on field implementation, there should be a clear period of logistical support for the project's field operation. This is also to support funding generation for the institutionalisation of the project as well as for field activities.
- The sustainability of the project lies in the continued participation of landholders and claimants. Thus, the project needs to access investment and marketing support. However, it is a challenge to mainstream policy support for the local environmental services payments mechanism in all natural resources-related government programs (REECS 2008). For A/R projects to be viable in the carbon market, the upfront funding provided by the government should be treated as the primary source of financial support to implement the project or should be treated as an innovative mechanism.
- Advocate for local payments for environmental services schemes to support implementation of the project, however, it should be determined whether this is in the form of subsidies, incentives or rewards.
- Review existing policies from national down to the barangay level to address conflicting policies, especially rules and regulations. Also, explore the potential of including the project under the REDD+¹² mechanisms.
- Explore using local experts instead of foreigners and ensure full involvement of local communities and experts in undertaking the development process (from project planning through implementation to monitoring and evaluation), not just as data collectors or information providers.

Research

There are several research questions that need to be clarified.

- Which specific agroforestation scheme (purely tree establishment and/or integrating crops) is appropriate in Arakan? Since rainforestation farming (with forest- and fruit-tree species) has been adopted, which specific indigenous, native or endemic species (from recommended pioneer/sun-loving and shade-loving species) are suitable in the area considering the biophysical conditions and land-soil characteristics as well as economics?
- What is the carbon sequestration potential of the specific rainforestation farming system (kind and number of tree species actually planted)? Will the area (216 ha) for the rainforestation farming and the land management practices to be employed result in real, measurable and long-term emission reductions, as certified by a third party?
- Will the carbon stocks generated by the project be secure over the long term (referred to as 'permanence')? Any future emissions that might arise from these stocks need to be accounted.

¹² REDD+ = Reducing emissions from deforestation and (forest) degradation plus conservation, a global program initiated as part of international efforts to address climate change.

- Valuation of the environmental services for appropriate payments is critical. This requires technical expertise and a proper, yet simplified, methodology that can be done without much financial and technical investment.
- A cost-benefit analysis and/or net present value assessment of adopting rainforestation farming needs to be conducted. This to assess whether the project will generate sustainable income for the participating landholders.

6. Lessons learned

- To institutionalise the project and be able to participate in relevant mechanisms such as carbon markets, a project development plan or a project design document is important. Thus, proper information and understanding of the project development process, including the rules of the carbon and environmental services' markets is crucial.
- The planning stage is crucial for formulating a project development plan or a project design document that complies with relevant agencies' or buyers' standard templates. This requires the involvement of the main stakeholders, particularly the implementers.
- Since not all stakeholders—not even technical personnel—have firsthand information regarding carbon and environmental services' mechanisms it is important that governments, international and research communities widen public knowledge. Only when information is properly disseminated can we expect acceptance from the target constituencies.
- The capacity of the intermediary entity to mobilise resources is important. Thus, the field-based intermediary entity that has been working directly with the local communities, especially the landholders and claimants is a crucial link in the process and must be supported effectively.
- Involve the potential participants from the start (conceptualisation through planning to implementation) to encourage involvement.
- To attract full acceptance by participants, clear technical and socio-economic arrangements should be established. Information should be well disseminated, not offer false hope, and clearly set out the potentials benefits and challenges.
- Baseline maps (for example, 1990, 2000 and 2010) are needed to ensure suitability of the area of the project and that selected parcels pass the eligibility criteria for the carbon market.
- Land (forest) resource management should be directed at realising other environmental services as well as socio-economic objectives, not purely for carbon stores.

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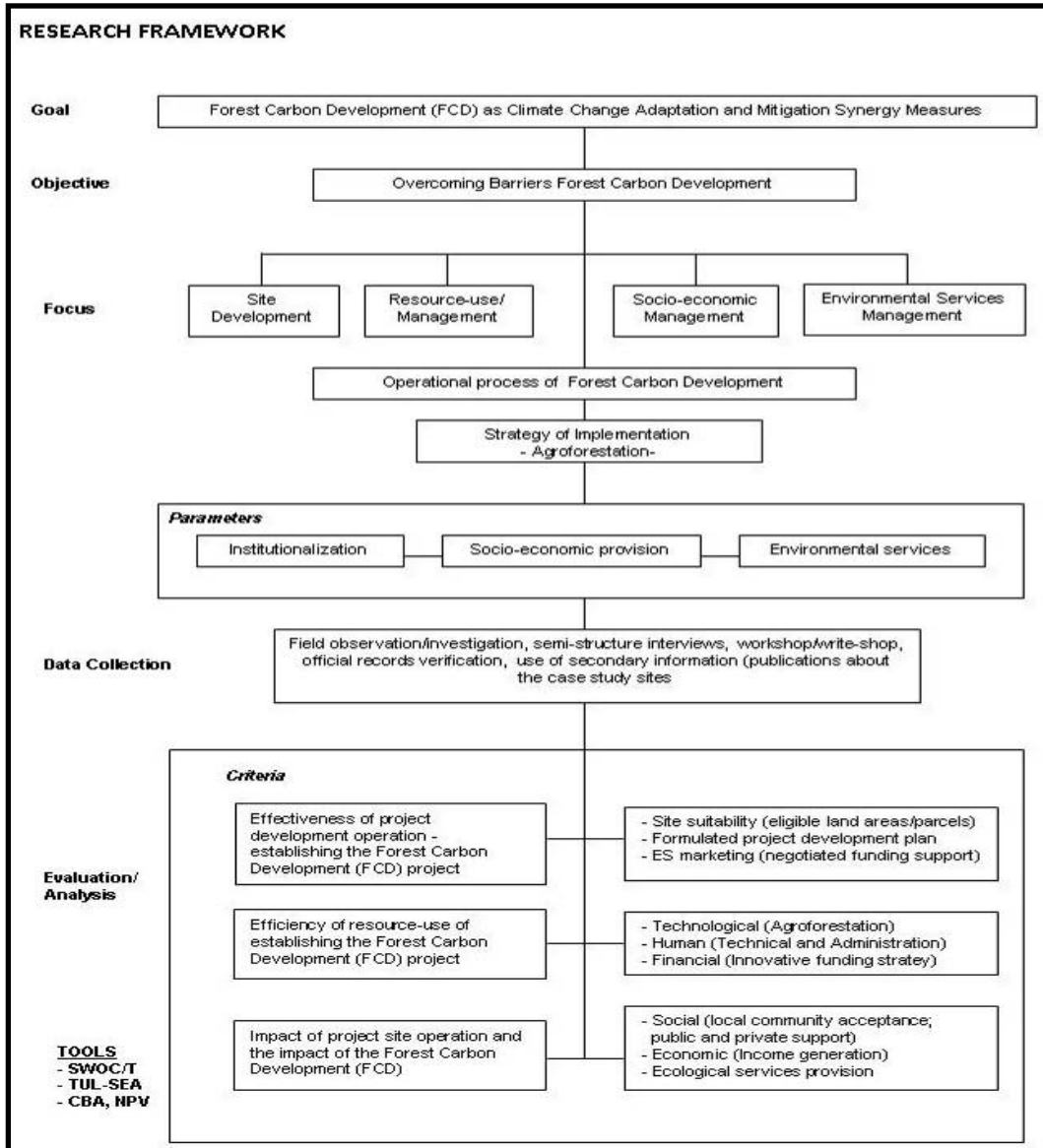
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Appendices

Appendix 1. Chronological activities from 2007 to 2008 in Arakan for the CDM

Date/Venue	Purpose	Activities/Results	Personnel
June 7, 2007; SEARSOLIN, Cagayan de Oro City	Exploratory consultations on accelerating rainforestation in Arakan	Discussed the Status of the Arakan CBRM project Initial CDM project design submitted to FPE as discussion paper	FPE: C. Reyes, G.Villapando, A.Pacudan PEF: A.Cereno, V.Estrada and F.Linsahay
August 15 – 16, 2007; PEF office, Davao City	Levelling-off about the situation in Arakan	CDM stakeholders' analysis and log frame	FPE: G.Villapando, A.Pacudan, J.Suazo PEF: A.Cereno, V.Estrada, R.Saligan, and R.Morales
Jan. 28-30, 2008 Lispher Inn, Juna, Matina, Davao City	To come up with a draft CDM work and financial plan	LLDA shared their CDM experiences, VSU reps shared Rainforestation experiences in Leyte PEF shared nature of partnership with FPE in Bukidnon and Arakan Work and financial plan for the Arakan CDM initiative	PEF: D. Salvador, A.Cereno, V.Estrada, R.Saligan and R.Morales FPE: C. Reyes, G.Villapando, A.Pacudan, J.Suazo VSU: Dr. Milan, Warlito; PTFCF: Eric; LLDA: L.Luna
Feb. 11-15, 2008 PEF and FPE offices; Lispher Inn	To level-off on the CDM and come up with a draft project design for the Arakan Forest Corridor	Kristoff and Cyril (consultants) presented CDM concept and system Joint team of FPE and PEF come up with a draft project design and presented to Executive Directors Christine and Dennis for comments and further development Group agreed that additional baseline socio-economic and other data shall be gathered with budget from FPE	PEF: D.Salvador, A.Cereno, V.Estrada, R.Saligan and R.Morales; FPE: C.Reyes, G.Villapando, A.Pacudan, J.Suazo IED: Kristoff and Cyril
February-June 2008	Conduct Preliminary activities on community consultations, mapping, profiling, phonological survey of rainforest species, identification of potential nursery sites.	PEFI has submitted its report on the outputs of the preliminary activities to FPE Information submitted is used for the development of the Project Design Document (PDD) to be submitted to the UNFCC Executive Board	PEFI personnel staff

Appendix 2. Research project framework: ‘Overcoming barriers of smallholder forest carbon development in the Philippines’



Appendix 3. The 29 parcels of landholdings making up the project area

Specific Location in Arakan municipality				
GPS Lat. and Long.	Sitio, Brgy	Land tenure/ Landholder	No. of parcels	Area (ha)
	Enamong, Datu Landayon	RXII: CADC No. 180	11	51.07
125° 11' 40" N 7° 14' 40" E			1	5.79
125° 11' 56" N 7° 14' 40" E			2	3.92
125° 12' 00" N 7° 14' 50" E			3	9.02
125° 12' 05" N 7° 14' 35" E			4	16.42
125° 11' 45" N 7° 14' 20" E			5	2.11
125° 12' 07" N 7° 14' 55" E			6	4.38
125° 12' 20" N 7° 14' 50" E			7	4.89
125° 12' 10" N 7° 14' 23" E			8	0.85
125° 12' 40" N 7° 14' 33" E			9	1.95
125° 12' 35" N 7° 14' 10" E			10	1.33
125° 12' 05" N 7° 13' 50" E			11	0.41
	Pan-uangdig and Makati, Ganatan	RXII: CADC No. 011	12	85.03
125° 12' 17" N 7° 14' 55" E			1	9.76
125° 12' 03" N 7° 14' 52" E			2	2.47
125° 12' 00" N 7° 14' 47" E			3	1.36
125° 12' 13" N 7° 14' 40" E			4	5.55
125° 12' 25" N 7° 14' 45" E			5	28.88
125° 12' 10" N 7° 14' 30" E			6	2.76
125° 11' 52" N 7° 14' 30" E			7	1.09
125° 12' 05" N 7° 14' 23" E			8	5.97
125° 12' 00" N 7° 14' 00" E			9	23.61
125° 12' 05" N 7° 14' 00" E			10	0.78
125° 11' 52" N 7° 13' 57" E			11	2.31
125° 11' 50" N 7° 13' 52" E			12	0.49
	Uwayanon, Ganatan	CSC	6	42.11
125° 10' 27" N 7° 14' 23" E			1	2.45
125° 10' 30" N 7° 14' 23" E			2	2.45
125° 10' 45" N 7° 14' 05" E			3	11.39
125° 10' 57" N 7° 14' 10" E			4	12.11
125° 10' 57" N 7° 14' 35" E			5	9.02
125° 10' 50" N 7° 14' 45" E			6	6.07
	Kayopaton and Bagtok, Tumandig	RXII: CADC No. 006		38
		TOTAL	29	216.21

Appendix 4. Summary of accomplishments from last quarter of 2009 to February 2010

Activities	UM	Target	Accomplished	Remarks
1. Nursery establishment				
Maintained by resident households				
<i>1.1. Satellite Nursery</i>	<i>No.</i>	3	3	
Nursery 1				Household 1
Nursery 2				Household 2
Nursery 3				Household 3
<i>1.2 Community Nurseries manage by people's organizations</i>				
	<i>No.</i>	6	6	
				Due to high mortality * Attributed to the PEF staff negligence to provide the needed materials for nursery recovery chamber for the collected wildlings
PALUPA		10 000	4500	
				Mostly shade coffee and rubber seedlings High mortality of collected indigenous wildlings. Attributed to the PEF staff negligence to provide the needed materials for nursery recovery chamber for the collected wildlings
KFA		10 000	4500	
TULPA-MALUPA		10 000	48 586	
				Due to high mortality* Attributed to PO(BENRA) in charge negligence as this activity is not their priority concern
BENRA		10 000	4000	
NAMADLA		10 000	38 000	
SFAT		5000	18 043	
2. Seedling/Wildlings Produced				
	No.	55 000	117 629	
Grassland areas planted with indigenous species produced from community nurseries (SFAT, NAMADLA , TULPA)				
3. Area planted	Ha	60	12	
<i>Purely forest trees</i>			6	At site Enamong and Kayupaton
<i>Agroforestry (fruit trees)</i>			6	At site Tinago and Panguanding
<i>Assisted Natural Regeneration</i>			3	Not part of the carbon project area

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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.

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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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