Content

Improving Forest Dependent Livelihoods through NTFPs and Home Gardens: A Case Study from Satchari National Park, Bangladesh

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Abstract: Non-timber forest products (NTFPs) and home gardens play crucial role in the livelihoods of people living in most tropical countries. They are also very important as far as forest conservation is concerned. This paper explores the roles of NTFPs and home gardens in improving the livelihoods of forest dependent people and forest conservation in and around a newly declared protected area, Satchari National Park. An intensive field survey was carried out from mid- February to late June, 2006. Study results suggest that 27% of households in the Satchari area receive at least some cash income from NTFPs. Moreover collection, processing and selling of NTFPs constitutes the primary occupation of 18% of these households. It was also found that wealthier households with rich home garden compositions rely less on nearby forest, than poorer households who are mostly dependent on forests to meet their subsistence needs. Based on these results and discussions with various stakeholders in the study area, the recommendation was to enrich home gardens and buffer zones with commercially important NTFPs in order to get benefit in forest conservation. To reduce local dependency on Satchari National Park, introduction of co-management approach was suggested in the study.

Introduction

Protected areas such as national parks and reserves act from the front line in the campaign to conserve biodiversity. Worldwide protected areas cover more than 12% of the planet's surface (Chape et al. 2003). In Bangladesh, one of the world's most populated nations, protected areas cover about 4.19% of the total land area. Simply declaring an area to be a 'national park' or 'protected area' has not worked in Bangladesh or elsewhere to stop the steady loss of biodiversity for a number of reasons. Among others, these include the fact that timber or fuel wood based commercial operations located in and around these areas perceive them to be a direct threat to their economic well-being, while neighboring low-income households perceive a threat to their livelihoods from reduced access to forest biomass in different forms. In addition a number of non-local groups such as timber companies, International development banks, the military and tourism agencies often have valuable economic and political interests at stake in areas (Brechin et al 2002). Scholars such as Dove (1993) suggest

that if local people develop an economically valuable forest resource, elite economic and political interests will assume control of it. These scholars suggest that the problem for forest people is not that they are poor but that they are politically weak: they inhabit a resource which is coveted by groups that are more powerful than they are.

Based on the belief that human activities are incompatible with the ecosystem conservation, managers of national parks and other protected areas across the globe often prioritize keeping local people out. Many national agencies charged with managing protected areas lack the human and financial capacities, the knowledge of conservation, motivation, commitment and the resources necessary for supervising the vast protected areas under dear rule, particularly if they have alienated local communities or local commercial interests with a stake in resource extraction from those areas. Mounting pressures on protected areas from growing populations, Persistent poverty, and the penetration of the market economy all compound the pointlessness of trying to manage protected areas by isolating them from human activities.

The contribution of non-timber forest products have a positive impact on rural livelihoods The fact that their use is less ecologically destructive than timber harvesting has encouraged the belief that more intensive management of forests for such products could contribute to both development and conservation objectives, and have thus led to initiatives to expand commercial use of NTFPs (Arnold and Ruiz Perez 2001). It is also widely believed that poor rural communities may be less inclined to engage in illegal logging if they are able to derive more material benefits from maintaining forest for various alternative goods and services (Oldfield 1988). Moreover, in many cases, development of non-timber forest resources has assisted stakeholders in obtaining opportunities to merge forest conservation with economic development at the community and national levels (CBD 2003).

Home gardens have a long tradition in many tropical countries. They consist of an assemblage of plants and many include trees, shrubs, vines and herbaceous plants, growing in or adjacent to a homestead or home compound (Nair 1993). Home Gardens represent a well established traditional land use system in Bangladesh and about 80% of the population lives in villages having small home gardens (Zashimuddin 2004). Such gardens play an important role in the livelihoods of rural poor and in the rural economy of the country (Chowdhury and Mahat 1993). Moreover trees and tree products from home gardens play an important role in household food security, as it is a sustainable source of food, fruits and vegetables. Home gardens also play a significant role in forest conservation by providing for subsistence needs of local populations, which they may otherwise have derived from the forest.

Protected areas should help to conserve biodiversity. However, in developing countries like Bangladesh, The declaration of a site as a protected area is often done without thinking about rural communities abutting forests who are traditionally dependent on their resources for subsistence and food security (Sharma et al. 2005). Thus conflicts occur between protected area managers and local forest dependent peoples who maintain their livelihoods with forest resources, particularly non-timber forest products. This study focuses on the contribution of

NTFPs and home gardens in improving rural livelihoods and forest conservation in and around the newly declared Satchari National Park.

Background

Satchari National Park (SNP) is one of the 43 protected areas of Bangladesh. The word "Satchari" comes from "seven streams "(locally called 'chara') and refers to the streams that flow through the forest. The park is located in Chunarughat upazilla of Habiganj district and is situated nearly 130 kilometres northeast of Dhaka, and about 60 km southwest of Srimangal. The area of the park is about 243 ha and is comprised of Forests of Raghunandan Hills Reserved Forests within the Satchari Range. The Raghunandan Hill reserve Borders the park on its north western side, while India lies to the south of the park. (Fig. 1). Tea estates, coffee and rubber plantation, and rice fields abut other adjacent areas of the park.

The park originally supported a vegetation cover of mixed tropical evergreen forests. However, almost all of the original forest cover has been removed or substantially altered and turned into a secondary forest (Mollah et al. 2004). Now only 200 ha of natural forest remains, which has a higher potential for eco-tourism then the remaining secondary forest. Some areas of the park are subjected to flash floods. Soil texture of the park area is generally sandy loam to silty clay and soils are more acidic than in adjoining ecological zones. The topography is undulating with slopes and hillocks, locally called tila, ranging from 10 to 50 meters in elevation. A number of small, sandy-bedded streams drain the forest, all of which dry out in the winter after November. The total annual average rainfall is 4162 mm. July is the wettest month, having an average of about 1250 mm of rain, while December is the driest, with no rainfall. May and October the hottest months have an average maximum temperature of around 32 ℃, while January is the coldest month, when the minimum temperature drops to about 12 ℃. The relative humidity is about 74% during December while it is over 90% during July to August (Chowdhury et al. 2004).

The park is very rich in Flora (about 241 species) and fauna. From various secondary sources it was found that a total of 6 species of amphibians, 18 species of reptiles, 220 species of birds and 24 species of mammals (including 6 species of primates) have been recorded from this forest (Mollah et al. 2004). Moreover, it is one of the last habitats in Bangladesh for hoolock gibbons (Bunopithecus hoolock) and the rare Hooded Pitta (Pitta sordida). But in recent years, the biodiversity of the park has become highly degraded. Already a number of animals and tree species have become locally extinct, while many more are on the verge of disappearing. Overall, a large number of species are variously threatened due to habitat destruction, poaching and over exploitation.

A total of 19 villages with varying degrees of interaction with SNP have been identified. Of them one village (Tiprapara) is located inside the park and the rest are located from 5 to 8 km away. Table 1 lists the degree of dependency the various villages have on the park. Local people have traditionally collected various resources from SNP and other adjacent reserved forests. Many households, particularly poor households from the identified villages, rely

either entirely or partially on the park for collecting fuelwood, timber and bamboo.

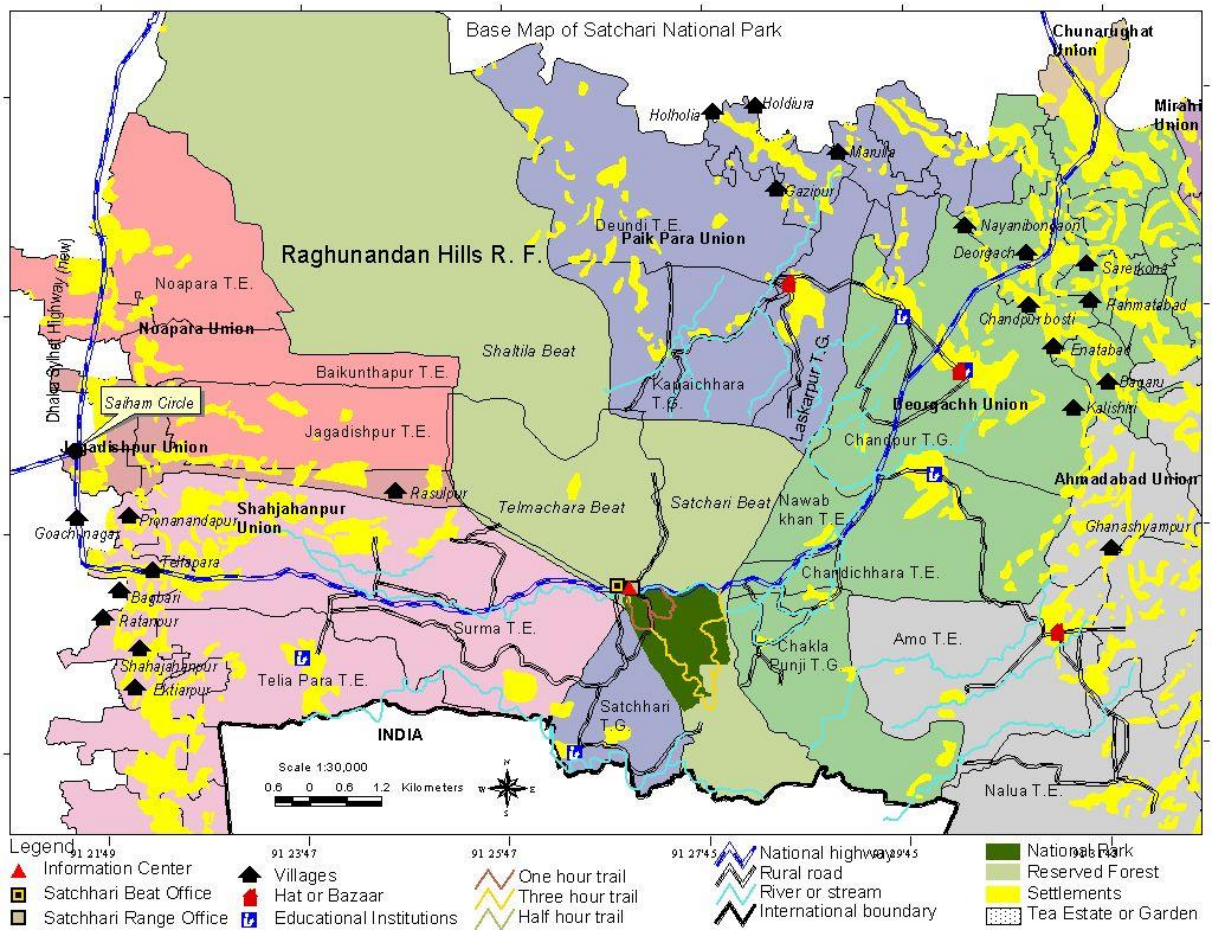

Figure 1: Map of Satchari National Park (Source: RIMS unit Bangladesh Forest Department)

Little is known about the availability and collection of NTFPs in Satchari National Park. According to Mollah et al. (2004) people extract about 12 different types of NTFPs from the park and adjacent forests. Fuelwood is extracted on a large scale; bamboo and building materials are extracted on a medium scale, and other resources are extracted on a minor or negligible scale. Extraction of resources from the forest is seasonally dependent. Villagers extract forest resources primarily for meeting household needs, as well as for earning additional income to support or supplement their livelihoods.

An average household owns approximately 0.10 ha, though the amount of land owned varies with the household's economic condition. Within the homesteads people usually have home gardens and plant various timber species, horticulture species and seasonal vegetables to meet their own needs and sometimes to sell for additional cash income.

Table 1: Degree of dependency on Satchari National Park found in various villages

Degree of Dependency	Name of the villages
Major	*Tiprapara*
Medium to major	Gazipur, *Ratanpur*
Medium	Kalishiri, Ghonoshyampur, Doulatkhabad, *Deorgach*
Minor to medium	Baghbari, Telipara, *Goachnagar*, Ektiarpur, Marulla, Nayani Bongaon
Minor	Shanjanpur, Rasulpur, Promnandapur, Bhaguru, Enatbad, Holholia

Source: Mollah et al. (2004); Names of case study villages are shown in italics.

Study Objectives and Methodology

The aim of the study was to illustrate the role and importance of NTFPs to local people's subsistence and income and to find out the potential of NTFPs as well as home gardening in Forest conservation and poverty alleviation among the people living in and around Satchari National Park.

The study was based on a literature review and primary data collection. Reports from existing studies performed by the government and various national and international non-governmental organizations (NGOs) concerning Satchari National Park and protected area management were reviewed. One village was randomly selected from each of the first four forest dependency categories as identified by Mollah et al. (2004-table 1) including the only village inside the park- Tiprapara. Any village with only minor dependency on the park was not selected. The residents of the villages who had a broad and in-depth knowledge about their village and its various households were chosen as key informants. Focus group discussions (FGD) were conducted to construct community maps and community profiles. During the community mapping exercise Field visits including walking through transects were done in order to observe and verify the information recorded.

Intensive household surveys were conducted in the four sample villages - Tiprapara, Ratanpur, Deorgach and Goachnagar - from mid-February to late June, 2006. Households within each village were classified into three forest dependency strata or classes: "totally or most dependent", "moderately dependent" and "less dependent". To calculate a household's level of forest dependency, the contribution of forests to the household's annual cash income was considered. These contributions include the direct cash derived from selling of forest products and the cash value of products they consume from the forest, which they may have purchased from the market. The perceptions of the local people regarding their dependency on the forest were also considered in this study.

100% sample was taken in Tiprapara, as the villagers were highly dependent on the park for their subsistence. 10% sample of households from each of the forest dependency classes was taken in Ratanpur, Deogach and Goachnagar using a stratified random sampling approach. A semi structured questionnaire was used to collect data on each household, their relationship with the forest, resources exploited from the forest, quantity and frequency of exploitation of resources, traditional pattern of resource utilization, major threats and causes of forest destruction and each households perceptions of conservation and park management, their home garden composition and its role in household food security and livelihoods. Samples of unknown or difficult to identify species were collected and verified by botanists. Additional data were also gathered on the market potential of different locally available NTFPs and their probable contribution to a household's socio economic enrichment. Furthermore, on each topic the respondents were free to express their own views.

Results

Community Livelihoods in and around Satchari National Park

Demographically, the sample households in the study area fall into four categories: forest villagers, local poor people from villages outside the forest, tea estate laborers and auctioneers. In the sample village there are about 818 households with an average family size of around six members (table:2). Among 818 households about 96 households were interviewed having 597 members (49% female). The primary occupation in the study area is agriculture (37%), mainly paddy cultivation, followed by NTFP extraction (19%), illicit felling of timber (18%), day labor (15%), small business (5%), service in Government agencies or NGOs (4%) and overseas employment (2%) (fig-2). The scenario is different in Tiprapara: here there are no agricultural lands as in other villages, and so the main income generating activities observed are day labor (38.5%) followed by extraction of NTFPs (mainly fuel-wood, 32%). Forest patrolling is the main service conducted by the residents of Tiprapara. Moreover, day laborers also collect fuel-wood on their days off.

During the survey, the households were categorized into three different income classes i.e., extremely poor (monthly income below BDT 2000); medium to poor (monthly income between BDT 2000 to BDT 7500) and rich (monthly income more than BDT 7500). This categorization was done by asking them two basic questions, i.e. what is their monthly expenditure and monthly savings (if any). Based on this categorization, approximately 37% of the households in the sample villages fall into extremely poor group followed by medium to poor (32%) and rich (31%). Besides this the literacy rate in the villages is about 54%, among which children who studied in the primary school comprise the largest group (61%).

Table 2: Information of selected villages having interests in Satchari National Park

Name of village	Approximate No. of households	Location	Union	Level of dependence	Forest practices
Tiprapara (Forest Village)	18	Inside SNP	Paikpara	Major	collect fuel-wood, house building materials, fruits and other NTFPs, cultivate lemon and others
Ratanpur	156	outside SNP	Sahajanpur	Medium to major	mainly involved in illegal tree felling and majority of households collect fuel-wood
Deorgach	316	outside SNP, east	Deorgach	Medium	mainly collect fuel-wood, some involved in illegal tree felling
Goach Nagar	328	outside SNP, west	Sahajanpur	Minor medium	same as above

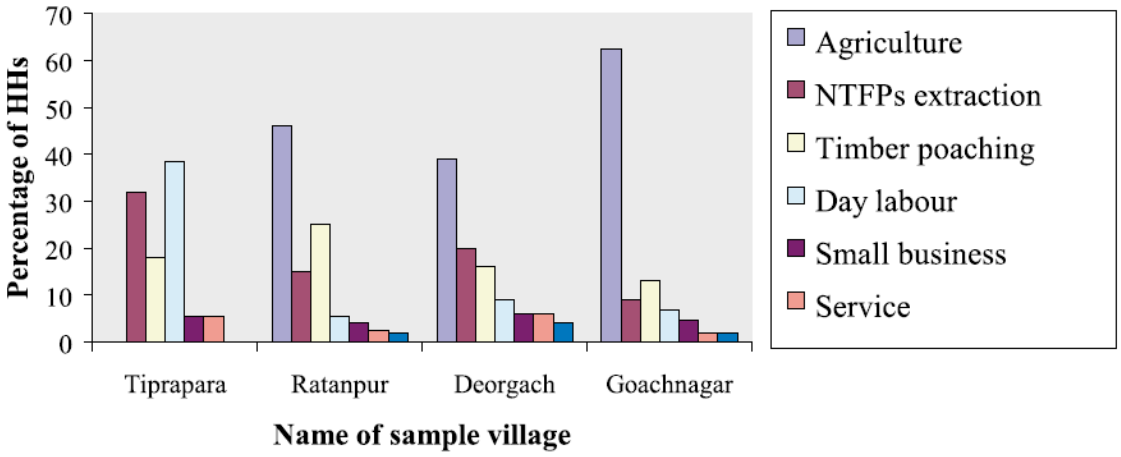

Figure 2: Households involved in various livelihood activities in and around Satchari National Park

Dependency of Households on Forest

The local inhabitants have traditionally used SNP and adjacent forest area for centuries. The study suggests that, about 13% of households of the sampled village are totally dependent on the forest for their livelihoods, while the others are moderately or less dependent (Fig 3). In SNP many poor households are entirely or partially dependent on the forest for collection of fuel-wood, timber and bamboo. All of households in Tiprapara village depend on the forest for their fuel-wood. They also grow lemons in a confined area of the national park.

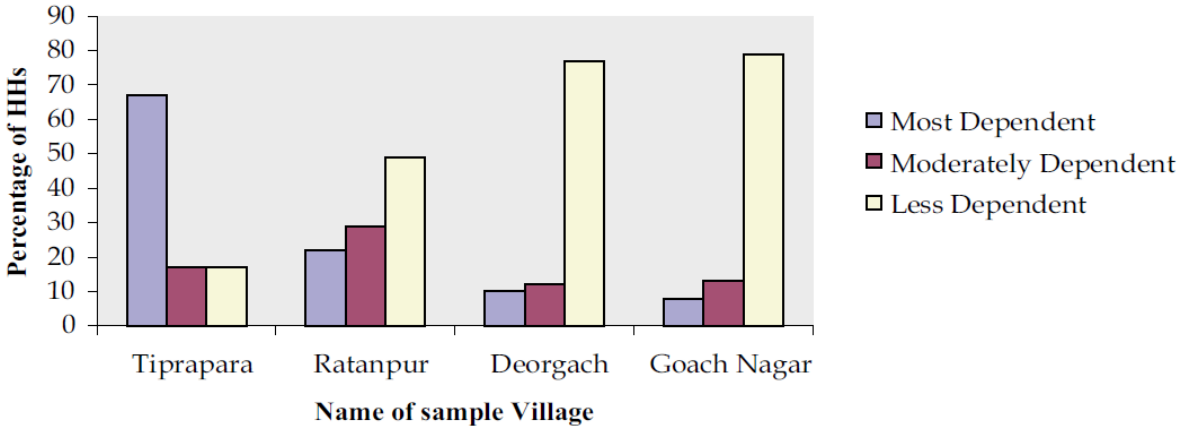

Figure 3: Forest dependency of the villages by household

NTFP Diversity and Households dependency on NTFP Collection

In the Satchari area about 27% of the sampled households gets at least some of their cash income from the extraction and sale of NTFPs and NTFP based products. These contribute on an average 19% of household cash income. However this figure varies from village to village, household to household and season to season and usually ranges from BDT 2500 to BDT 1500 annually and from BDT 40 to BDT 120 daily. The study reveals that the sale of NTFPs

is the primary occupation for 18% of households in the sampled villages and 76% of these households with extra cash on occasion and provides security in emergencies.

During the household surveys, interviewees named a total of 14 NTFPs that they extract from the forest (Table 3). However, only a few of these NTFPs make a significant contribution to their household income. In the study area four NTFPs, fuel-wood, Menda bark (used for herbal medicine and mosquito coils), Taragota (used for its aromatic properties) and Kumbi leaves (used to wrap tobacco) - account for more than 90% of NTFP based income. However, the importance and collection of these NTFPs in the four sample villages was not uniform. It was observed that peoples dependency on nearby forest for various NTFPs varies with their socio-economic condition as well as from their distance from the nearby forest. Fuel-wood is the most harvested NTFPs of all. All the households of Tiprapara (100%) collect fuel-wood from the National Park, compared with 60% of households from Ratanpur, 55% of households from Deorgach and 56%of households from Goachnagar. Fig 4 presents a comparison of household involvement in different NTFPs collection in the area of SNP.

Among the NTFPs, medicinal plants possess a great diversity in Satchari. Although people mostly depend on modern medicines, some households (25%) use medicinal plants for treating various common ailments. It was found that a total of 39 species in the study area that have some sort of medicinal properties and are collected by local users for commercial purpose (63%) or for their own consumption (37%).

Table 3: Different NTFPs exploited from SNP and adjacent forest by local households

Products/ Service	**Origin**	**Amount of collection (based on peoples perception)**
Fuel-wood	All woody species	High
Bamboo	*Bamboosa vulgaris*	Medium
	Melocannabaccifera	
Fruits	*Artocarpusheterophyllus*	Low
	Artocarpuschaplasha	
	Artocarpuslakoocha	
	Citrus limon	
	Syzygium spp.	
Menda bark	*Litseamonopetala*	Medium
Taragota	*Ammomumaromaticum*	Medium
Sun grass	*Imperata cylindrical*	Medium
Forage and fodder	Various species	Low
Herbal remedy	Different medicinal plants	Low
Rattan	*Calamusguruba*	Low
	Daemonoropsjenkensianus	
Broomsticks	*Thysanolaena maxima*	Medium
Kumbi Leaf	*Careyaarborea*	Medium
Sand	*Sylhet sand*	Medium
Honey	*Apis florae*	Very low
	Apisdorsata	
Bush meat	*Gallus gallus*	Very low
	Susscrofa	

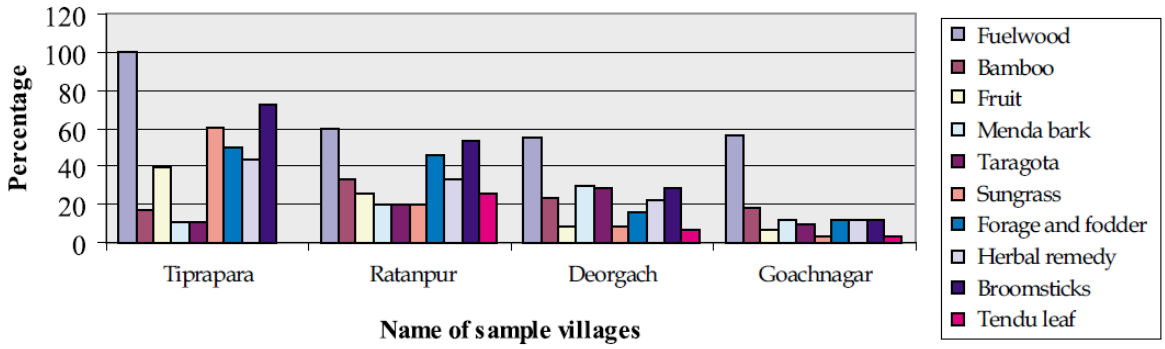

Figure 4: Percentage of households involved in different NTFPs collection activities

People's Perception of the Impact of NTFP Collection on Forest Conservation

The study shows that the extraction of resources from the forest is seasonally dependent. Most of the fuel-wood is collected during the dry season due to easy access and mobility inside the forest. Bamboo extraction also takes place mainly in the drier months to meet local needs for the construction of houses at that time of the year. The following quote from some local informants highlights the perceived role of NTFP collection in forest conservation (Ratanpur village, personal communication)

"We have collected NTFPs from Satchari since prehistoric times, but it doesn't damage the forest ecosystem as illegal felling does. Moreover, we collect NTFPs seasonally, so it has enough time to recover."

In addition, one villager from Tiprapara said, "NTFP collection keeps the forest safe from sudden fire and also destroys harmful organisms. It also acceleratesthe growth of seedlings and saplings by reducing the competition for nutrition. People's perceptions regarding different NTFPs collected from SNP and their impacts on the Park's ecosystem are summarized in Table 4.

Table 4: People's Perceptions of amounts, impacts and risks of collection of various NTFPs

Item	Amount collected	Impacts on the Park	Future risks
Fuel-wood	High	Loss of habitat and forest biodiversity.	High
Building materials	Medium to high	Reduce abundance of small trees, loss of habitat, and loss of wildlife.	Medium to high
Fruits	Medium	Causes low level damage to forest regeneration	Low
Vegetables	less	No apparent impact	Low
Medicines	Medium to less	Negligible	Medium

Status of Home-garden in and around SNP

Home gardens can provide families with important against food insecurity. From the household surveys it was found that the home-gardens in the study area (except Tiprapara village) are rich in diverse species. Families in the Satchari area have always grown a variety of timber, fruits and edible plants in their home-gardens. They fulfill a traditional subsistence

role in the sampled villages. With the declaration of the protected area, these gardens are expected to play a more important role in food security.

A total of 39 species were found in the home-gardens of the study area (Table 5) but none of these species were ubiquitous. 10 timber species, 9 fruit species, 5 species that produces both timber and fruit, 12 vegetable crops and 3 multipurpose species and medicinal plants were recorded from the home-gardens. Around 70% of the species grown in the study area are edible. Most villagers have a tendency to grow fruit and timber rather than vegetables in their home-gardens. For timber production people usually preferfast growing species. The livelihood benefits of home-gardens go well beyond simply meeting subsistence needs. In many cases, the sale of products produced in home-gardens significantly improves the household's financial status.

Table 5: Composition of a typical Home-garden in the study area

Common name	Botanical name	Abundance	Performance
Timber Species			
Acacia	*Acaia spp.*	C	+++
Chapalish	*Artocarpuschaplasha*	FC	+
Mahagoni	*Swienteniamacrophylla*	C	+++
Koroi	*Albizzia spp.*	C	+++
Rain tree	*Albizziasaman*	FC	++
Chatim	*Alstoniascholaris*	R	++
Eucalyptus	*Eucalyptus camaldulensis*	FC	++
Menda	*Litseamonopetala*	FC	++
Teak	*Tectonagrandis*	FC	++
Chalta	*Dilleniaindica*	R	++
Fruit Species			
Lemon	*Citrus spp.*	C	+++
Papaya	*Carica papaya*	C	++
Pineapple	*Ananascomosus*	FC	++
Banana	*Musa sapientum*	FC	++
Star fruit	*Averrhoa carambola*	FC	++
Batabilebu / Pomelo	*Citrus grandis*	FC	++
Guava	*Psidiumguajava*	FC	++
Coconut palm	*Cocos nucifera*	C	++
Betel nut	*Areca catechu*	C	++
Timber and fruit bearing species			
Mango	*Mangiferaindica*	C	++
Jackfruit	*Artocarpusheterophyllus*	C	+++
Sajna	*Moringaoleifera*	C	+++
Jaam	*Syzygium spp.*	FC	++
Neem	*Azadirachtaindica*	C	+++
Vegetable Crops			
Radish		C	+++
Bean		C	++
Eggplant	*Solanum melongena*	C	++
Bottle gourd	*Lagenariasiceraria*	C	++
Red spinach	*Amaranrhus tricolor*	C	+++
Indian spinach	*Basella alba*	C	++
Green Spinach	*Brassica rugosa*	FC	++
Chili	*Capsicum frutescence*	C	++
Cabbage	*Brassica oleracea*	FC	++

Ladies finger	*Abelmoschusesculentus*	FC	+++
Tomato	*Lycopersiconlypopersicum*	FC	++
Pumpkin	*Cucurbita maxima*	C	++
Other species with multipurpose use			
Bamboo	*Bambusa spp.*	C	+++
Patipata	*Schumannianthusdichotoma*	FC	+++
Rattans	*Calamus spp.*	FC	+++

Key: C=common; FC= fairly common; R=rare; +++=very good; ++=good; +=not so good

In Satchari, it was found that the average rich household owned approximately 0.18 ha of land, while medium, poor and extremely poor households owned less than 0.08ha. Rich households usually plant different plant species in their home-gardens to meet their subsistence needs. On the other hand, people in poorer households mostly depend on mostly depend on the forest for their fuel-wood and other needs, as they have no land for home-gardens. Study results suggest that home gardens are negatively correlated with dependency on the forest.

Discussion

The study results paint an interesting picture of the use and role of NTFPs and home-gardens for livelihoods and forest conservation by the communities under study. Non-timber forest products make a vital contribution to livelihoods for a large proportion of the poor living in, or close to, the forest in most tropical countries (Arnold and Perez 2001). In the Satchari area villagers collect a large number of NTFPs - more than 14 products were identified. Some NTFPs including the medicinal plants hold real potential for livelihoods and as an incentive to conserve forest. The study suggests that the sale of NTFPs and NTFP-based products provide an important source of cash income for the villagers in and around SNP. The most important point is that NTFPs represent a significant component of their livelihoods strategies, accounting for 19% of their total annual income. In addition, about 18% of households receive cash income only from the sale of NTFPs . These findings are comparable to the results of studies done in Southeast Asia (Table 6). It was also found that a majority of the people (76%) who benefit from the extraction and sale of NTFPs are poor. If they did not derive these benefits they might not have an incentive to manage it as sustainably. This finding agrees with the observations of Cavendish (2000) in Zimbabwe who also found that NTFPs benefit mostly the poorest populations.

Home gardens provide livelihood benefits in terms of nutrition and daily subsistence. The data in the study identified 39 different species in home gardens in the Satchari area, of which approximately 70% are edible. All of the wealthier people in the study depend on their at home gardens for fuel wood and other forest products from the forest to home Gardens. This finding also agrees with Caron (1995) that is home gardens for could play an important role in forest protection by shifting the dependency for food and income from the forest onto home gardens.

Table 6: A comparison of cash income obtained from NTFPs in various studies

Topic	This study	Other study
Contribution of NTFPs to households cash incomes	19%	14% (Mahapatra et al. 2005) 17% (Malhotra et al. 1991) 24% (Ganesan 1993) 21% (Gunatillike et al. 1993)
Households receive at least some cash from NTFPs	27%	-
Households receive cash income only from NTFPs	18%	12% (Mahapatra et al. 2005)

Conclusion and Recommendations

The main conclusion from our study is that NTFPs, NTFP-based products, and home gardens in and around SNP play important roles in improving the livelihoods of forest dependent people and forest conservation. Understanding the dependency of households on the forests of Satchari National Park is critical for developing effective management strategies. The data presented here suggest that the production and sale of NTFPs and NTFP-based products provide an important source of cash income for villagers in and around SNP. This study also found that households in villages with diversified home are less dependent on the national park for forest products.

This study suggested some new policy avenue such as enriching forest and buffer zones with commercially important NTFPs, which may be used for establishing NTFP-based small-scale enterprises. In addition, protected area management strategies should be coordinated with the overall development of communities that depend on the protected areas. Management plans should give these people the right to collect forest resources in sustainable way, enable them to enrich the park and the buffer areas with different subsistence crops (i.e., NTFPs, fruits, vegetables), and give them incentives like seeds and seedlings to develop their home gardens.

Managers should take a cautious approach. First, a comprehensive feasibility analysis of the contribution that NTFPs,NTFP-based small-scale enterprises and home gardens can make to forest conservation and livelihoods must be conducted. This analysis must consider the social, economic and ecological aspects of the proposed changes. Secondly, a co-management plan that involves local people in forest management and which ensures equity in decision making and benefit sharing should be developed. The plan should specify both short-term and long-term objectives and goals. Thirdly, institutions must be identified to facilitate the implementation of the plan and ensure equitable distribution to benefits to local communities.

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Overview of the Contributions of Forests to Poverty Alleviation in Cambodia

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Abstract: The most recent Cambodia Socio-Economic Survey indicated that about 80-84% of the people in rural areas depend on forest resources for both consumption and income generation. Since forests are of such critical importance to the livelihoods of rural communities, the Royal Government of Cambodia has enhanced forest management efficiency and acted to ensure their appropriate protection and development. This paper provides an overview of past and current contributions of forestry to poverty alleviation in Cambodia. It reviews traditional forestry practices, the development of community forestry - including opportunities for community-based production forestry - commercial and industrial forestry, and payments for environmental services, including those associated with carbon sequestration. One of the most important lessons learned from the review is that the capacity of local villagers managing community forests must be enhanced to empower their efforts to protect and ensure the sustainability of forest resources. On the basis of the review of case studies from three field sites, these recommendations emerge: (1) Forest resource management approaches should prioritize direct access of local communities to benefit from forest resources, especially in high-value forest management areas, including protected areas; (2) Commercial forest management options should be considered and optimized to ensure the forestry sector's contributions to poverty alleviation and socio-economic development; (3) Improving the lives and livelihoods of the rural poor should be a government priority, including equitable access to common property resources, as a critical source of income security; (4) The government should develop and deliver support services to rural communities, especially those support services associated with community forestry, agroforestry, and the development of non-wood forest products for rural livelihoods and food security; and (5) Communities must be involved in the development of systems and processes under which their forests will be managed and this will require the development of partnerships with other stakeholders.

Keywords: Rural livelihoods, poverty alleviation

Introduction

The forests of Cambodia include evergreen, semi-evergreen, deciduous, mangrove, bamboo and others forest in various conditions from closed to disturbed and mosaic formations. There are also re-growth and plantation forests as well as open forest types including evergreen shrub land and dry deciduous shrub land. Ownership of the forest is divided into state forest and private forest. State forest is permanent forest reserve and is classified into production forest, protection forest and conversion forests, the latter meaning forestland to be changed to other land uses. Private forests are so limited that they are not yet registered, but private forest owners have full user rights, including harvesting and selling of trees (FAa, 2010).

The most recent assessment report of the National Institute of Statistics – NIS (2015) indicated that approximately 82% of the households lived in rural areas and a large majority of these households have engaged in rice-based agriculture, collection of forest products, and livestock raising. However, in 2015, the number of households involved with collecting forest products declined by 69 percent, with the share of households involved in these activities relatively high in the mountainous and highland areas, at 88 percent and 78 percent, respectively, than in the Tonle Sap and Coastal areas, at 76 percent and 60 percent, respectively. In addition, a large part of their livelihoods was from Non-timber Forest Products, including 38% from wild fruits and vegetables, 37% by collecting firewood, and the rest from other activities, such as collecting rattan, bamboo, palm leaves and other fibrous products. Moreover, the forest sector contribution to the nation's GDP was about 2.8% in 2010 and 1.8% in 2015 (NIS, 2015).

Since 2002, the population has dramatically increased in Cambodia, which has coincided with the establishment of Social Land Concessions, Economic Land Concessions, and social-economic development. Consequently, forest resources in Cambodia have become degraded and have declined from 73% of the total land area in 1965 to 57.07% in 2010 and to 49.48% in 2014 (FA, 2016). In many places, relatively large areas of forestland have been converted into agricultural land and the lack of suitable strategies for livelihood improvement is one of the principle reasons for the resulting unsustainable development that is occurring.

For the last twenty years, forest management systems have been involved from solely timber benefit management to timber, non-timber forest products (NTFPs), and environmentally friendly management such as tourism recreation, benefit sharing among national and local economics. Under the strong commitment of the Royal Government of Cambodia, the Forestry Administration with supporting from the Ministry of Agriculture, Forestry and Fisheries, very important roles, a number of laws, regulations and declarations related sustainable forest management and conservation have been ratified and entered into force. The RGC has set policies that are related to sustainable management including land administration reform and natural "forest" resource management. The reform in natural resource management (NRM) has focused on strengthening sustainably environmental protection and natural forest resources that are based on three important pillars: Sustainable

Forest Management Policy, Natural Resource and Biodiversity protection, and Community Forestry development promotion (FAb, 2010).

In order to achieve the goal of reducing poverty and sustainable use of forest resources, the sustainable livelihood approach provides a useful means for understanding forest-based livelihood development. The overall objective of increasing incomes of Cambodians living in rural areas: land, water, agriculture, forestry and fisheries and transport are so importance. In this context, livelihood resources – i.e., the assets that local communities have – including natural, economic, human, and social capital – have to be examined to recommend prospective livelihood approaches (Dany et. al; 2016). This paper aims to describe how forest resources contribute to poverty alleviation for local communities (CFs), how forest management has addressed livelihood needs.

Forests and Livelihoods

All sectors of society are linked to forest resources. There exist two broad distinctions between stakeholder interest: those whose interest focuses on forest resources, and those interest focuses on forest land. Within the category of forest resources, it is helpful to further distinguish between groups who use the forest primarily for consumption purpose such as collection of fuel wood, medicinal plant, and wild vegetable. Those who generate small levels of income from the forest, through the collection of bush meat, non-timber forest products - NTFPs (such as resin, rattan, charcoal production) and commercial larger scale operators (FAd, 2010).

The contribution from forestry to Cambodia's GDP is limited, but heavily underestimates the livelihood contributions which range from NTFPs to timber for buildings and other subsistence-based products, as well as environmental services benefiting other economic sectors and the nation as a whole. Income to the Forestry Administration comes from different uses of land that can be natural forests or plantations. Large areas of unmanaged, yet productive forests can play a direct role in improving livelihoods and the national economy, providing employment through forest management activities and NTFPs processing enterprises. There was a steady reduction in the rural poverty rates from about 53% in 2007 to about 21% in 2011: steep in 2008 and 2009, and gradual thereafter. What this suggests is that trends in poverty reduction are led by significant changes having happened in rural areas.

Improving Forestry Management and Use

The forestry sector contributes around 5 percent to GDP, with potential for expansion. Forestry Management reform has been implemented by the RGC to respond to the need for sustainable management of forest resources. A sub-decree on community forestry has been developed. This provides a potential for better support to forest development community. The RGC is now focusing on the enforcement of the Forestry Law, including aspects on procedures, forest demarcation, elimination of illegal logging, and enlargement of natural forest conservation areas for eco-tourism.

Poverty and Forestry in National Policy

The RGC is strongly focused on implementation of the Forestry Reform Programme. Its policy goal is to manage and use forestry resources in a sustainable way, aiming to take the maximum advantage from their contribution to poverty reduction and socio-economic growth. For long-term national supporting to deal with improving livelihoods in the forest sector, policies, strategies, and programs to support and complement the implementation of broader development plans that are embedded in the following documents:

- National Forest Program, 2010-2029.
- National Poverty Reduction Strategy 2003-2005
- National Strategic Development Plan 2014-2018
- Forestry Strategic Development Plan 2017-2030.
- Rectangular Strategy Phase III, 2013-2018.
- Cambodia Sustainable Development Goals 2017-2030.
- Agricultural Sector Strategic Development Plan 2014-2018.
- Cambodia Climate Change Strategic Plan, 2014-2023.
- Joint Monitoring Indicators, 2014-2018.

The National Forestry Program 2010-2030 (NFP) was formulated and adopted by RGC in October 2010. It focuses on forestry law enforcement and governance, forestry boundary demarcation, enhancement of sustainable forestry management, wildlife conservation, promotion of community forestry development, increase of reforestation and tree plantation, capacity building of institutions, human resources development, and a research and extension programme for sustainable forestry management. Recently the Ministry of Agriculture, Forestry and Fisheries has issues first Declaration on Private Forests with the purpose of promoting public-private-farmer partnerships for establishing small- and medium-scale forest plantations and increasing forest cover.

Past and Current Contribution of Forestry to Poverty Alleviation

Traditional Forestry

Indigenous and local communities who living within or near by the forest, have been using and depending on timber and variety of non-timber forest products (NTFPs) for their subsistence and livelihoods for generations daily income. These communities often have long traditions of sustainable forest resource use and a wealth of knowledge and skills regarding forest resource and management. Because a large proportion of the rural population in the country still live in or near forests, it is generally assumed that forest resources play a very important role in the livelihoods of a majority of Cambodia's population (FAO, 2012).

During the 1980s and the 1990s when forests were managed under the lower level of law called Anukret (Sub-Decree) No. 35, all forest uses for local people's consumption were

allowed without the need for permit. Local uses included extraction of wood for house construction and collection of firewood and poles for making fences. The latest Forestry Law 2002 clarifies traditional uses of forest products (RGC 2002). Shifting cultivation at the family scale, usually manual tree cutting and clearing, is considered by the law to be a traditional use. However, due to population increase and in-migration, shifting cultivation can cause serious problems of forest clearing. Other legal customary forest uses are the collection of dead trees and NTFPs. Customary user rights are also ensured in forest concession areas. Harvesting of trees traditionally used for resin tapping by local communities is prohibited.

The NIS survey in 2015 estimated that the share of households with forestry and hunting activities is higher in the mountain and plain zone, at 88 percent and 78 percent, respectively than Tonle Sap and Coastal zone, the corresponding share is lower, at 76 percent and 60 percent. NIS (2015) indicated that the most common activity was Non-timber Forest Products (such as root crops, wild fruits and vegetables) collecting at 38 percent, firewood at 37 percent, and besides these activities such as rattan, bamboo, palm leaves and other fibrous material collecting. However, reliable statistical data on these products and the people engaged in their production are not available. One of the reasons is that NTFPs are mainly produced by a huge number of very small-scale producers across the country whose activities are not part of the formal sector.

Community Forestry

In Cambodia, community forestry gradually developed since the mid-1990s through small pilot projects supported by the government and mainly by national and international NGOs. These projects showed that community forestry has considerable potential in protecting forests and enhancing their productivity and capacity to support rural livelihoods while, at the same time, stabilizing critical watersheds and ecosystems. Community forestry is one of the priority areas to promote the forest sector in Cambodia. There are about 580 Community Forestry initiatives mostly supported by various NGOs (FAd, 2017). The Forestry Law and sub-decrees promote communities' participation in forest management, including the decision-making process for formulating management plans and internal rules. Throughout the CF planning process, local communities are encouraged to play a lead role in decision-making. Under the new organizational structure, the role of the local FA staff is to provide support, such as in providing technical assistance in the preparation of the forest management plans.

As provided under the Community Forestry Sub-Decree 2003, local communities that participate in CF projects have the right to manage and use forestlands in or near their villages for up to 15 years based on the agreement between the communities and RGC. The local communities can keep these secured land use rights as long as they abide by forest management plans that were agreed upon. A group can allocate their CF for different purposes, such as agriculture, protection, regeneration, production, and reforestation. They cannot, however, sell the land to a third party or divide it among themselves. Nonetheless, the Sub-Decree on Community Forestry does not include clear provisions about compensation for

local communities if the State retakes the allocated CF lands for other uses. Through field extension efforts that explained the forestry by-laws, some community people have become aware of their rights in preventing the destruction of their resources. A lawsuit was filed against some violators of their management plans in the community. Further, active participation of women in CF management is encouraged, e.g., in their participation in the planning process and in their inclusion as members of CF management committees, as well as their capacity building and awareness raising, with assistance of international donors and NGOs. The establishment of community forestry showed local communities that they have specific rights to participate in managing and using natural resources appropriately with the aim of contributing to upgrading the living condition of people and environment within the area (CFRP 2006).

The implementation of CF in Cambodia to date is not able to contribute substantially to poverty reduction due to various factors. Forest-dependent communities and stakeholders have limited legal access to forest resources in terms of the extent or coverage and quality of forest resources. CFs are difficult to establish in suspended forest concessions and ELCs, regardless of community traditional use and dependence on forest resources in these areas. The relatively short duration of community rights to CFs (15 years only) implies the lack of guarantee of tenure security after 15 years elapse and the uncertainty in the evaluation criteria diminishes the incentives for communities to participate in CF management. The powers given to community forest committees to impose sanctions on illegal activities by outsiders are limited. The community forestry program did not provide direct livelihood support to communities. In terms of economic benefits for the members, livelihood activities in CF are limited due to limitations in technologies, people's skills, and access to capital for organizations to engage in productive activities and add value to their forest products.

The success of CF depends on capable local organizations, but most of the organizations have not obtained full recognition by the government. The lack of tenure security reduces their motivation and incentive to actively participate in CF management. Also, the lack of legal status prevents communities from commercializing forest products to their full potential.

Community-based Production Forestry

As a strategy toward SFM and poverty alleviation, the Community-based Production Forestry (CPF) program is an innovative form of forest management. The Wildlife Conservation Society in partnership with the FA has been piloting CPF in the Seima area in eastern Cambodia. The site was designated as a conservation area in 2002. The system combines aspects of commercial forest management with community forestry and aims to demonstrate that a community-based enterprise can responsibly undertake commercial management of part of Cambodia's forests. The CPF initiative aims to combine biodiversity conservation with the maintenance of local livelihoods. Based on this model, community based forest enterprises (CFEs) would be set up at the village level and these CFEs would then be awarded timber harvesting rights. Contractors and other organizations would undertake harvesting and marketing activities. Besides gaining tenure security and continued access to NTFPs,

communities would benefit financially from CFEs through direct employment in forestry operations and profit sharing. Income to the RGC would be through timber royalties and other taxes.

Commercial and Industrial Forestry

Timber is the most valuable forest product in terms of the forestry sector's contribution to the economy, including earning foreign currency for the government. In Cambodia, large quantities of timber are used for the construction of houses and buildings and for the manufacture of furniture, bridges, wagons, and sleepers.

Forest Concessions

During the 1990s and early 2000s, approximately 6.8 million ha were managed under a concession regime that contributed much less than expected (only 4-12 %) to the national GDP. The export of logs peaked in 1995 with about 590,000 cu m, then declined to 74,000 cu m in 2000, and was almost zero in 2007. The contribution of the forestry sector to the national GDP is limited but heavily underestimates The establishment of this tree plantation by a private company on its economic land concession in a commune in Kampong Thom province was met with protests from local community members over the encroachment of the ELC into their community forest area and crop lands. The contributions to rural livelihoods, which include NTFPs collection, timber extraction for building houses and other subsistence-based products, income from unauthorized logging, as well as environmental services benefiting other economic sectors and the nation as a whole. The forest sector needs rationalizing in terms of income generation. The concession forests area, community forests, and other production forest areas can add up to about 5.7 million ha. If estimated income is just US$ 8-10 per ha per year in timber revenue on average, there should be US$ 46-57 million in income. This potential income is not being realized at present, however. In addition, payments for the forests' environmental services through fees from ecotourism, income from carbon credits or other forest management efforts are being explored. These may provide income and other benefits more than logging and ensure sustainable revenue sources.

Almost one-half of the 4.5 million ha of production and community forests are under FA control. About 2.25 million ha can be classified as degraded forests with less production for the first 20 years. These can produce annually 0.5 cu m per ha of logs for a net value of US$ 54 per cu m (or US$ 60.75 million per year). The remaining 2.25 million ha of good and intact forest can produce 1.1 cu m per ha of logs that can have a net value of US$ 54 per cu m equivalent to US$ 133.65 million per year. Some investments in planting with natural regeneration potential will be needed. Income for the FA, the RGC, or the economy as a whole depends on how the 10.8 million ha of forest lands are utilized. It is valid to compare the revenues from different uses of land that can be natural forests, plantations, or small-scale agricultural production. Essentially, even using conservative estimates, the forest sector can be managed along sustainable lines in accordance with the NFP and absorb NFP implementation costs while yielding a substantial revenue. The projected revenue from production forests in the NFP Sustainable Financing Programme (Operational Framework) is

rather low, considering the extent of the production forest land of 4.4 million ha (3 million ha of forest concession and 1.4 million ha of FA-controlled production forest). If there is US$ 10 per ha per annum net yield on an average, there should be a total of US$ 44 million available in the form of royalties from timber (Fraser Thomas Ltd., 2009). This could balance the cost of the entire NFP. However, if US$ 10 per ha per annum is not possible, the economic viability of the current forest cover may be questionable (Ibid.). It is worth noting that the forest sector has an estimated sustainable annual timber harvest in the area of 4-4.5 million cu m, according to the NFP Sustainable Forest Financing Programme (Operational Framework). Assuming that only 10% will be allocated for timber production (equal to 425,000 cum) and that the annual domestic demand is presently in the region of 283,000 cu m (FA 2008), there is a significant export potential for certified timber.

Large areas of unmanaged yet productive forests can play a direct role in improving livelihoods and providing employment through forest management activities and NWFP processing enterprises. However, forests and forest lands are under pressure from different groups of forest users and processes, such as allocation for economic concessions and internal migration, illustrating the need for management within forestry and across other economic sectors. Financial modeling based on conservative estimates indicates that the forest can be self-financing while maintaining social and environmental functions in accordance with NFP principles.

Payments for environmental services and carbon payments

Forests provide a range of environmental services that provide benefits for communities within and outside the immediate area of the forests. In Cambodia, forests provide an important protection for watersheds. In particular, they perform essential functions in ensuring fish breeding grounds and in regulating water flow to farmers in the lowlands. Forests also provide a home to a significant number of rare animals. The Cardamom protected forest covers the largest tract of primary rainforest in mainland Southeast Asia, together with other wildlife sanctuaries such as Samkos and Aural Mountains (Meta 2010). Mlup Baitong, an environmental NGO, has been working with the villagers in Chambok to establish a community-based ecotourism (CBET) initiative with the dual aims of sustainably managing natural resources and improving the livelihoods of the people. Situated on the borders of Kirirom National Park and the community protected area, the ecotourism site covers 161 ha, with waterfalls, bat caves, lake, and forests in the community protected area that can attract visitors. The CBET in Chambok was established in 2003 and a lot of activities were conducted for natural resource conservation, income generation, and community capacity building. With the community's cooperation and facilitation by the authorities, Mlup Baitong provided training courses to community members for capacity building on forest management and for raising awareness about the importance of natural resources and their relation to ecotourism.

Through capacity building activities, the villagers are more aware of the problems caused by deforestation. They are committed to protecting the forest by conducting patrols to guard

against illegal activities. Nine villages are part of the CBET project and they work together in patrolling the forest, marketing products, providing services to tourists, and managing natural resources, as well as building infrastructure such as roads and bridges and market stalls. Villagers patrol two to three times a week and report illegal activities to the FA. Through these activities, tourists are attracted to visit the plantation and the botanical garden located in the community. During visits, community members present the importance of ecotourism in their community and the conservation of natural resources. The CBET initiative is contributing to livelihoods by creating jobs for community members through related services and activities, such as homestays, plantation tours, ox-cart rides, food sales, and tour guides for swimming, hiking, and camping on the mountains. The women in the community also formed a self-help group to save their earnings from the tourist visitor services. Chambok's community-based ecotourism has done well in natural resource management and in helping the community members improve their incomes. In 2006, the initiative was awarded a Certificate of Appreciation from the authorities and a medal from the Ministry of Tourism for their efforts.

Forest-based Income

Despite a decline of forest-sourced products, local communities still get benefits from forest resources for their subsistent uses and income generation. According to a case study in 2011, forest-based income that used to be the largest source became the second major source after agricultural production, providing the community members with from US$ 200-300 per month, on average, which accounted for 40-60% of their annual income. For some family members, the income was about US$ 125 a year from selling mushrooms and US$ 50 a year from collecting tree resin. Interestingly, producing charcoal could make their higher, reaching more than US$ 250 a year. The other main products were from collecting fuel wood for household cooking, bamboo, timber for housing, wild fruits and vegetables. In short, almost all families in the communities collect fuel wood, while about 100 households practically depended on selling NTFPs collecting from forests for their daily income.

A case study done with this community found that there were 60-70% of the CF members who depended on forest resources. Overall, the income was from 600,000-700,000 Riel/year or 400-450 dollars/year per family, and this made up 50-60% of the total income for a family. About 30% of total families in the CF could even earn further income from selling small and big poles and sawed wood, and their income could increase to 2.5-3 million Riel/year or 500-750 dollars/year.

Different kinds of wild fruits can be harvested in the months of March to September. Mushrooms appear in June and July, while bamboo shoots are available in May to June fruits and vegetables every year. Some families could earn CR 40,000-120,000 (US$ 1-3) or as high as CR 150,000 (US$ 3.75) from harvesting wild fruits. Almost 80% of the families in the CF used wild vegetables collecting from the forest nearby, and some of those were sometimes sold at the local markets for cash. Firewood was used not only by the CF members, but also by all villagers in Sala Visaiy commune, mainly for cooking and burning to protect their

animals from insects. Honey could provide more income than wild fruits and vegetables. About 30 out of the total 98 familiesin the CF earned an income of about CR 500,000-800,000 (US$ 125-200) during the honey collecting season. A villager reported having earned CR 1,100,000 (US$ 275) from selling honey last year and this amount was considered the highest individual income from harvesting honey. The average use of firewood by a family ranges from two to three carts per month (costing about CR 40,000-50,000 per cart). All CF family members used the firewood they collected from the community forest. As they got these for free, the families saved the money and no need to spend on buying firewood.

The study reveals that people worried about deforestation, especially a loss of high commercial trees such as Dalbergia cochinchinensis (rosewood), which was the main target for illegal loggers. Because of higher demands for timber and charcoal, the forests in the area were degraded, which led to less income for those who depended on NTFP collection. Another concern was that there may be no longer high commercial trees and even a lack of wood stocks reserved for the next generations for their construction needs. The community forests established for the local communities are not enough for the traditional use of the communities and income sources, and are at risk of over-exploitation. The ELC not seem to have any positive benefits for villages in the commune. The deforestation had serious impact on the villagers' livelihoods through a decrease in water supply as a result of low crop productivity. With less income, life is more difficult for a number of families. Those who depend on the forests have to find other jobs within or outside the commune.

The Way Forward

An important lesson is that continuous technical support from local Forestry Administration officers are of importance for encouraging CFs to keep moving towards sustainability of community forest management, and in particular, forest management plan is absolutely necessary to be well prepared and implemented dealing with some challenges. Therefore, the establishment of CFs in commune would be the best solution for long-term support their traditional uses and income sources more substantially as they used to be. Livelihoods can be improved through providing opportunities to local people to shift to craft production using NTFPs and establishment the household private forest plantation. Other options to improve the contribution of forests to people's livelihoods are identifying market for NTFPs, providing training courses on making handicrafts from NTFPs to add value to the raw products, establishment bamboo or rattan handicrafts enterprises to reduce the cutting of trees for selling, increasing tree plantations in the area and combating illegal logging.

One of the most potential strategies for the future is that it needs to build capacity of local villagers regarding community forest management to empower them with protecting and ensuring sustainability of the existing forest resources. Livelihoods may be improved through providing vocational training to local people such as manufacturing NTFPs as handicrafts so as to add value to forest products they collected. Other alternatives to improving the contribution of forests to people's livelihoods would be identifying markets for NTFPs,

establishing bamboo or rattan handcraft enterprises to reduce the cutting of trees for selling, planting trees in the area, and strengthening law enforcement.

Recommendations proposed by CF members to improve their organization and livelihoods include the following:

- Provision of trainings on manufacturing skill and marketing would improve their small enterprises through the integrated commune investment plan or CF development plan, since CF members lack technical skills for manufacturing NTFPs as handcrafts and furniture.
- Provision of trainings on sustainable forest uses and management at the CF and commune level would improve their skills to collect forest resources properly in the sustainable ways so that it can help to minimize negative environmental impact.
- Investment projects are needed to integrate livelihood improvement into the forest-based livelihood development plan at commune level and CF. Funding from other sources such as government and development partners should be allocated mainly to establish and develop economic activities such as micro-credit, rice and animal banks, and other farming and marketing activities including integrated farming system, animal raising and production. These would, of course, enhance local livelihood in the long run.
- Alleviating poverty depends not only on the forest but also on other sectors such as education, business, agriculture, health, and social networks. Thus, commune investment and development plans should not be overlooked, and they should be integrated, assessed, and monitored well, and supported with sufficient funds and strong partnerships.

Conclusions

Results from the assessment indicate that forest can make a significant contribution to the welfare and livelihoods of local households in Cambodia. Poverty reduction and gender equity also need to be understood and resolved at the political level and integrated in Sustainable Forest Management. To ensure sustainable use of forest resources, establishing community forest should be explored with active participation from the communities in the commune for them to gain control over the forest resources and land tenure. The socio-economic and governance context of community forest resource use is as important to the contribution of forests to local poverty reduction as the nature of the local forest resource.

Forest plays a crucial role in poverty alleviation in Cambodia. Major population in rural areas depend more considerably on forest products for their substances at which approximately 80% of the population depends on forest-related livelihood activities (NIS, 2009). Those forest commodities and NTFPs function as the income sources, the subsidiary supplies for local communities in all seasons, and safety net for emergent needs, including jobs, products, and its ecosystem services.

There is a need to optimize the contribution of forests and the forestry sector to poverty alleviation and to the economy through enhanced forest management and technology. The majority of the population depends on access to forest products, especially for food, fuel wood, small-scale timber and pole harvesting, resin tapping, fodder, and traditional medicines. Thus, local peoples' rights of access to forest resource utilization are fundamental. The contribution of forests to the national economy is not fully realized and the GDP share of the forestry sector continues to decline. The challenge was that it was hard to gain revenues from forest and non-forest products and to fully raise the public awareness of the values of biodiversity conservation and environmental services. With legislative framework and technical assistance from local Forestry Administration and other relevant authorities, community forestry have been moving towards their long-term sustainability through well-prepared community forest management plan and improved public awareness among communities.

Since the forest is crucial for the livelihoods of the people, the RGC should enhance forest management efficiency of the forests and ensure their appropriate protection and development, including reviewing ELC allocation, allocating community forests, ecotourism for employment generation and additional income for the people. Moreover, attention should be given to the management of the protected areas. Based on data review and case studies from three field sites, we recommend the following:

- Forest resource management approaches need to prioritize direct access of local communities to benefit from forest resources, especially in high-value forest management areas and including protected areas.
- Commercial forest management options should be considered and optimized to ensure the forestry sector's contributions to poverty alleviation and socio-economic development.
- Improving the lives and livelihoods of the rural poor should be a top government priority, including equitable access to common property resources as a critical source of income security.
- The RGC should develop and deliver support services to rural communities, including community forestry and agro-forestry and support for the development of NWFPs for rural livelihoods and food security.
- Communities themselves must be closely involved in the development of systems and processes under which their forest will be managed and this requires the development of partnerships with other stakeholders.

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An Overview of How Forest Management is Accommodating Livelihood Concerns at the Economy Level, Fiji

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Abstract: There is a growing pressure on forest resources because of the increased demand for timber and other forest products and the ongoing conversion of forest land for other uses. With Government support for forest industry development, timber has become an important export commodity. On the other hand, resource owners' aspirations for increased benefits from the use of their land needs to be taken into account as well as the potential of forestry activities for improved livelihoods predominantly in the rural areas. Faced with these challenges today, the management of Fiji's forest resources as part of national heritage in an integrated and sustainable manner to optimize environmental, economic, social and cultural values has become an urgent necessity.

There is evidence of increased deforestation, logging, intensive sloping land cultivation and livestock farming. The consequences of these unsustainable practices will be addressed through government's endorsement of several policies and consequently legislation changes as well. Since the government does not have the capability to fund all related activities it has also sought donors for technical and financial assistance for the formulation and implementations of plans and strategies in these areas.

In 2003, the Forestry Department stated the need to "redefine forest policy to reflect the adoption of appropriate sustainable forest management system to ensure the full and successful implementation of current strategic directions and landowner aspiration on the management of their resources"

Introduction

By the end of 2016, Fiji has a population of 898,760 people, which represents an increase of 6,611 people compared to 2015.It now ranks number 159 among196 countries which published its information in countryeconomy.com website

The male population is greater, with 456,760 men, representing 50.82% of the total, compared to 442,000 or 50.82% women. Fiji shows a moderate population density, with 49 people per square km and it was in position 68th in our ranking of density population in 2016.

Land is an important factor in the development of the economy. Previous studies have emphasized the critical role of land tenure system, land use and its management in the development of Fiji's economy. The increasing population over the past 40 years has

increased demand for agricultural land and consequently has put a significant amount of pressure on arable land. This has resulted in land degradation, reduced productivity, lower yields, reduced food security and an increase in poverty. Much of Fiji's arable land has been taken up for housing, industrial and commercial developments. With competing demands for limited land resources, the government has now endorsed the Rural Land Use policy to provide framework for the land development in the country.

The Fiji land classification system comprises eight classes ranked in order of increasing degree of limitation in relation to agricultural use, and decreasing order of agricultural versatility. Class 1 is considered the best land for agriculture because of little or no limitation whereas Class 8 is not considered for agricultural use because of severe limitations the land have.

Arable cropping on Class I land

Pineapple farms on Class IIe land in Ba

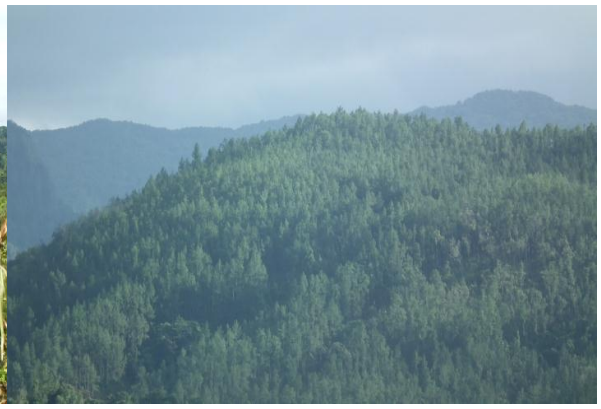
Cane farming on Class IIIw land

Cultivated class IV land (IVe) in, Sakoca, Savutalele

Grazing on class Ve land

Pine plantations on LUC class VIs land (degraded talasiga land)

LUC class VII on steep slopes



Extremely steep with class VIII land

Through the Fiji Forest Policy, the Government of Fiji recognized the multiplier effect of developing the sector, and the forest policy and strategies are driven towards the sustainable management of the forest resources for the benefit of the rural community, in particular the land and resource owner. The need to create awareness about the management of forest resources in a realistic and sustainable manner was highlighted by Qalo (1996). He emphasised the need to disseminate "the relevant knowledge and making ethnic Fijians understand that any desire for development must be realistic, affordable, qualitative and achievable"

Qalo (1996) undertook a socioeconomic analysis of the people of the Drawa Project, sponsored by the SPC/GTZ Pacific–German Regional Forestry Project and noted that the people are "very aware and concerned about their natural resource" (Qalo 1996, p. 17), and that forest resources are seen as the main cash earners and provider of road access through the construction of logging roads. There are also high expectations of job creation, electricity, piped water, housing and transportation. The study further indicates that people support the concept of sustainable management of forest resources in perpetuity, for the purpose of gaining regular cash benefits as well as for environmental reasons.

Fiji effort to address state of poverty and livelihood has been organised through community levels where resources owners and users are organized and empowered to plan and manage their resources, in order to provide the bottom up input necessary in the interactive resources

management. A mechanism to facilitate this is through the group based concept where the resources owners and users are organized into local resources management groups, widely known internationally as the Landcare Groups. The Landcare Concept is based on participatory community development approach. Experience has shown that technology alone has not improved the management of natural resources. The emphasis has therefore been placed on institutional strengthening, local decision making and building the self-reliance of the local communities.

Fiji is fortunate that it has a social structure which embraces and enhances the formation of such a movement at settlement, village, district and provincial basis. But for the resources users such as the lease holders, they need a lot of awareness and education to strengthen their participation and supportive role. The need to integrate and work together as a team for the benefit of the country is quite imminent.

After the completion of two very successful workshops by the Ministry of Agriculture on "Landcare in Fiji" themed, "Strengthened partnerships for the sustainable management of land resources," a National Landcare Working Committee was formed. This committee has the important mandate to facilitate consultations for the development of a framework that promotes sustainable land management through the coordination and collaboration of all involved agencies with the participation of the local communities. The committee has met several times with representative from, Native Land Trust Board, Dept. of Environment, Forestry Dept., Ministry for Agriculture, Sugar and Land Resettlement (MASLR), Ministry of Provincial Development (NDM0), University of the South Pacific, EU/SPC/DSAP and the SPC/GTZ PGRFP, Ministry of Works, Ministry of Finance, Ministry of Education and Representative of the NGO Landcare Steering Committee. A NGO Landcare Steering Committee was also formed with members consisting of the various NGO's such as the World Wide Fund, PCDF, Conservation International, FPSI, Live and Learn and other environmentally based NGO's.

Key elements relating to the case study / overview paper

The alleviation of poverty is high on the Government's agenda, and strategies are in place to effectively address the issue. One of the key areas of the Government focus is to ensure effective and meaningful participation of forest resource owners in the social and economic development of their forest resource. Under the Government's affirmative action programme, various forms of assistance are channeled through several Government agencies and financial institutions, to ensure economic participation of forest owners in this regard. For instance, the development of community-based forest management projects; non-timber forest products, cottage industry; sustainable forest management techniques in which community participation is vital, as well as ecotourism opportunities. Other areas of Government assistance include family assistance schemes; poverty alleviation programmes to fund business enterprises; and education assistance to rural schools.

Policies, plans, programmes and some of the projects that deal with improving livelihoods in the forest sector are as follows:

1) Under new initiative funded by the European Union and implemented by the Secretariat of the Pacific Community (SPC), the reforest project is expected to have an extra 7.5 million trees spanning six thousand hectares of forestry plantations and woodlots in a major boost for livelihoods in the main islands of Fiji. The Euro 9 million (F$20 million) project will provide important long-term environmental and economic benefits for Fiji. Reforest Fiji will involve communities in areas highly susceptible to soil erosion in developing world-class sustainable forests to reforest degraded and other under-utilised land, improve local employment and generate income. The idea is to show that through forestry plantations, the planting of trees will protect soils from erosion and restore their fertility but can also provide long-term revenue to the populations, farmers and communities living on those lands. Trees planted under the Reforest Fiji programme, using international best practice, will provide the raw materials required to ensure less reliance on imports and contribute to generating an estimated 400,000 days of employment, and increased jobs for years to come.

2) The National REDD+ Programme will work with local communities to convert degraded grasslands and idle degraded land into productive forests. This will help expand forest carbon sinks and at the same time stabilize and restore the forest ecosystem and its important services, such as the provision of clean water and wild foods. stabilise micro-climate, protection of soils, and protection or enhancement of biological biodiversity. The replanting plan will ensure that traditional and social needs of the local communities will be considered whereby medical plants and trees of traditional significance will be promoted. Agroforestry systems will also be included to strengthen food security.

3) The Drawa Forest Carbon Project uses an approach enabling the local community (who own and controls resource management of the Project Area forests) to continue to have access to their forest, and engage with several non‐timber commercial resource management activities within the Project Area. These activities will include harvesting of non‐wood forest products, harvesting of non‐commercial timber for local housing and for cultural purposes.

4) Sisi Initiative Site Support Group manages natural resources around the periphery of the Natewa Tunuloa Important Bird Area. The organization has established a 600-hectare community protected forest and developed alternative livelihood options for the area’s indigenous landowners. Developed in response to illegal logging, forest fires, overgrazing, agricultural encroachment and invasive species, the organization uses an innovative incentive scheme to protect the globally important bird and wildlife species in Natewa Tunuloa. Communities signed a Memorandum of Understanding in which they agreed to protect the community forest and refuse logging concessions. In return, the initiative provides alternative livelihood training and projects in beekeeping, poultry, handicraft and jewelry-making, bakery and pastry-making, and sustainable agricultural. The group’s model farm and tree nursery also help to reduce deforestation.

The initiative has been used as a learning model for community-based conservation and forest management across Fiji.

5) The Nakavaudra Forest Carbon project was initiated in 2008 by FIJI Water LLC and Conservation International (CI). One of the project's main objective is to establish a first of its kind community restoration project that would enable local community landowners the opportunity to participate in the emerging carbon market, and alternative livelihoods through jobs from restoration activities (in the short term) and sustainable harvesting of timber (in the long term). The project is also working towards integrating other income generation activities such as agroforestry, ecotourism and beekeeping as additional incentives for the communities to participate in this initiative.

6) The Project Team consists of forestry and carbon experts from CI, community members and government agencies. CI's office in Fiji oversees the technical, financial and administrative activities for the project. CI Fiji and its partners have facilitated development of the planting model, assisted in the baseline assessment and monitoring of carbon and are readying documentation for third party verification of the project's multiple benefit design standards and carbon benefits. An initial 500 community members have been engaged in the project to complete restoration of the degraded grasslands and abandoned sugar cane farms. The local communities carry out the planting and manage the mixed-use forest.

The Social Justice Bill was enacted by Parliament in 2001 to safeguard the livelihood of indigenous people. The bill has created the necessary framework for the Government to initiate appropriate affirmative action programmes, which, among others, assist in the effective involvement of resource owners in the commercial harvesting of their own forests. Programmes implemented by the Ministry of Forests include a low interest financing facility to support Fijians to establish their forest-based enterprises, including logging, sawmilling and secondary processing. Effective participation of resource owners will be an important determining factor in the country's move towards implementing Sustainable Forest Management. Active Government support, in addition to this financing facility, needs to be provided to resource owners to ensure their success. Proper targeting of this affirmative action programme is required to ensure that support and assistance is provided to the people who need it most.

Organizations responsible for Forest management in Fiji include the following:

	Government agency	Non Government Organisation
1	Ministry of Agriculture	Nature Fiji/Mareqeti Viti
2	Ministry of Forests	Partners in Community Development, Fiji
3	Ministry of Environment	Live and Learn
4	National Trust of Fiji	Community & vanua groups
5	Provincial offices	Conservation International

Mechanisms to encourage increased participation of stakeholders especially landowners is to:

1) Encourage total participation of resource owners and resource users in all aspects of the forestry sector.

2) Improve knowledge and raise awareness of resource owners and resource users on forest ecosystem values and sustainable forest management.

3) Raise awareness of resource owners and resource users to optimize tangible and intangible benefits from sustainable forest management.

4) Train resource owners in technical and planning aspects of sustainable forest management.

5) Resource owners ensure sustainable management of their forest resources.

Lessons Learnt

Efforts to strengthen the livelihood contribution of forests include the following:

- The Ministry of Forests will support community-based management of natural forests and foster the active cooperation and support of forest management licensees in such management activity, based on equitable and fair benefit-sharing arrangements.
- The Ministry of Forests will encourage the development of community forestry plantation projects with adequate attention to ecological, economic and marketing aspects.
- The Ministry of Forests will provide extension and technical support to resource owners and communities for planning, implementation and monitoring of sustainable forest management.
- Community-based forest industries for value added production will be promoted.
- The Ministry of Forests will provide appropriate advice, assistance and technologies to communities in order to improve and sustain their livelihoods, and to strengthen and promote their socioeconomic, environmental and cultural values.
- The Ministry of Forests will conduct awareness and education campaigns for landowners/resource owners to emphasize the importance of agroforestry for the improved socioeconomic wellbeing of the communities.

Major causes of poor performance.

There are several examples of community based resource management projects that have failed to achieve their original objectives. Some livelihood programmes provide too little support to communities, and yet expecting too much from them. In some cases, the local communities had the project presented to them, and they were not involved in its design, had no ownership of its outcomes, and did not receive tangible (or short term) benefits. Often, development projects provide technology and funding without a thorough analysis of the range and distribution of local skills required to sustain the project. In Fiji, skills that often need building include those related to financial management, market analyses, infrastructure maintenance, and social and ecological monitoring.

Community Based Resource Management benefits may not be realised if the benefits that flow from livelihood or conservation activities are not equitably shared in accordance with the efforts invested. When benefits are not equitably shared, the 'free rider' problem arises, where those doing little work receive the same benefits as those doing the most work. Because of this, communities may need external assistance to develop guiding principles and processes to deal with unfamiliar income generating activities and changed socioeconomic conditions.

Factors that have contributed to success.

Over the past five years there have been impressive successes in Fiji using participatory techniques and involving local communities in improving environmental management and environmental sustainability. Major factors in their success have been wide community involvement in pre-planning, design, implementation and monitoring. Partnerships in environmental management projects facilitate institutional strengthening by enabling dialogue, information exchange; technical assistance and reducing duplication and competition for scarce resources. The importance of partnerships between national and local government, civil society, NGOs and communities needs to be acknowledged by donors and included within the planning process as it can bring together all government sectors including health, education, public works, agriculture, fisheries, and forestry.

The Way Forward

What will the priority given to poverty alleviation or livelihood improvement?

Reducing poverty has been a core policy objective of past governments and has been regularly articulated in Development Plans and Strategies and annual budget address. Poverty reduction is a core objective of all development partners and Millennium Development Goals.

Under Pillar 8 of the Peoples Charter for Change, Peace and Progress on Reducing Poverty to a Negligible Level, the following key measures and actions have been taken with due priority and urgency:

- Launching of a concerted and coordinated National Programme to Reduce Poverty with a target to reduce poverty in line with the Millennium Development Goal
- Strengthen coordination, implementation and monitoring of poverty alleviation programmes including partnership agreement between government, the civil society, and the private sector
- Introduce a minimum wage and at the same time enhance national productivity
- Encourage and protect the savings and investment of the poor
- Ensure affirmative action programmes are needs based
- Enhance research and analysis on issues relating to poverty and social justice programmes
- Align affirmative action programmes to a shared social justice preamble.

A commitment has been made to support all actions to alleviate poverty and strengthen social justice programmes based on need for the disadvantaged in our community, including the enhancement of participation and promotion of the interest of the youth and women.

To enhance the livelihood roles of forests, the government under the Fiji Forest Policy has set the following key directions;

- Forest management should be implemented in a way that local communities are actively involved in its planning, implementation, monitoring and evaluation.
- Through active participation in the administration and implementation of sustainable forest management, the resource owner should receive stable income from forest products and diversified employment opportunities.
- The Government will develop guidelines and a scheme for compensation of landowners dedicating their land for protection and conservation purposes.

The impacts of climate change will continue to further impede Fiji's efforts to achieve sustainable development. Fiji is particularly vulnerable to increased frequency and intensity of natural disasters and to sea level rise, which will have negative impacts on food security (through declines in fresh water availability, crop production and fisheries), coral reef and forest biodiversity and the prevalence of certain infectious diseases (especially those spread through contaminated water, lack of safe drinking water and unsatisfactory sanitation).

Summary

In Pacific Island countries including Fiji, there is limited knowledge and/or acceptance at all levels of society that the environment is an economic issue and that environmental degradation carries economic costs that hamper social and economic development.

Little recognition is given at the policy making level to the link between environmental degradation and loss of natural resources to increasing poverty, most particularly among rural communities. Poverty alleviation programs seldom include adequate consideration of environmental sustainability or population issues.

In pursuit of better services and deliveries, the Government of Fiji continues to push for reforms in public enterprises. Along this line, the commercialization of the two major plantation resources has been implemented with strong Government support to ensure the effective economic participation of land owners is integrated into this process.

Revenue from forestry does not comprise a high percentage of GDP, but is expected to remain a significant driver of growth in the future. The importance of forests lies in the rural sector, by providing employment opportunities and supporting living standards. Despite urban drift and the decline in the rural population over the past decade, some 54% of Fiji's populations still live in rural areas. Additionally, the value of the environmental services of forests, that is, the important functions forests perform in respect of biodiversity, soil and water conservation and for future development of (eco-) tourism cannot be overrated. Government policies to foster an increased but sustainable forestry production, along with other primary industries,

are being taken to alleviate poverty of forest dependent communities. Given that close to 90% of the lands are communally and privately owned, the effective participation of landowners in the development of their own forests will also be a vital step towards the sustainable management of Fiji's forests.

Dynamics of Social Forestry in Indonesia

Gamin

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Abstract: Indonesia is an agricultural country with 44% of the total workforce or approximately 46.7 million in 2009. In 2014, agricultural land is around 41.5 million hectares while 63% of the area is forest. The average land area of farmers in 2017 is 0.36 hectares. This prompted the high poverty of Indonesia with the poor as much as 27.77 million people or 10.64% of the total population. Human Development Index at the level of 0.685 (middle category). Efforts to improve community welfare are done through community involvement in forest management. Social forestry practices have been started since 1982 with various scheme changes. Social forestry programs based on existing policies from 2007 to 2016 are Community Based Forest Management, Village Forest, Community Forest, Community Plantation Forest, and Partnership, and Indigenous Forest. Social forestry is perceived to increase both perceived and potential income in the field. In forest sustainability, social forestry can increase the variety of crops and increase land cover. Social forestry can also reduce tenurial conflicts through employment, safety, and peace of mind in forest areas. Assistance to social forest actors and ensuring that no transfer of management rights is an important lesson of the study.

Keywords: land access, social forestry, community welfare, forest sustainability, conflict-tenure.

Introduction

Indonesia's forested land area covers 120, 77 million hectares (BPS, 2017) or about 63 per cent of Indonesia's total land area of 192.26 million hectares (Badan Information Geospasial, 2013). As much as 37% of land other than forest area is inhabited by about 254.9 million people (Anton, 2015) so that the land ownership ratio in Indonesia is 0.28 hectares per person. Geographically Indonesia's location is a tropical country with high rainfall and fertile soil. The livelihood of the population is mostly agriculture with 44% of the total Indonesian workforce or about 46.7 million people (BPS, 2009). The human development index of Indonesia is currently at the level of 0.685 which places Indonesia in the category of middle human development, and ranked 113 out of 188 countries and regions (UNDP, 2017) with poor population of 27.77 million people (10.64 percent of total population) (Destrianita, 2017). One of the drivers of this poverty is the low agricultural productivity as a result of the narrowness of agricultural land that only 41.5 million hectares (BPS, 2014) is reduced 100 thousand hectares annually (Astuti, 2016). Currently, the average land area of farmers in

Indonesia is only 0.36 hectares lower than Vietnam and Thailand which has more than one hectare (Abdullah, 2017). The narrowness of agricultural land that contradicts the increasing population causing land to become an increasingly scarce goods and strategic value. Poor ownership of farmland implies low productivity resulting in farmer welfare (Abdullah, 2017). As a result the population pressures on land are increasingly high so that forest tenure conflicts in various places are difficult to avoid until the current government period.

Social forestry practices and research have been widely practiced both outside and inside the country. Social forestry, as the researchers note, has an environmental, economic and social impact. Another note, social forestry is done as one step to resolve forest tenure conflict.

Social forestry practices in Indonesia have been in existence since 1982 with the Mantri-Lurah program, Village Community Forest Empowerment-PMDH, Community Forest Resources Management-PHBM (Perhutani, 2016). During the reformation period 1997/1998 was published Law No.41 / 1999 on Forestry which was then regulated on community forestry in 2001 and community empowerment in the framework of social forestry in 2004. Period 2004-2016 the forestry scheme consists of four types, namely: Community Forest (HKm), Village Forest (HD), Community Plantation Forest (HTR), and Kemitraan. In 2016 social forestry is manifested in Community Forestry (HKm), Village Hutan (HD), Community Plantation (HTR), Kemitraan and Customary Forest (HA).

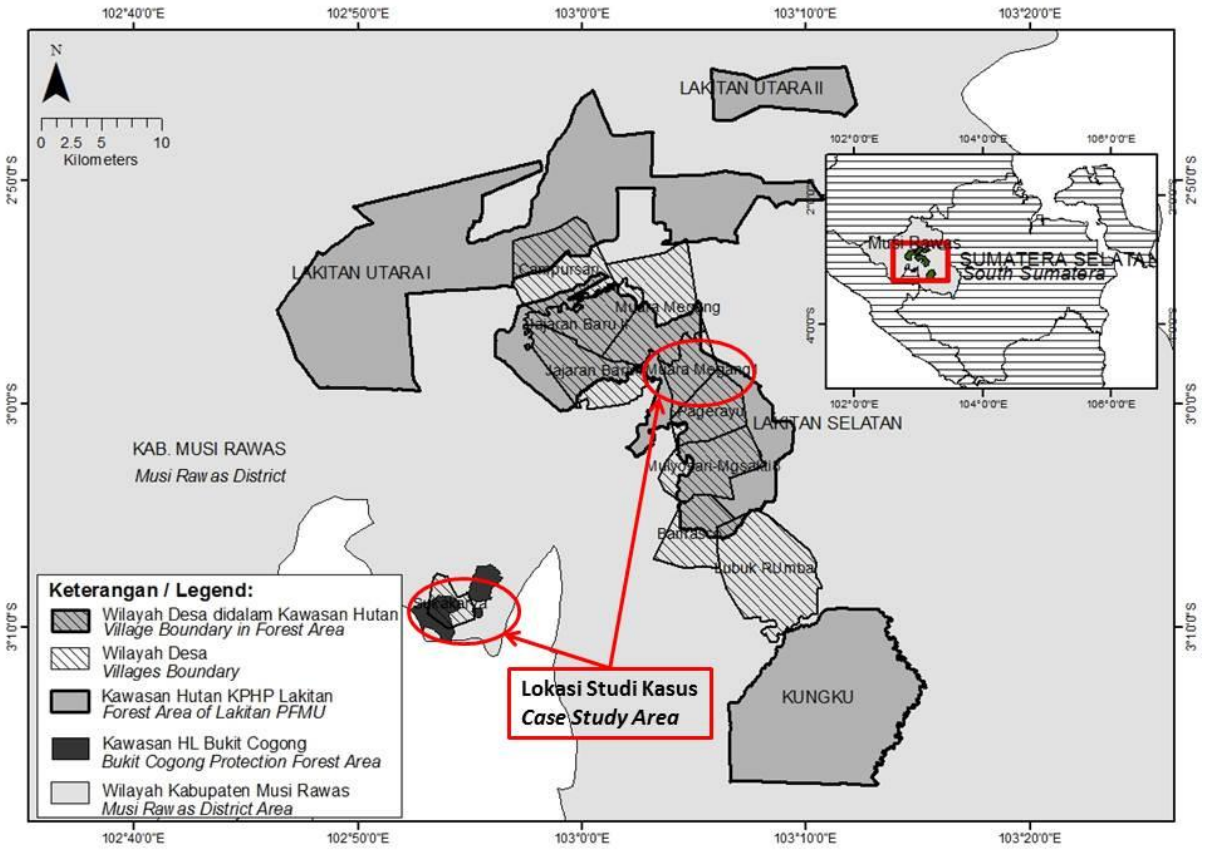
Conceptually, the results of social forestry have a positive effect on the environment (Thompson, 1999), (Singh K., 2000), on the welfare economy (Djamhuri, 2008), (Nasir, Saleh, & Bahruni, 1997). The results of social forestry on ecology, economy and social are also reported by (Singh, Mahankuda, Dolai, Behera, & Choudhury, 2016). Social forestry is also noted by researchers as an attempt to resolve conflicts (Kant & Cooke, 1999), (Hayami & Otsuka, 1993), (Hu, 1997) (Handoyo, Suka, & Ginoga, 2011), (Kartodihardjo, 2011) (Gamin., Nugroho, Kartodihardjo, Kolopaking, & Boer, 2014) and (Khan, 1998).

From the facts described above it can be said that social forestry is done in order to give people access to forest areas that are believed to provide economic, ecological, and social benefits, as well as efforts to reduce / resolve forest terurial conflicts. The current Indonesian government, the period 2014-2019, targets social forest allocation covering 12.7 million hectares of forest area (PSKL, 2017). The development of access to 12.7 million hectares of forest to be managed by communities through social forestry to date is something that needs to be guarded and scrutinized. This is considering the distribution of 12.7 million hectares is targeted to be completed in 2019. While the target of the previous five period only 2.5 million hectares. This paper describes the dynamics of the development of social forestry in Indonesia as well as its impact on the welfare and reduction of forest tenure conflicts.

Research Methods

This research was conducted by using qualitative descriptive method (Sugiyono, 2010), (Irawan, 2006). The approach used is case study (Yin, 1996) and literature study. Research data on the development of social forestry from policy to program and the results obtained from the head office of the Ministry of Environment and Forestry in Jakarta as well as

information from the official website. The official website of Perum Perhutani is also a source of information on the results of this study. While data on the impact of social forestry on the welfare and conflict resolution of tenure of forest area will be obtained from Community Forest in Sukakarya Village and Village Forest in Muara Megang I Village, and KPH Lakitan in Musi Rawas Regency South Sumatera as a case (Figure 1). The location of the case was deliberately chosen, given that: 1) the location has selected a social forestry scheme of HKm and HD in 2014 as an attempt to resolve the conflict and has held a business license by 2015 (Gamin, Nugroho, Kartodihardjo, Kolopaking, & Boer, 2014), 2) communication with the management of both groups and head of the Forest Management Unit of Lakitan associated with both groups is still quite well established. Other relevant information is also obtained from the Campursari Village Forest Manager located not far from the village of Muara Megang I and KPH Dampelas Tinombo Central Sulawesi. Additional field observation data were also obtained from the Teluk Jambe area of Karawang regency of West Java working area of Perum Perhutani.



Source: (Gamin., Nugroho, Kartodihardjo, Kolopaking, & Boer, 2014); (Pemprov Sumsel, 2015).

Figure 1. Case Study Site

Data collection techniques are document studies, interviews, and observation / field observations. Determination of informen is done by Snowball Sampling technique that follows previous informant to determine next informant (Sugiyono 2010) and key informant determined purposively based on criteria of data acquisition.

Written policy data is traced from libraries and the Ministry of Environment and Forestry website. Data The social forestry programs and the results are obtained from the office of the Director of Preparation of the Social Forestry Area. Data on improving the welfare, impacts on land conflicts were obtained from the HD Village Management of Muara Megang1 Sumatera Selatan Village, HKm Wana Manunggal Board in Sukakarya-South Sumatera, and Head of Forest Management Unit Unit 13 Bukit Cogong, South Sumatra as the initial information. Other informants are the village administrators of Muara Megang I, and the HD Campursari board. The analysis of this research as a whole is qualitative (Irawan 2006), (Asropi, 2016).

Social Forestry Strategy for Poverty Reduction and Improvement of Welfare

1. Government Policy Related to Social Forestry

Indonesia's current government, the period 2014-2019, led by Jokowi-JK launched 9 (nine) "Nawa Cita" to realize "sovereign, self-governing Indonesia and personality based on mutual cooperation". Five of the nine "Nawa Cita" are related to the environment and forestry (Nurbaya, 2015). Two of the five "Nawa Cita" related to the environment and forestry are directly related to the welfare of the community, namely: 1) building Indonesia from the periphery, and 2) improving the quality of human life of Indonesia. Building villages from the periphery is carried out by doing rural development that needs to be realized through: a) guaranteeing village rights to manage local scale to support the eradication of 5000 disadvantaged villages and 2000 independent villages; and b) granting access to 12.7 million hectares of community managed forests in HKm , HD, HTR, partnership, and HA. In terms of improving the quality of human life, Indonesia wants to realize the "Improvement of Marginal People's Welfare through the Implementation of Working Indonesia" which can be done through the "Identification of Forest Areas" to conduct "Redistribution of land and legalization of assets". The Government of Indonesia has targeted social forest allocation covering 12.7 million hectares of forest area (PSKL, 2017). The development of access to 12.7 million hectares of forest to be managed by communities through social forestry to date is something that needs to be guarded and scrutinized. This is considering the distribution of 12.7 million hectares is targeted to be completed in 2019. While the target of the previous five-year period is only 2.5 million hectares.

Policies related to social forestry are traced to the regulations issued by Perum Perhutani as managers of production forests and protected forests in Java. Perum Perhutani has been managing the forest area prior to the Ministry of Forestry, now the Ministry of Environment and Forestry. Perhutani has been in operation since 1972 while the Ministry of Forestry began to establish since 1983. The forestry policy products issued by Perhutani are 4 (four) decisions of the Perum Perhutani Board of Directors (Table 2).

The Ministry of Forestry has issued a ministerial decree in 2001 related to community forestry and a ministerial regulation in 2004 regarding community empowerment. However, no record of achievement of the results of the policy has been found (Table 2). The social forestry

policy of the Ministry of Forestry that was recorded was in the period 2007 to 2016. The policy regulates HKm, HD, HTR and Partnership (Table 2). HKm is regulated through Minister of Forestry Regulation number P.37 / Menhut-II / 2007 as amended twice through Minister of Forestry Regulation number P.13 / Menhut-II / 2010 and Forestry Minister Regulation number P.52 / Menhut-II / 2011. In 2008 there was a regulation issued by the minister of forestry regulating the HD number P.49 / Menhut-II / 2008 which was changed twice through P.14 / Menhut-II / 2010, and P.53 / Menhut-II / 2011.

HTR is a plantation forest in production forests built by individuals or cooperatives to increase the potential and quality of production forests by applying silviculture in order to ensure the sustainability of forest resources (Permenhut P.23 / Menhut-II / 2007). This regulation has been amended through Minister of Forestry regulation number P.5 / Menhut-II / 2008. The policy governing the Partnership is the Regulation of the Minister of Forestry (Permenhut) Number P.39 / Menhut-II / 2013 on Local Community Empowerment through Forestry Partnership.

Year 2016 issued Minister of Environment and Forestry Regulation Number P.83 / MENLHK / SETJEN / KUM.1 / 10/2016 on Social Forestry. This ministerial regulation regulates the granting of land access to communities in forest areas in the form of HD, HKm, HTR, Kemitraan, HA (Table 2). Lastly, the minister of environment and forestry issued Permenhut No. 39 / MENLHK / SETJEN / KUM.1 / 6/2017 on Social Forestry in Perum Perhutani Working Area.

2. Social Forestry Programs

Speaking social forestry programs in Indonesia can not be separated from the programs that have been done by Perum Perhutani. Since its establishment in 1972, Perhutani has implemented various programs involving communities in forest management (Perhutani, 2016). The Mantri-Lurah program is the first program of Perhutani to empower the community. 1982 Bio-Physical Infrastructure Development Program in Village Development. In 1984 Perhutani rolled out the Social Forestry program through the formation of Kelompok Tani Hutan (KTH), Agroforesty and Productive Enterprises. In 1994 social forestry was enhanced through Integrated Village Village Community Development (PMDHT). Four years later, 1988, known the Village Village Community Empowerment (PMDH) program. In 2001 PMDH was put into a system of Community Forest Resources Management (PHBM) with a shared, empowered, shared and transparent principle. In the CBFM system, forests are divided into village bases. In each village a Village Community Forest Society (LMDH) is established and has a constitution (AD) and a household budget (ART). LMDH is an authorized institution as an equal partner working with Perhutani in managing forest resources.

Since the reform era of 1997-1998, the new concept of forestry development in Indonesia is more pro-active and allows people to participate in forest management. One of these policies is social forestry as set forth in the Minister of Forestry Regulation No. P.O.I / Menhut-II / 2004 which also accommodates the Minister of Forestry's decision no. 31 / Kpts-II / 2001 on the Implementation of Community Forestry.

Community empowerment offered by the government in forest management in Indonesia for the period of 2004-2016 consists of several types of programs: HKm, HD, HTR, and Kemitraan (Table 2). Period after 2016 social forestry programs in addition to HKm, HD, HTR, and Partnership are Indigenous Forest.

Table 1. Policy on Social Forestry, Programs, Outcomes, and Obstacles

Year	Type of policy	Number	Subject to Policy Contents	Support-ed Programs	Policy Results						Obstacles
					Community Involvement / Number of Permits	Distributed land area (Hectar es)	Loca-tion	Public welfare		Forest Sustainability	
								Economic	Social / Conflict	Ecology	
2007	Decision of the Director of Perum Perhutani	268/Kpts/ Dir/2007	Guidelines for Community-based Forest Resources Management Plus (PHBM Plus)	PHBM Plus	5,278 villages (97%) of 5,386 villages in Java and Madura Island in the vicinity of forest areas.	2.216.225 hektar[1)]	Banten Province, West Java, East Java1[1)]	Rp.252,34 billion (Profit sharing W / Non W), Rp.7.469.09 billion or an average of Rp 679.01 billion per year (intercropping)[1)]	-Provide workforce 6,304,467 people, value of Rp.705,71 billion, - Encourage the business opportunity of 13,500 business units in various sectors [1)].	The existence of forest is maintained in accordance with the rules of silviculture and conservation and forest is sustainable[1)]	There are trhree: 1) The timber is too long, 2) the right to change hands to the outsiders of the village, 3) ownership of more than one right.
2007	Decision of the Director of Perum Perhutani	400/Kpts/ Dir/2007	General Guidelines for Perum Perhutani Business Development	PHBM Plus							
2009	Decision of the Director of Perum Perhutani	682/Kpts/ Dir/2009	About the Guidelines for Community Forest Resources Management	PHBM Plus							
2011	Decision of the Director of Perum Perhutani	436/Kpts/ Dir/2011	About the Forest Timber Product Share Guidelines	PHBM Plus							
2001	Decree of the Minister of Forestry	31/Kpts-II/2001	Implementation of Community Forestry	Communit y Forest	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet
2004	Regulation of the Minister of Forestry	Nomor P.O.I/Men hut-II/2004 tanggal 12 Juli 2004	Empowerment of Local Communities in the Framework of Social Forestry	*Social Forestry*	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet
2007	Regulation of the Minister of Forestry	P.37/Menh ut-II/2007	Community Forestry	HKm	498 HKm Business Management License[3)]	175.250,30 ha[3)]	20 provinces [3)]	Rising from NTFPs and nature tourism [4)]	- People are more calm trying legally - The forest is recognized by the community [4)]	Increase variation of plant species and land cover [4)]	There are 3 things[4)]: 1) There are other parties want to take care of, 2) The tourism office makes rules that have not been agreed, 3) The tourist attraction is less well maintained
2010	Regulation of the Minister of Forestry	P.13/Menh ut-II/2010	Community Forestry	HKm							
2011	Regulation of the Minister of Forestry	P.52/Menh ut-II/2011	Community Forestry	HKm							
2008	Regulation of the Minister of Forestry	P.49/Menh ut-II/2008 perihal	Village Forest	HD	93 Village Forest Management Right[3)]	184.270,83 ha[3)]	12 provinces [3)]	Not yet felt the result [4)]	-More calm society trying legally - The forest is recognized by the community [4)]	Increase variation of plant species and land cover [4)]	There are 4 things[4)]: 1) HD boundary in the field does not exist yet, 2) HD boundary outside the village area, 3) Village limit has not
2010	Regulation of the Minister of	P.14/Menh ut-II/2010	Village Forest	HD							

Year	Type of policy	Number	Subject to Policy Contents	Support-ed Programs	Policy Results						Obstacles
					Community Involvement / Number of Permits	Distributed land area (Hectar es)	Loca-tion	Public welfare		Forest Sustainability	
								Economic	Social / Conflict	Ecology	
	Forestry										been agreed on by neighboring village, 4) No budget for HD boundary
2011	Regulation of the Minister of Forestry	P.53/Menhut-II/2011	Village Forest	HD							
2007	Regulation of the Minister of Forestry	P.23/Menhut-II/2007	Procedures for Application of Business License for Utilization of Timber Forest Products in People's Plantation Forest in Plantation Forest	HTR	2.781 HTR License[3)]	203.738,34 ha[3)]	28 provinces[3)]	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet
2008	Regulation of the Minister of Forestry	P.5/Menhut-II/2008	Procedures for Application of Business License for Utilization of Timber Forest Products in People's Plantation Forest in Plantation Forest	HTR							
2013	Regulation of the Minister of Forestry	P.39/Menhut-II/2013	Empowering Local Community Trough Forestry Partnership	Kemitraan	29 MoU[3)]	44.010,16[3)]	5 provinsi[3)]	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet	There is no fund in KPH to buy rubber sap from partnership[5)]
2016	Regulation of the Minister of Environment and Forestry	P.83/MENLHK/SETJEN/KUM.1/10/2016	Social Forestry	HD, HKm, HTR, Kemitraan, HA	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet
2017	Regulation of the Minister of Environment and Forestry	P.39/MEN.HK/SETJEN/KUM.1/6/2017	Social Forestry in Working Area of Perum Perhutani	HD, HKm, HTR, Kemitraan, HA	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet	No data has been obtained yet

Source :[1)] (Perhutani, 2016), [2)] Field observation in Jambe Bay Karawang West Java, July 2017, [3)] (KemenLHK, 2016), [4)] Observation in the Case Study Site, [5)] Interview with Section Head of Protection, Security and Community Empowerment KPH Dampelas Tinombo, August 2017.

3. Target and Achievement of Social Forestry until 2016

From 2001 to 2012, Perhutani claims to have opened community access to 2,216,225 hectares of land through PHBM from its working area of 2.5 million hectares (Perhutani, 2016). This management cooperation involves 5,278 villages (97%) of 5,386 villages in Java and Madura Island in the vicinity of forest areas (Table 2).

The Ministry of Forestry has issued a ministerial decree in 2001 related to community forestry and a ministerial regulation in 2004 regarding community empowerment. However, no record of achievement of the results of the policy has been found (Table 2).

The target of social forestry programs proclaimed in the national medium-term development plan-RPJMN 2010-2014 covering 2.5 million hectares (Purwanto, 2017). The achievements of social forestry programs in the period of 2007 to 2016 in the form of HKm, HD, HTR and Partnership reached an area of 607,269.63 hectares (Table 3).

Table 2. Recapitulation of Social Forestry Permit 2007 to November 2016

No	License	Area (Hectare)
1	Village Forest Management Right	471,451.00
2	Community Forestry License	432,613.36
3	Community Forest Plantation License	768,859.73
4	MoU Forestry Partnership	44,010.16
	Total	607,269.63

Sumber : (KemenLHK, 2016)

4. Social Forestry Target and Achievement after 2016 to Now

The target of social forestry in HKm, HD, HTR, Kemitraan and HA formulated in the RPJMN 2015-2019 is 12.7 million hectares of land access for the community. There is currently an Indicative Map of Social Forestry Area (PIAPS) covering an area of 12,739,224 hectares on October 22, 2015 (Purwanto, 2017). This area is the accumulation of production forest (HP) which is not burdened with permits covering 4,545,797 ha, customary forest proposals resulting from registration of Indigenous Peoples Registration Agency-BRWA and Indigenous Peoples Alliance of Nusantara-AMAN covering 3,921,841 ha, the result of participatory mapping Network Mapping Participatory (JKPP) of 595,659 ha, KpSHK identification and data collection of 1,607,877 ha, non-agricultural land (TORA) in South Kalimantan (Kalimantan), Nusa Tenggara Barat (NTB), Lampung and Bali area of 197,310 ha, and the processed area and the proposed River Basin Management Agency (BPDAS) covering an area of 1,870,740 ha). This PIAPS is initiated by the Directorate of Social Forestry and Environmental Partnership (PSKL). DG of CSR supported by data by BRWA / AMAN and Consortium for Supporting Community Forest System (KpSHK).

The PIAPS map is accessible on the Ministry of Environment and Forestry's website, http://webgis.dephut.go.id:8080/kemenhut/index.php/en/peta/petapiaps. One example is a snapshot of the PIAPS map sheet 192 which also contains a map of the study location as in Figure 3.

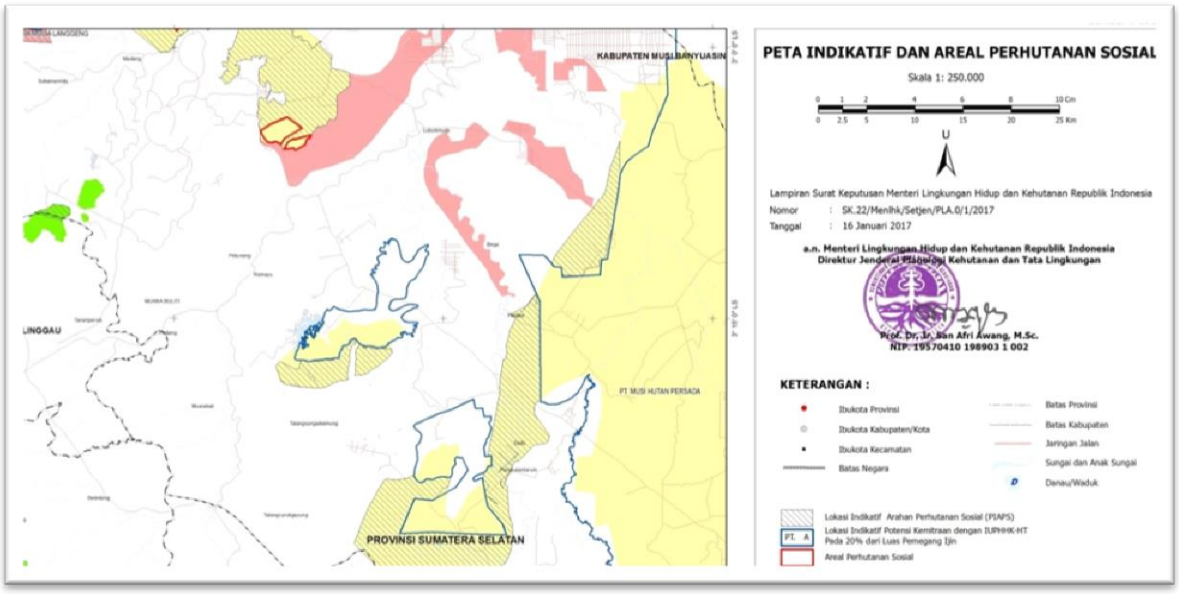


Figure 2. PIAPS Map Trailer and Case Study Site

Lessons Learnt

1. The Role of Social Forestry in Improving the People's Welfare

The role of social forestry in improving the welfare can be approached with the perceived benefits of society in improving the economy and ecology that is in towards the realization of prosperous society and sustainable forests. Economically social forestry through PHMB in Perhutani is claimed to be able to absorb the workforce as much as 6.304.467 people with a value of Rp.705, 71 billion. The share of timber and non-timber production amounted to Rp.252.34 billion for the period of 2002 to 2012. Revenue from food crops grown in intercropping activities reached Rp.7,469.09 billion or an average of Rp 679.01 billion per year (Perhutani, 2016). Besides welfare, PHBM benefits perceived by the community is the existence of the protected forest in accordance with the rules of silviculture and conservation and forest remain sustainable (Perhutani, 2016).

In the location of social forestry benefit studies, which have been running since 2015, not all can be perceived direct economic value. In HKm Wana Manunggal, income from NTFPs and revenues from nature tourism has been felt by the community. While HD in the village of Muara Megang-1 is currently not felt the economic benefits of crop cultivation. Existing economic values are still potential in the form of crops which in the next few years will yield results (Table 2). In terms of environmental or forest sustainability, the case study note shows that both in HKm and in HD there is an increase in the variation of plant species and land cover (Table 2).

From the records of the results of the Social Forestry both in Perhutani and at the location of the study showed the results of an increase in income both the perceived and still potential. In terms of forest sustainability, the increasing number of plant species and land cover is found both in Perhutani and in HKm and HD programs at the study sites. Thus, signs of increased

welfare and improved forest sustainability have been observed. Therefore, this program is optimistic to be able to realize "Prosperous Society and Sustainable Forest".

2. The Role of Social Forestry in Reducing Tenurial Conflict

From a social point of view, the PHMB in Perhutani is claimed to be able to absorb the workforce of 6,304,467 people with a value of Rp.705.71 billion within the period of 2001 to 2012. PHBM is also said to be able to encourage business opportunities in various sectors, namely industry of 3,655 units business, trading 3,775 business units, agriculture 1,347 business units, livestock 2.737 business units, plantations 95 business units, 482 fishery business units, 1,888 business units, and 76 other business units (Perhutani, 2016). This is deemed to reduce land usability conflicts which are one of the causes of tenure conflicts.

The role of HKm and HD in the study sites of tenurial conflicts previously felt is to provide a sense of security and calmness in activities within the forest area. Land use activities in forest areas are now legal with the existence of a Community Forest Management Permit (IUP HKm) and Village Forest Management Rights (HPHD). In HD at a recorded study site may affect other village dispute styles. The Jajaran Baru-II Village, which borders the village of "Muara Megang-1", is now changing its style of competition from competition, in 2012, into a compromise. This compromise style is demonstrated by his deciding attitude in collaboration with "KPH Unit 13 Lakitan Bukit Cogong" in forest area management. The change in the style of disputes in this conflict comes after seeing villages that already have HPHD obtain many beneficial programs from "KPH Lakitan".

3. Obstacles to the Implementation of Social Forestry in the Field

Some of the things that are noted to be obstacles in the implementation of social forestry both at study sites and other additional locations are: a) wood products are too long, b) rights are changed hands to outsiders, c) ownership of more than one right, d) exist conflicts of management resulting in the neglect of social forestry management, e) borders on the field of governance do not exist, f) HD boundary borders outside the village area, g) village administration boundaries not yet agreed by neighboring villages, h) not budgeted for HD bordering fees, i) there has been no funding in the FMU to buy rubber sap from the partnership, and j) the ban on land clearing by burning.

4. Factors Supporting the Success of Social Forestry

The political will of the government and the participation of various parties, including non-government institutions, are key to the successful implementation of social forestry. The political situation in the run-up to the elections after the 2019 period is also considered to be a factor driving the achievement of social forestry targets as the government for the period 2014-2019 would want to provide good reporting on its partisanship.

The Way Forward

Some of the things that need attention in the next implementation of social forestry are:

1. The need for intensive assistance in the utilization and marketing of non-timber forest products in the short term. This is because the results of the timber long enough to be perceived benefits.
2. The need for periodic evaluations to ensure that management rights do not change hands.
3. Need assistance in the implementation of the organization to avoid conflicts in the field management, especially after the program has been perceived benefits.
4. The village government and the rights holder group or the management permit need to budget and schedule the arrangement of work area boundaries in the field. If there is a boundary problem with the village area, in order to resolve the village boundary first.
5. The need for community awareness of the benefits of clearing land without burning.

Summary

Social forestry policies can be recorded in several phases. The first phase is the policy issued by the Director of Perum Perhutani in the form of Director's Decree from 2007 to 2011. At the ministry of forestry the ministerial decree was issued since 2001 related to community forest then in 2004 related to community empowerment in the framework of social forestry. The period of 2007 to 2014 was issued by regulation of the forestry minister, which was amended several times, regulating HKm, HD, HTR, and Kemitraan respectively separately. In 2016 LHK Ministerial Regulation No. 83 of 2016 regulates HD, HKm, HTR, Partnership, and Customary Forest under one rule.

The social forestry program since Perhutani was established, evolved from the Mantri-Lurah program in 1972, Social Forestry in 1984, Integrated Village Community Development (PMDHT) in 1994, PMDH in 1988, PHBM in 2001 and PHBM Plus from 2001 to 2016 The social forestry program at the Ministry of Forestry began with the name of Community Forest in 2001. HD, HKm, and HTR programs were born in 2007, while the Partnership was born in 2013. The last social forestry program that emerged in addition to HD, HKm, HTR and Partnership , based on P.83 of 2016, is an Indigenous Forest.

Social forestry conducted by Perhutani, from 2001 to 2012 through PHBM, has opened community access to 2,216,225 hectares of land. Social forestry at the LHK ministry targeted at 2.5 million ha in 2010-2014 reached 607,269.63 hectares by the end of 2016 through HD, HKm, HTR and Kemitraan programs. The target of social forestry in 2015 to 2019 is 12.7 million hectares which is still in the process of achieving it from PIAPS prepared by Directorate General of PSKL.

The role of perceived social forestry can increase both perceived and potential income in the field. In terms of sustainability of social forestry forest can increase the variation of plant species and increase land cover. Social forestry is declared to reduce tenurial conflicts through employment, safeguarding and providing peace of mind in forested areas because it has management legality.

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Social Forestry in Indonesian Protected Areas

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Abstract: In order to reduce environmental degradation and deforestation, especially in protected forests, various efforts have been made by the government, one of which is by providing access to forest communities to participate in managing forests through community forestry programs. From the various studies and evaluations that have been conducted, it shows that this program is a tenure conflict solution, an effort to improve smallholders' living standards through the utilization of non-timber forest products and the potential for ecotourism development. For community forestry programs to success, there are several things to consider. First, a simple technique for forest farmers to easily understand in utilizing protected forests, proven to be capable of encouraging the productivity of non-timber forest products. Second, the clear institutional structure and the formation of cooperatives to shorten the distribution chain of farmers' harvests so that the crop yields of farmers may get valued higher. In addition, good cooperation among stakeholders is also the key success of the program. However, there are still some problems related to ecotourism development in protected forests. Although the government has granted permits, regulations on ecotourism development standards and procedures need to be further stipulated by binding legal rules to balance conservation forest conservation with benefits over ecotourism.Top of Form

Keywords: protection forest, community forest, tenure conflict, improved smallholder's standard of living, and ecotourism

I. Introduction

Some forests in Indonesia are conserved due to their erosion and flood preventive function, reservoir storage, plantation and animal ecosystem, soil fertility conservation, and oceanic intrusion prevention. Nowadays protected forest remains more less 25 percent from total forest area in Indonesia or 29,6 million hectares (Kehutanan, 2015). Tabel 1 displays the Indonesian widest protected forests are Papua dan Kalimantan Island (31,84% and 23,70%). Papua and Kalimantan are considered to be large islands in Indonesia with a rare population density compared to Java and Sumatra islands.

Tabel1. Protected Forestry Area in Several Island of Indonesia

Island	Protected Forest Areas	Percentage (%)
Sumatera	5.629.305,65	18,97
Jawa	734.939,66	2,48
Bali	95.766,06	0,32
NTB	430.485,00	1,45
NTT	684.403,00	2,31
Kalimantan	7.031.608,00	23,70
Sulawesi	4.408.681,00	14,86
Maluku	1.211.314,00	4,08
Papua	9.446.872,00	31,84
Total	29.673.374,37	100,00

Source: Statistic of Ministry of Environment and Forestry, 2015 (modified)

During the period, the need for timber was taken from natural forests. Later in 2007, the government issued regulations on forest governance and the formulation of forest management plans and forest utilization. Afterwards, the need for more timber is taken from production forest and natural forest extraction is more limited. Additionally, forests are managed with more mature planning under Government by establishing Forest Management Unit ("Government Regulation Number 6 Year 2007 on Forest Management and Preparation of Forest Management Plans and Forest Utilization," 2007).

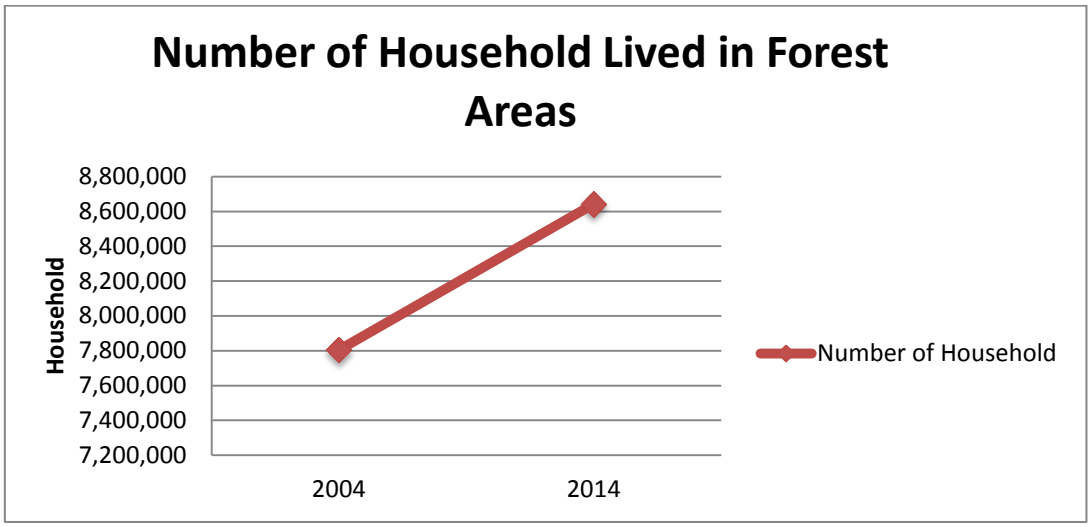
Meanwhile, the government also grants access to communities to participate in optimizing sustainable forest utilization through the Community Forestry program. However, the program has not been effective yet and has just been re-launched in 2015 with the release of a social forestry indicative map targeting 12.7 million hectares. Viewing the overall trend, the rate of deforestation tends to decrease.

Table 2. Deforestation of Protected Forest in Indonesia from 2003 – 2015

Source : Ministry of Forestry Statistic 2006, 2009,2011,2013,2015

Major root cause of protected forest deforestation and degradation is poverty. According to Social Forest Conservation Directorate of Ministry of Environment (2015), there are around 12 million of the poor lives in surrounding the forest areas. Meanwhile, according to 2015

Indonesian Central Statistic Bureau (BPS), the number of household living in the forest surrounding is increasing. Graph 1 below shows the number of household living surrounding the forest increased up to 900.000 families in 2004 – 2014. In other words, the number of households living in the forest increases 80,000 households each year.



Graph 1. Number of Household Living in Surrounding the Forest Areas

Source : Central Statistic Bureau (2015)

Number of the poor living surrounding the forest keeps increase due to their perception that forest may provide their daily living needs. Therefore, some problems may occurs, for example nomadic farming, illegal lodging, forest fire, wild animals hunting, etc. As in the Lombok island case, the poorest area in the island is people living in surrounding the forest. (Al Hasan & Yumantoko, 2012).

In the other sides, Indonesian government had performed serious efforts to overcome the problem. One of them is providing the surrounding people the access to involve in forestry management activities. It is under specific terms that they are not allowed to modify the main function of the area as protected forest, limited soil exploitation, and have no negative impact to forest biophysics and social economy, no heavy equipment utilization, and no infrastructure development. It is realized by the existence of social forestry program in protected forest. There are two social forestry programs in protected forests, namely Community Forest (HKm) and Village Forest.

II. Key Elements

A. Community Forest (Hutan Kemasyarakatan-HKm)

Community forest area is state-owned forest which currently has no specific utilization permit and may be utilized for community development. The area is allowed to be utilized for livelihood purpose of the surrounding people. The area is a source of livelihood for surrounding communities. Permitted communities are allowed to utilize protected forests within certain limits.

According to government regulation (Peraturan Menteri Kehutanan Nomor P.37/Menhut-II/2007) on Community Forest, (2007), IUPHKm has the right to :

1) Get facilitated to improve the ability to organize, formulate work plans, apply permits and conduct forest cultivation to increase production, access to markets and capital, and develop forest and forest product utilization.
2) Forest area cultivation except in the protected coverage, for example bees breeding, mushrooms, herbal plants, decorative plants, etc.
3) Environment service utilization, for example water flow utilization, natural tourism, plant and environment conservation, and carbon saving.
4) Non-wood Forest product utilization, for example rattan, bamboo, sago, Nypa fruticans, honey, resin, fruits, and swallow bird nest.

A Community Forest Management Permit (IUPHKm) may be proposed by a forest farmer group living in the surrounding of the forest close to the head of the local government then approved by the environment and forestry minister. After obtaining Business License (IUPHKm), the community is given 5 years to establish a cooperative. IUPHKm permit is valid for 35 years which can be extended based on evaluation result once every 5 years. Based on the report up to March 2017, IUPHKm permits in Indonesia both in protected forest and production forest have reached 190,028.67 Ha (Table 2).

Table 2. Ijin IUPHKm yang Telah Diberikan oleh Pemerintah

No	Year	Community Forest (Ha)	
		Reserve	Granted Permit/MOU
1	2007 – 2014	328.452,86	153.725,15
2	2015	49.128,00	20.945,06
3	2016	55.033,00	2.465,46
4	2017	-	12.893,00
Total		**432.613,86**	**190.028,67**

Source : Ministry of Environment and Forestry (2017)

B. Forest Village

In line with community forests, village forests are also licensed by the government for access to sustainably manage forest resources, but the permits are granted to village institutions ("Minister of Forestry Regulation No: P. 89 / Menhut - II / 2014 on Village Forests" 2014). As with community forests, licensed villages are allowed to use forest areas, utilize non-timber forest products and manage environmental services. Village forest management also receives facilitation from both government agencies and other parties as well as certain rights and obligations that are binding. The license period also equals community forest. Based on the strategic plan of the ministry of environment and forestry, there are 31,957 villages inside, edge and surrounding forest areas (Safitri, 2012).

Diagram 1 Social Forestry in Protected Area

Both community forest and village forest are both social forestry programs that permit communities to optimize the use of forests while keeping the forests sustainable. Therefore, there are some binding rules with permission given. And in its implementation, the central government has conducted socialization and coordination with the local government. In addition, local / municipal governments are obliged to provide community groups or village institutions that will propose and who have obtained social forestry permits in protected forests. Such assistance may be assisted by other parties such as non-governmental organizations, regional-owned enterprises, universities, community service agencies, financial institutions, cooperatives and state-owned enterprises.

III. Lessons Learnt

A. Tenure Conflict Solution

Based on research in the Sesaot forest of Lombok island (Abdurrahim, 2015), the conflict between local government as the holder of power over forest management with the community as a party that utilizes the forest can be solved by the existence of community forest (HKm). Tenurial conflicts that occur in the forestry sector occur because of imbalances of forest utilization between communities and plantation and mining companies, the inequities of allocation of forest areas and the lack of legitimacy of forest areas that are entitled to community management (Safitri, 2012). In addition, the results of the tenurial analysis research in Lampung also recommend that the implementation of village forest and community forestry programs address the tenurial conflicts as they are capable of accommodating people's expectations and dynamics without changing the status of forest areas (Sylviani & Hakim, 2014).

In order to provide certainty over the forest area and strong legitimacy of the land to be managed by the community, it is necessary to clarify the location with the appropriate boundary. In 2015, the government issued an indicative map of social forest covering an area of 12.7 million hectares in order to accelerate the target of granting social forest permits (Mulyadin, Surati, & Ariawan, 2016).

In community forestry programs, both parties benefit from each other, where people can still use protected forests to improve their living standards while the government can reduce poverty. However, there are several conditions to be addressed in the resolution of tenure conflicts, including: clear boundaries, good organizational status and management, legal and simple management systems, and stakeholder cooperation (Abdurrahim, 2015).

B. Impact to Farmers Income Level

Community forest peasants and village forests are allowed to use protected forests by harvesting non-timber forest products. Non-timber forest products include: coffee, rattan, resin, birds' nest, etc. The plants are plants that are allowed to be planted in intercropping, but people are forbidden to cut trees and hunt for protected animals. In order for these rules to be implemented properly, farmers participating in community forest and village forest are entitled to receive assistance.

Assistance in the form of techniques in managing and utilizing non-timber forest products without destroying the biodiversity of protected forests. In addition, farmers who obtain permits are also allowed to conduct cultivation, such as bee cultivation, mushrooms, medicinal plants and ornamental plants. In order for this cultivation to be conducted without violating the rules of protected forest management, the community is given skills and knowledge on how to cultivate the good and true. The results of the cultivation by the community must be recorded and managed well.Non-timber forest products and cultivation of these farmers are then sold and marketed.

However, in the marketing of these commodities there are some obstacles. First, commodity prices when harvest tend to fall because the supply is greater than demand. Second, farmers generally have difficulties in marketing because their location is far from the buyers so it requires transportation costs are high enough if farmers want to sell the harvest directly to the market. Moreover, the presence of intermediary traders who offer the needs of farmers in the form of basic commodities or money lending causes farmers prefer to sell to them even with a lower price than the market price.

Therefore, the material on the skills of how to save the crops to be durable and how to make product diversification from the harvest is important to be taught in the mentoring activities. In addition, it is mandatory for the holders of community forest and village forest permits to establish cooperatives in accordance with applicable regulations. This cooperative is a place for farmers to communicate, share knowledge and deliberation in solving a problem. In addition, with the formation of cooperatives, is expected to minimize the dependence on intermediary traders. So that will shorten the flow of marketing. (diagram2).

Diagram 2 Expected Value Chain

The HKm program facilitated by a directed work plan can increase farmers' income. Based on HKm research results in three villages in Lampung province (Aji et al., 2014), the Community Forestry program proved to increase the income of forest farmers (table 3). From the table it can be seen that people get additional income from coffee planting of 44% - 62.3%. Coffee planting intercropping is more profitable than rice cultivation. Likewise with

community forestry activities in mountain kidul, the research results prove that people get additional income through the planting of staple crops and intercrops (Mulyadin et al., 2016).

Table3. Source of Community Forest Household Income

Type of Income Source	Tri Budi Syukur			Tugu Sari			Simpang Sari		
	Mean / Year	% of HKm Income	% of Total Income	Mean / Year	% of HKm Income	% of Total Income	Mean / Year	% of HKm Income	% of Total Income
Coffee	10.248.746	80	44,2	9.985.294	98,7	62,3	10.800.000	82,3	49,5
Paddy	1.588.635	12,4	6,3	0	0	0	46.500	0,4	0,2

Source : (Aji et al., 2014)

While the evaluation conducted on two groups of protected forest HKm on the island of Lombok showed the value of moderate management HKm with a score of 53.17 and 45.77 (Nandini, 2013). The constraints experienced in both HKm are on the distribution of non-timber forest products (fruits, tubers and grains). Therefore, HKm cooperatives are important to help the distribution and training of crop processing and diversification of crop products are very beneficial to farmers.

C. Ecotourism Potential

The richness and natural beauty of protected forest is the main attraction for ecotourism enthusiasts who are increasingly increasing. Well-managed ecotourism is believed to support sustainable and sustainable management of protected forests while improving the welfare of the people. Therefore, the government has granted permits for the utilization of environmental services ("Regulation of the Minister of Forestry Number P.37 / Menhut-II / 2007 on Community Forests," 2007), spiritual tourism activities in protected forests ("Regulation of the Minister of Environment and Forestry Number P.50 / Menlhk / Setjen / Kum.1 / 6/2016 on Guidelines for Use and Use of Forest Areas, "2016) as well as protected forest tourism promotion activities (" Regulation of Director General Number: P.12 / IV-SET / 2014 on Procedures Implementation of Promotion of Utilization of Environmental Services in Conservation Area and Protection Forest, "2014). There are currently some protected forest ecotourism in Indonesia, two of which are Sesaot protected forest where the ecotourism is located within the forest and Pink beaches located on the edge of a protected forest. Both ecotourism is located on the island of Lombok.

Case Study

In February 2017, we conducted research on Pink Beach, East Lombok. Pink Beach is located on the edge of protected forest Sekaroh visited by many tourists because of its pink sand beaches and beautiful scenery. To get to the tourist location, visitors through the protected forest are levied by the company's licensee holder of business license for the utilization of environmental services and nature tourism. Visitors are charged the current rate of entry varies because there is no specific regulation on this matter. In fact, the government has not collected non-tax state revenue over the visitor's entrance fee.

From the field observation, pink beach conditions are still relatively good. But still looks a little trash visitors and garbage from the beach in some places. In addition, infrastructure such as toilets have not been properly constructed. In addition, there are food tents that have not been neatly arranged. It is destructive to scenery and shows that ecotourism management has not been properly managed.

From the questionnaire data we collected, the ecotourism demand equation of the Pink coast ecotourism demand equation is as follows

$$Y = 7.0805894 - 0.000000596\ X_1$$

in this case :Y = visits per 1000 inhabitantsX1 = Average total travel cost from each zone (Rp million / person)

From the equation, the total value of the Pink coast tourism economy (table 4). From Table 4 above, it is known that the value paid by Sekaroh protected forest ecotourism is Rp 20,597,525,000 while they actually have willingness to pay Rp 34.343.066.074, so that the consumer surplus is Rp 13,745,541,000. It can be concluded that paid enter tariffs is still below the visitor's willingness to pay.

Table 4 The Total Economic Value of Ecotourism

Economic value	The Total Economic Value of Ecotourism (Rp/year)
Willingness to Pay	34.343.066.074
Value Paid	20.597.525.000
Consumer Surplus	13.745.541.000

Purpose Solution

From the above problems, there are several solutions formulation that we try to explain, namely:

a. Management of ecotourism management.

It is hoped that there will be collaboration between companies holding environmental services business license with community forestry. Firms as capital providers can build infrastructure, such as bins, toilets, dining tents, parking lots, checkpoints. Community forest members can be empowered as laborers for incoming fees collectors, parking officers, ecotourism patrol officers, food and beverage service providers and souvenir makers and vendors.

In the determination of an area of ecotourism in protected forests, certainly different from the process of natural tourism parks. Should be required rules that bind to the flora and fauna can be maintained as well as waste visitors do not contaminate the existing ecosystem. Ecotourism schemes and environmentally friendly management should be carefully planned with regard to caring capacity of protected forest.

b. Ecotourism promotion and visitor education

Ecotourism promotion is not only an activity to inform the beauty and recreational facilities provided, but also a means of education for visitors about the procedures and rules as ecotourism. Education of ecotourism can be socialized through advertisement either from mass media, social media, social media or material on formal teaching in various education level.

c. Policies and cooperation between sectors.

In the future, it is expected that the government will immediately set the standard of entry tariff, service as well as the amount of non tax state revenue contribution and its distribution of profit sharing. In addition to policies on promoting ecotourism, operational standards of procedures, monitoring and evaluation, policies on cooperation with other parties should also be further regulated to ensure a balance between maximizing ecotourism benefits and conservation in protected forests.

IV. Summary

Social forestry proclaimed by the government aims to reduce encroachment, deforestation and degradation occurring in protected forests in Indonesia. Of the several programs included in social forestry, there are two programs that can be applied to protected forest areas, namely community forest and village forest. With regulation, binding facilitation and procedures and monitoring, it is expected that the program can run well and can optimize the utilization of protected forest. It is expected that the program will also improve the living standards of the community as well as forests to be maintained, sustainable and sustainable. Cooperation between the central government, local government, and the private sector is expected to generate a positive multiplier effect for economic growth.

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Forest and Rural Livelihood Development in Lao PDR

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Abstract: Lao's People's Democratic Republic (Lao PDR) is a landlocked country located in central Indochina with a total land area of 236.800 square kilometers, 70 percent of which is mountainous. About 6.8 million people live in its 18 provinces, with most people. With a population growth of approximately 2.3 percent per annum. The Lao population comprises 49 official ethnic groups of some 200 sub-ethnic groups, and around 68 percent of them live in rural areas in which livelihoods rely on forest resources. A lower-middle income economy with a GDP per capita of $1,740 in 2015. The poverty status is continues decline, 23 percent in 2015. The Government of Laos recognizes that forest resources are essential for poverty eradication. It is clearly spelt out in one of the NGPES strategic objectives "maintaining a healthy and productive forest covers as an integral part of the rural livelihood system, and generating a sustainable stream of forest products". To materialize the objective, sustainable forest management is one of the four development goals of the Agriculture and Forestry Development Strategy to the year 2020 'Sustainable forest management for preserving biodiversity, improving national forest cover, providing valuable environmental services and fair benefits. NTFPs also play a central role in the rural economy of the Lao PDR. Some forest restoration and rehabilitation project activities as APFNet (China) and Sustainable Forestry and Rural Development (SUFORD) linking with rural livelihood development.

Introduction

Lao's People's Democratic Republic (Lao PDR) is a landlocked country located in central Indochina. The country shares borders with China to the north, Myanmar in the northwest, Thailand to the west, Cambodia to the South, and Viet Nam to the east.

Lao PDR has a total land area of 236.800 square kilometers, 70 percent of which is mountainous. There are three agro-climatic zones in the country: the mountainous north; the hilly to mountainous regions in the central and south; and the alluvial river plains along the Mekong and its tributaries in the central and southern parts of the country. About 6.8 million people live in its 18 provinces, with most people. With a population growth of approximately 2.3 percent per annum. The Lao population comprises 49 official ethnic groups of some 200 sub-ethnic groups, and around 68 percent of them live in rural areas in which livelihoods rely on forest resources.

Despite still being a least development country (LDC), Lao PDR has made significant progress in poverty alleviation over the past 2 decades with poverty rates declining from 46 percent in 1992 to 24 percent in 2015. The country achieved the Millennium Development Goal target of halving poverty, however the challenge now is to ensure that all Lao people benefit in the country's development.

Politically the country has considerably opened up in recent years, ratifying six out of the nine core human rights treaties, creating a more conducive legal environment for civil society, and actively pursuing regional and global integration.

Lao PDR, a lower-middle income economy with a GDP per capita of $1,740 in 2015, is one of the fastest growing economies in the East Asia and Pacific region and the 13th fastest growing economy globally. GDP growth averaged 7.9 percent over the last decade. Use of the country's natural resources – mostly water, minerals and forests – contributed one third to growth. Construction and services also expanded, with growing regional integration boosting tourism and attracting foreign investment. The macroeconomic environment remains challenging, reflecting both domestic, and increasingly external risks, and needs careful management. Growth contributed to lowering the number of poor people to an estimated 23.2 percent of the population in 2012/13 from 33.5 percent a decade ago. However, poverty has been declining slowly compared with some regional peers.

The Lao PDR has grown rapidly since the launch of the transition from central planning to a market economy more than two decades ago. Over the past 25 years, the economy has performed very well (see Table 01). From 1990 to 2013, GDP grew at an average of 6.85 percent, with a high of 8.62 percent in 2006 and a low of 3.97 percent in 1998. Economic growth is estimated at 7.4% for 2014. Nominal GDP grew to US$12,120 million in 2014, mainly due to growth in the natural resources sector, including mining and quarrying, continued construction work in large FDI-financed power projects, accommodative macroeconomic policies, tourism-related industries, and services. One key factor driving economic growth is the level of investment – public investment, domestic private investment and foreign direct investment. In fiscal year 2013-2014, total investment is estimated to have reached about 34,877.41 billion Kip, slightly increased from 33,141.49 billion Kip for fiscal year 2012-2013 (MPI, 2011).

Table 01 Lao Key Economic Indicators

	1990	1995	2000	2005	2010	2011	2012	2013	2014
GDP (US $ Billion)	0.86	1.76	1.73	2.73	7.20	8.30	9.40	11.10	12.10
Real GDP growth (%)	6.70	7.10	6.30	6.80	8.10	8.00	7.90	8.00	7.80
GDP per capital (current US $)	203	362	321	472	1122	1265	1408	1628	1671
GDP per capital growth (annual %)	3.64	4.39	4.03	5.41	6.36	5.96	6.00	6.53	-

Source: World Bank 2014, ADB 2014

Economic growth over the past five years has continued at an average of 7.9 percent per years (target of > 8 percent). This continuous economic growth is due to the appropriate macroeconomic management measure and mechanisms of the government, peace in the

country, social order, political and economic stability, and increased regional and international integration

Table 02 Comparison between GDP Growth Rate of each Fiscal Year with the 7th NSEDP (2011 – 2015)

Description	7th NSEDP Targets (2011-15)	Actual 2010-11	Actual 2011-12	Actual 2012-13	Actual 2013-14	Actual 2014-15	Average (5 years)
GDP growth (%)	> 8	8.10	8.30	8.00	7.80	7.50	7.90
Agriculture and Forestry (%)	3.50	2.90	2.80	3.10	3.00	3.00	
Industry (%)	15.00	15.80	14.40	7.40	8.50	8.90	
Services (%)	6.50	7.80	8.10	9.70	9.30	9.10	

Source: Report on NSEDP Achaemenes 2010-11 and 2014-15

The Situation of Lao PDR Poverty

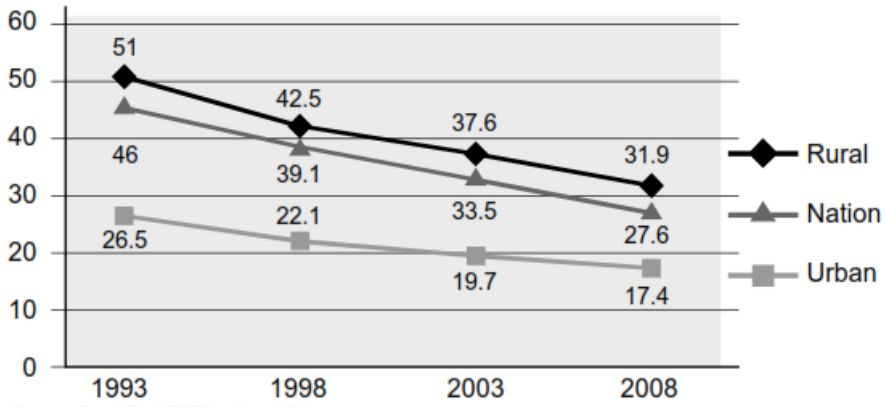
Despite the significant economic growth, Lao PDR remains a country with much poverty. Poverty in Lao PDR is defined as "the lack of ability to fulfill basic human needs such as not having enough food, lacking adequate clothing, not having permanent housing and lacking access to health, education and transportation services" (NGPES 2004).

Poverty in Lao PDR has a strong geographic dimension. Poverty incidence registers higher in the uplands as compared to lowlands. In particular, it appears highest in the southwestern region of the country, particularly along the Vietnamese border.

In general, there is a big poverty gap between rural and urban areas, as depicted in Figure 01, that the average national poverty line is very close to the average rural poverty line indicates that the highest poverty incidence remains in rural areas.

For concentrating poverty eradication schemes, the Government of Laos (GoL) identifies 72 districts as poor and a core group of the 47 poorest districts has been selected for priority investments. All identified districts are located in remote and mostly forest areas.

Figure 01 Lao PDR's Poverty Trend



Source: 7th NSEDP of Lao PDR

To tackle the problem, the GoL is strongly committed to achieve the MDGs and targets set in its National Growth and Poverty Eradication Strategy (NGPES). The strategy set the targets

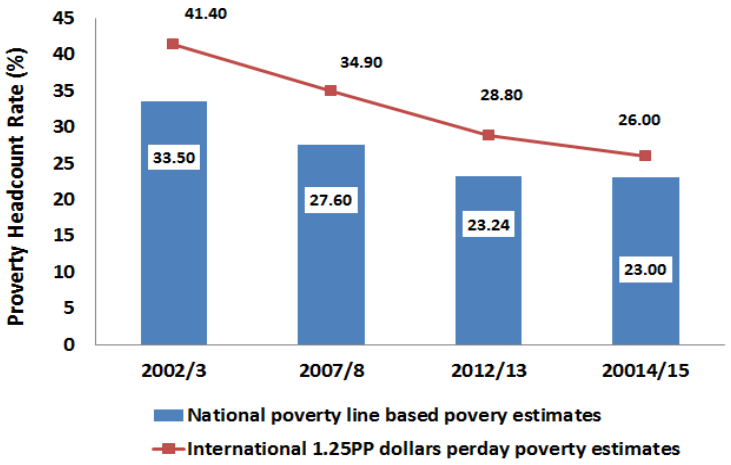
for stable economic growth at 7.5 percent and the population living under the international poverty line to 23 percent by 2015. The strategy was elaborated and translated into the 6th National Socio-economic Development Plan (NSEDP), which was implemented during the period 2006-2010. The 6th NSEDP considered agriculture and forestry, transport, health, and education as priority sectors for poverty eradication.

The implementation of the 6th NSEDP resulted in a rapid economic growth and a satisfactory poverty reduction rate. For instance, in this period GDP per capita increased from US$491 (2005) to US$1,069 (2010) and the poverty headcount ratio was reduced from 33.5 percent to 26 percent in the same period (Report on the High Level Round Table Meeting 2010).

To continue reducing poverty, the GoL adopted its 7th NSEDP in the 6th National Assembly Meeting held 9 to 24 June 2011. In the 7th NSEDP (2011-2015), GoL targets an increased annual per capita income of US$1,700 by 2015 and a stable annual GDP growth at 8 percent. Out of the total GDP, the agriculture and forestry sectors are expected to contribute 23 percent, the industry sector 39 percent, and the service sector 38 percent. The poverty headcount ratio is targeted to be brought down to 24 percent (7th NSEDP of Lao PDR 2010). Another forestry-related target in the 7th NSEDP is to increase forest coverage to 65 percent of the country's total area by 2015.

The poverty status is continues decline in Lao PDR. Recent estimates from the Laos Expenditure and Consumption Survey (LECS5) show that the proportion of poor people-those hose consumption is less than the national poverty line, declined by 4.3 percentage points from 27.56 percent in 2007/8 to 23.24 percent in 2012/13 and declined to 23 percent in 2015 (UNDP. 2015). As (Figure 02) shows, the same trend us observed when you consider the proportion of people living on less than 1.25 PPP dollars a day. These estimates imply that poverty in Lao PDR halved from 46 percent in 1992/93 when the first LECS survey was conducted.

Figure 02 Poverty Reduction in Lao PDR 2002/3-2014/15



Rural Development and Poverty Reduction

Over the past five years, each sector at national and subnational levels has give great attention to developing village and focal area in accordance with the four concepts and four targets together with the implementation of the "3 builds" directive (building provinces to become strategic units, districts to become comprehensively strengthened units and villages to become development units), which is being piloted in 52 districts and 109 targeted villages.

This piloting is ongoing and has contributed to strengthening local capacity and poverty reduction. Some highlights are:

- The political system at the village and Village group level has been significantly strengthened. The proportion of village with solid political organization with strong provincial party unit leadership has increased to 68 percent of all villages in the country; of these, 80.98 percent were security villages, 68.25percent were drug free villages and 74.47 percent were case-free villages.
- The government has focused on building necessary infrastructure such as road access to districts and village to village. In relation to the target set for 2015, road access to all villages with essential conditions in highly achievable. At present, road improvement and construction is under way to access six districts: Kaleum, Dakcheung, Samouay, Saychamphone, Saysathane and Phonethong (districts in southern of Laos). At the same time, attention has continued to be paid to expanding the education network, health service and sanitation to poor and remote rural areas. Based on the poverty assessment and village development criteria, the number of village which achieved compulsory education (primary education) increased from 80 percent of all villages in 2011 to 99.63 percent of all villages in 2014, and health model villages increased from 24.5 percent of all villages in 2011 to 64.84 percent of all villages in 2014.
- Settlement and permanent job creation have been achieved through concentration on bordered and priority area of the government. Many families in the area shifted from slash and burn rice cultivation to commercial production using their local potential skills and new techniques, to secure permanent jobs as well as ensuring improved livelihoods. This consequently tackled poverty issues through progressive development villages, priority areas

In summary, over the last five years, rural development and poverty reduction has been achieved to a large extent. A poverty assessment in 2014 (Decree No.309/PMO regarding poverty and rural development 2012-2015) suggested there were 76,604 poor households and 1,736 poor villages which accounted for 23.09 percent of all villages nationwide. However, LECS5 indicates that the poverty rate fell from 27.6 percent in 2007-2008 (LECS4) to 23.2 percent in 20012-2013, and it is expected to remain at approximately 20 percent in 2015.

Economic Sector Development from Agriculture and Forestry

During the past five years, agriculture and Forestry was one of the sectors that generated a number of significant achievements despite the impacts of natural disasters, fluctuation of agricultural product and production input prices, and others. These accomplishments include food production, the promotion of commercial production for domestic consumption and exports, and enhancement of quality and productivity. The forestry achievements are shown:

- **Management of production and plantation forest:** At present, across the country, there are 51 National Production Areas that cover 3.1 million ha and are divided into 324 sub area. To date, surveys, data collection are allocation plans have been completed in 276sub area, covering an area of 2.2 million ha. The registration of tree plantation sites has been completed in nine province: Luang Prabangm Vientiane, Bolikhamxay, Khammouane, Savannakhet, Champasack, Saravan, Sekong and Attapeu, a total pf 530 lots on 1,026.85 ha.
- **Forest restoration:** There was 164,096 ha in the production areas, accounting for 20 perdents of the Five Year Plan target (817,400ha).
- **Tree plantation:** Collection of heartwood has increased from 56,26q kg in 2010 to 102,937 kg in 2012, and the seedling nursery reached 94.81 million seedlings, averaging 45.40 million annually. The total plantation of 113,776 ha represents 76 percent of the Five Year Plan target (150,000 ha). At present, the total plantation is 437,705 ha or 87.5 percent of the plan target by 2020 (500,000 ha).

The Ministry of Agriculture and Forestry (MAF) regulation on villages forest management was issues in June, 2001, mostly to consolidate exiting provisions concerning village forests, e.g. classification of village forest, harvest of logs for housing and social welfare construction activities. However, collection of NTFPs for sale is also recognized, with the condition that management plans are formed and approved. NTFPs have been recognized as one of the few income sources available to rural villagers for a long time without legal recognition, which, for the first time, this regulation provides.

Key Elements

Overall development policy with special attention to role of agriculture and forestry sectors. The development of the Lao PDR and its agriculture and forestry sector has moved through several phases since 1975. The Government of the Lao PDR (GOL) was first faced with rehabilitating the physical infrastructure and social fabric. After some experimentation in policy initiatives and development, in 1986 the government embarked on a new policy called the "New Economic Mechanism". State-owned enterprises have been progressively privatized, the market economy has been encouraged and many other approaches made towards integrating the Lao PDR with the global economy. The Lao PDR joined ASEAN in mid-1997. These and other policies have been largely successful and the country has developed steadily, at least until the recent disruptions in Southeast Asian economies.

The socio-economic development strategy occurs within eight National Priority Programmes, outlined in the Socio-Economic Development Plan until year 2020. These national programs concern food security, increased commercialization-oriented production, stabilization of shifting cultivation, infrastructure development, improved socio-economic management and foreign economic relations, rural development, human resources development and services development. The major contributions of the Ministry of Agriculture and Forestry (MAF) to the National Socio-Economic Development Plan is reflected in six major programmes: food production, support to commodity production, stabilization of shifting cultivation, irrigation development, agriculture and forestry research and human resources development.

Agriculture cum forestry is recognized to remain the leading national economic sector and engine to foster socio-economic development up to the year 2020, gradually laying down the foundation for a shift to the industrial sector (that is, the move into processing for the agriculture sector). In the vision, the Lao agriculture and forestry sector is to play an important role as a contributor to food security within the ASEAN Region as well as to the maintenance of a sound environmental base in the region.

The Forestry Strategy 2020 of Lao PDR, adopted by Ministry of Agriculture and Forestry in July 2005, set the objective of increasing forest coverage from 47% to 70% by 2020. The Strategy aims to generate a sustainable supply of forest products, preserve unique and threatened habitats and promote environmental conservation and protection, where 11 of the 19 districts and 334 villages are identified as very poor communities, are endowed with rich forest resources which play an important role in maintaining the livelihood of local communities, promoting rural development and conservation of environment and biodiversity. However, deforestation and forest degradation in Lao PDR remains as a great challenge and has posed threats to sustainable management of forest ecosystem and sustainable development of local communities. It has become a common goal and task of the Central and Provincial governments to reverse the trend of deforestation and forest degradation by taking effective measures, including strengthening land use planning, promoting restoration and rehabilitation of degraded forests, improving livelihood, conserving biodiversity and facilitating participation of local communities in forest management.

Forest Resources Management

Forest classification was completed for all protected area. As a result, there are 139 protected forests covering 7.99 million ha, of which 49 are national protected areas covering 7.48 million ha, five provincial protected areas covering 141,633 ha and 85 district protected areas covering 366,838 ha. In addition, there are 176 conservation areas covering 4.89 million ha, of which 24 are national conservation areas covering 3.77 million ha, 59 provincial conservation areas covering 626,499 ha, 93 district conservation areas covering 420,678 ha and two connections areas- Nakai-Namtheun and Hin Nam No – covering 77,170 ha. A protected forest classification plan was established in five national areas and five provincial areas. The most outstanding is Namha national protected area, which is being proposed to be list as a World Natural Heritage site.

Sustainable Development Goals of Lao PDR

Sustainable Development Goals (SDGs): At the present, the United Nations has defined the post 2015 development agenda and adopted it officially at the United Nations General Assessment in September 2015, which also marked the day of completion of the MDGs. The adoption of the post 2015 development agenda was collectively participated in by a large number of social groups and organizations through initiatives taken by the number states. As a result, a number of inputs have greatly contributed to the development agenda that contains a total of 17 sustainable development goals (international context). For Lao PDR, there are 18 SDGs: (i) End poverty in all its from everywhere; (ii) Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably mange forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss; etc.

Poverty Eradication and Forestry in National Policy

The highest poverty incidence in Lao PDR is found in rural areas, where around 73 percent of the total population resides. These people are dependent on natural resources, especially forest resources for survival. Thus, forests and poverty are interrelated, and sustainable forest management and utilization are essential for poverty alleviation.

In the national policy, the GoL recognizes that forest resources are essential for poverty eradication. It is clearly spelt out in one of the NGPES strategic objectives "maintaining a healthy and productive forest covers as an integral part of the rural livelihood system, and generating a sustainable stream of forest products" (NGPES 2004). To materialize the objective, sustainable forest management is one of the four development goals of the Agriculture and Forestry Development Strategy to the year 2020 'Sustainable forest management for preserving biodiversity, improving national forest cover, providing valuable environmental services and fair benefits (MAF, Agriculture and Forestry Development Strategy to 2020).

In addition, forests are recognized as one of the most important environmental resources, which play an important role in the poverty-environment nexus, particularly in the interrelationship between economic growth, poverty eradication, and environmental degradation. It is also noted in the national policy that deforestation will most likely accelerate poverty in rural areas, where most of the poor inhabit, and cause unsustainable economic development in natural resource-based sectors such as mining and hydropower development, and environmental degradation, which in turn affects economic growth and exacerbates the poverty situation.

In reaction, the GoL through the Poverty-Environment Initiative (PEI) has conducted a number of social and environmental impact studies of the development in key sectors with potential negative impact on the forest and its natural resources, including forest resources. These include, for instance, impacts related to FDI such as land concessions, commercial plantations, mining, hydropower development, bio-energy development, and others. Findings and recommendations for inclusive and sustainable development have been streamlined into the planning process, especially in the preparation of the 7th NSEDP.

Forests have an important role to play in the national economy and are central to poverty alleviation, especially for rural people. For poverty alleviation in particular, Oksanen (2003) has grouped contributions from forests into five categories: (i) income generation, (ii) subsistence, (iii) energy, (iv) agriculture and rural development, and (v) governance.

In general, it is recognized that forests provide a significant contribution to poverty eradication, but to what extent, especially at the household level, is hard to quantify and is not recorded in national statistics. The following sections describe examples of forest contributions to poverty alleviation. Knowing that it is difficult to quantify indirect contribution of forest to poverty alleviation, discussion hereunder focuses on direct contributions in different aspects.

About one-third of the rural inhabitants of Mekong corridor, one-half of those living in mountainous and rural areas. Particularly upland people are directly dependent on neighboring forests for subsistence and for generation of meagre but vital income. The benefits derived from forests include wood for house construction, food and fuel for domestic needs, cash income from NTFPS sale, wages for commercial forestry activities, land for cropping, shifting cultivation and tree planting or regeneration and inputs for cropping and livestock rising.

Threats to these contributions to rural livelihood and welfare take various forms. The main ones include: (i) forest loss and degradation leading to NTFPS scarcity, (ii) loss of access to forests through protection or conservation forest designation, relocation due to infrastructure development, village consolidation or warfare, use of defoliation agents or presence of UXO, etc. (iii) natural disasters and indiscriminate or uncontrolled logging causing loss of valuable and environmental degradation.

Recognizing the dire need and acknowledging increasing deterioration of forests, forestlands and other lands inhabited by rural people, Government issued several legislation documents, culminating with the 2007 Forestry Law, and continues to prepare implementing regulations and additional laws and policies. Several measures aimed at improving rural peoples' living standards have also been implemented including efforts to control and reverse deterioration and improve delivery of basic social and development services. In chronological order, the most important government programs and project are as follows:

- Protected/Biodiversity Conservation Area program
- Shifting cultivation reduction program
- Land and Forest allocation program
- Community forest and NTFP programs
- Focal site strategy, and village relocation and consolidation program

The Roles and Contribution of Forests and Forestry Sector in Lao PDR

In addition, Lao forests made a significant though unmeasured contribution through benefits provided to the rural population. Most rural households, especially the poorest, depend

heavily on forests not only for timber for house construction and other purposes but also for food, fodder, fencing materials, medicines and condiments. Villagers also often derive cash income from sale of NTFPs and, in many areas, harvesting of forest resources is one of the few available economic activities. NTFPs consumption and sales often equate to more than half of family income.

The forestry sector contributed 3.2% of GPD and 25 percent of the total national export value in 2001 and makes a substantial contribution of the national budget. In 2001/02, log royalties constituted 15 percent of total fiscal revenues. The forest sector is of great importance on employment generation, and although exact estimates are not available, the sector provides several thousand jobs in log extraction, transportation and processing, with the rural population and the poor amongst those benefiting most. In turn, secondary employment creation in the wood processing industry, including furniture manufacture, provides some 22,000 jobs constituting one-quarter of the national total of 93,400 in the manufacturing sector.

In some cases, timber harvesting has had a negative impact on the poor by destroying the very forests on which they depend. Therefore, government efforts at controlling timber harvesting and fostering village participation in forest management aim directly at improving the livelihoods of the poor

Legal Framework Governing Village Forests and Their Use

Through Government's past and on-going efforts the legal framework concerning village land use and forest management has been made comparatively clear. The most relevant legislation includes the Forestry Law, MAF Instruction 822/1996 and MAF Regulation 535/2001. Village boundaries including forest boundaries are officially drawn with acknowledgement from neighboring villages, through the land and forest allocation process. Village forest is classified into several types and rules on the use of each type are agreed upon with villagers' full participation. Villagers are allowed to collect and sell NTFPs and harvest timber for domestic use. They may be allocated land for tree planting and regeneration, and ownership of the resulting trees is guaranteed upon registration. Land tax may also be waived on tree plantations under certain conditions.

The Effects of Programs and Projects on Village Land and Forest and Poverty Eradication

Protected/Biodiversity Conservation Area Program

The objective of the National Protected Area/Biodiversity Conservation Area Program is to protect natural areas for conservation of flora and fauna, maintenance of ecological stability and watershed functions and to preserve historically, aesthetically, culturally or scientifically valuable sites. Program objectives should, wherever possible, be achieved through local, participatory management benefiting NBCA residents. Villages involved in NBCAs are classed into one of four types:

- Enclave villages, whose production forests fall entirely within the NBCA boundary;

- Straddle villages that may be outside the NBCA but some or most of its village production forest are within it;
- Adjacent villages whose village production forest borders but does not impinge on the NBCA, and
- External villages whose activities have an impact on the NBCA.

The designation of an areas' inclusion in the program may also impact on villagers' access to forest and more generally on their livelihoods. A village may be constrained or even prohibited from customary use of the former village production forests or commercial forestry activities, which generated, or could have generated, income. Hence, participatory management involving the concerned villagers should be stressed to ensure they have access to some new sources of income that NBCA establishment may generate. Examples include: better utilization of management zones, employment as wardens or tour guides, establishment of conservation and monitoring agreements, sale of handicrafts, income from accommodating and providing food for tourists, etc. However, initial investments including the necessary training should be supported by beneficiaries of biodiversity conservation, be it the Government or international society.

Shifting Cultivation Stabilization and Permanent Occupation Program

Government has been concerned with the issues of shifting cultivation and permanent occupation since liberation and the program has been active since 1989 (PM's Decree 117/1989). Its objectives are to:

- stabilize shifting cultivation
- stop indiscriminate logging and regenerate forests, and
- improve the living standard of upland people through the adoption of permanent land use systems.

The strategy dealing with shifting cultivation stabilization, as spelled out in the 1999. Agricultural Sector Strategy includes activities in the following areas:

- Land use zoning based on slope and land capability
- Sedentarization of agriculture in sloping lands through farming system diversification and agroforestry development
- Enhanced access to markets through feeder road construction and delivery of market information
- Rural savings mobilization and credit grants, and
- Land allocation and land use occupancy entitlement

A major advance in policy definition has been the differentiation between 'shifting cultivation' ('hay kheuan nhai'15), in which clearing and farming advances continuously into the forest and 'rotational cultivation' ('hay moun vien'), which return to previously cropped areas after an appropriate fallow period, normally between seven and twelve years to allow recovery of

soil fertility and eradication of weeds. In contrast to the shifting mode, the rotational cultivation does not impinge on new forest tracts.

Since 1990 significant reductions in the areas involved and the number of families practicing shifting cultivation have been reported. From 249,000 ha and 210,000 families in 1990, figures dropped to 93,900 ha and 134,000 families in 2001 and further to 29,400 ha and 43,039 families in 2005. The current targets are to eliminate 70% of the area under shifting cultivation by 2005 and to eradicate it completely by 2010. Five provinces in the North of the country (Luang Prabang, Oudomxay, Huaphanh, Phongsaly and Luang Namtha) are the focus for this program each being given an annual reduction target.

Rotational upland cultivation on allocated plots or within agreed areas, without encroachment upon new forest areas, is an accepted alternative, although sedentary cultivation on upland or sloping areas using improved, conservation-oriented farming methods is preferred. Promotion of non-rice crops, fruit and commercial trees, cattle, and fishponds potentially provide alternative sources of food and income for affected populations.

The Importance of NTFPs for the Rural Economy

NTFPs play a central role in the rural economy of the Lao PDR by providing the following items, amongst others:

- Protein (wild meat, fish, frogs, shrimp, soft-shelled turtles, crabs and molluscs)
- Calories, vitamins and dietary fiber (mushrooms, bamboo shoots, fruits and vegetables, honey)
- Materials for house construction and handicraft production (bamboo, rattan, broom grass, paper mulberry)
- Traditional medicines
- Cash income (from sale of NTFPs or product there from)

Forest Restoration/ Rehabilitation Project Activities in Lao PDR.

Duration	Name of Project
1932 – 2006	Forest plantation (protection, production and genetic conservation) 186,000 ha(DOF,2005) 220,000 ha (FRA 2005)
1989 - 2006	Forest and Forest Land Allocation Programs (FFLAP)
1995 – 2005	Forest rehabilitation and afforestation project (FORCAP) benefit sharing between local communities and local government
2004 - 2008	Sustainable Forestry and Rural Development (SUFORD)
2009 - 2014	Participatory Land and Forest Management Project for Reducing Deforestation in Lao PDR (PAREDD)
2014 - 2018	Sustainable Forestry and Rural Development Scaling –Up Forest Certification (SUFORD-SU)
2014 - 2017	Forest Carbon Partnership Facility (FCPF)
2014 - 2019	Sustainable Forest Management in Northern park of Lao PDR (APFNet)
2016 - 2025	Reforestation for water resource protection (AFoCo)

Sustainable Forestry and Rural Development Project (SUFORD): The project initiative, which started in 2003 with an expected 5 years project period. The project covers 8 districts

of Khammouane, Savannakhet, Champasack and Salavanh provinces with 413 villages and is in the process of establishing 8 production forest, covering a total area of about 655.000 ha. The objective particularly focus on

- Strengthening the policy, legal and incentive framework for sustainable participatory management and
- Improving rural well-being and livelihood through sustainable forestry and community development

Sustainable Forest Management in Northern Park of Lao PDR: The project will mainly carry out land use planning, restoration and rehabilitation of degraded forest land, NTFP development, forest law enforcement and trans-boundary biodiversity conservation to promote and facilitate the sustainable forest management in the three targeted provinces, and mainly focus on helping local authorities and communities to sustainably manage forest resources by

- Exploring and demonstrating effective approaches on forest restoration and forest management, which can help to generate sustainable flow of benefit to closely related stakeholders,
- Strengthening capacity on forest law enforcement, promoting trans-boundary cooperation on biodiversity conservation,
- Sharing the information and knowledge of best practices on forest restoration and rehabilitation.

The project will last for 5 years and be implemented by the Ministry of Agriculture and Forestry of Lao PDR with supports from line ministries, departments and the three provincial authorities.

Reforestation For Water Resource Protection Project: The implementation of this project will be the availability of seeds of valuable tree species for forest restoration programs in the country, model forest site with advance soil erosion engineering techniques, health mountainous level forest restoration, and the higher awareness on a landscape level forest restoration of the people in the surrounding areas of the project site in particular and in the country in general.

Lessons Learnt

Lao PDR, a lower-middle income economy with a GDP per capita of $1,740 in 2015, is one of the fastest growing economies in the East Asia and Pacific region and the 13th fastest growing economy globally. GDP growth averaged 7.9 percent over the last decade.

Poverty in Lao PDR has a strong geographic dimension. Poverty incidence registers higher in the uplands as compared to lowlands. In particular, it appears highest in the southwestern region of the country, particularly along the Vietnamese border.

Over the past five years, each sector at national and subnational levels has give great attention to developing village and focal area in accordance with the four concepts and four targets together with the implementation of the "3 builds" directive (building provinces to become strategic units, districts to become comprehensively strengthened units and villages to become development units), which is being piloted in 52 districts and 109 targeted villages. LECS 5 indicates that the poverty rate at approximately 20 percent in 2015.

The Ministry of Agriculture and Forestry (MAF) regulation on villages forest management was issues in June, 2001, mostly to consolidate exiting provisions concerning village forests. NTFPs have been recognized as one of the few income sources available to rural villagers for a long time without legal recognition, which, for the first time, this regulation provides. The Forestry Strategy 2020 of Lao PDR, adopted by Ministry of Agriculture and Forestry in July 2005, set the objective of increasing forest coverage from 47% to 70% by 2020. Where 11 of the 19 districts and 334 villages are identified as very poor communities, are endowed with rich forest resources which play an important role in maintaining the livelihood of local communities, promoting rural development and conservation of environment and biodiversity. One of 18 SDGs is End poverty in all its from everywhere.

The highest poverty incidence in Lao PDR is found in rural areas, where around 73 percent of the total population resides. Forests have an important role to play in the national economy and are central to poverty alleviation, especially for rural people. For poverty alleviation in particular, Oksanen (2003) has grouped contributions from forests into five categories: (i) income generation, (ii) subsistence, (iii) energy, (iv) agriculture and rural development, and (v) governance.

NTFPs play a central role in the rural economy of the Lao PDR by providing the Protein, Calories, vitamins and dietary fiber, Materials for house construction and handicraft production, Traditional medicines, Cash income

The Rural Development and Poverty Eradication (RDPE) should be carefully implemented in strongly focused manner, continuously building up the selected larger villages as the hub for social, economic, and cultural services in the rural areas, while working to develop more model families, and to support formation of production groups such as livestock, and business activities in partnership with entrepreneurs.

Successful RDPE implementation requires active study, good understanding and perception of the party and state's RDPE policies, followed by creative translation into concrete plans and projects that are compatible and relevant to both the NSEDP and local realities, and active encouragement and mobilization of society's participant in the implementation, and leadership that is unified responsible and realistic.

The RDPE plan should be supported by adequate funding, raised from all the various economic sectors, domestic as well as foreign in order to achieve the maximum potential for rural development and poverty eradication

The RDPE plan involves many varied government sectors and agencies in integrated development tasks, and as such would be most effectively directed by the Party politburo. All party committees, from the central down to local level should be provided with the organization, coordinating mechanisms and procedures necessary to assure harmonious coordination amongst different sectors and organizations centrally and locally, and also human resource development according to local potentialities.

The Way Forward

Contribution of Forests to Rural Development and Poverty Alleviation

Forests have an important role to play in the national economy and are central to poverty alleviation, especially for rural people. For poverty alleviation in particular, Oksanen (2003) has grouped contributions from forests into five categories: (i) income generation, (ii) subsistence, (iii) energy, (iv) agriculture and rural development, and (v) governance.

Some of the most obvious which would be required to fill critical gams in NTFPon rural development.

- Identification of promising NTFPs for subsistence and income generation for villagers.
- Nutritional value of NTFPs and their role in food security

Rural Development and Poverty Reduction Targets to 2020

- The poverty rate decreases to 10 percent by 2020
- The poor families rate remains at not more than 5 percent by 2020
- The remaining poor villages are less than 10 percent of all villages
- The remaining poor districts are less than 10 percent of the total number of districts
- Establish developed families to be more than 50 percent of the total number of families
- Establish developed villages to be more than 50 percent of the total number of villages across the country
- Group big villages to form small rural towns, achieving three small rural towns in each district.
- Reduce the number of the poor district to half of the total number of district across the country
- Establish developed districts until they represent more than 10 percent of all districts.
- Attempt to sort out migration problems
- Reduce the number of the UXO victims from 45 persons per years to 40 or less per year by 2020

- Put efforts into clearing UXOs from priority areas to enhance the living standards of the population and ethnic minorities and the government's socio-economic development projects, to have a clear area of 300,000 ha
- Complete the survey to locate UXO affected locality in 124 priority development areas in nine provinces by 2020
- Provide assistance to 1,500 UXO victims (survivors) by 2020.

The government of Lao PDR continues with its efforts to develop the country's infrastructure, particularly the road sector, as per the overall described. Continue building the national road which are sub regional and serve as links between the north to the south, and from the east to the west, and complete the construction of paved roads in Vientiane capital which link the municipal areas of provinces throughout the country. Road from the municipal areas to districts in the provinces and focal development areas must be usable during both seasons.

- Give proper attention to maintenance and restoration of roads for them to last longer.
- Continue improving and restoring the cleanliness of all municipals as part of town planning and expanding water supply services that cover at least 59 percent of the total population in municipal area in the next 5 years.
- Ensure an adequate supply and generation of electricity to meet domestic demand and to export the excess to other countries in the region. By the year 2010, try providing the electricity for daily living of 70% of the entire households in the country, and of 9 percent by the year 2020.

Since improving the management and operational capacity of the sector is a priority in the achievement of the plan, capacity building programs must therefore be provided to relevant staff to ensure the ability to supply quality services to all people in the country.

The Government has set two major national development goals to be achieved by 2020. The first is to graduate from least developed country status, the second to eradicate poverty. Development of the forestry sector and implementation of sustainable forest management are key elements supporting these objectives. The NGPES clearly recognizes the important roles of sustainable forest management for poverty alleviation through village forest management including NTFP processing and sales and water/soil conservation, small scale tree growing, participatory Production Forest management and so on.

The overarching objective supported by improved forest policy and management is poverty eradication. A significant proportion of the Lao population lives within or around forested (or previously forested) areas. Such people make up the majority of the poorest sections of Lao society, including many impoverished ethnic groups. A major part, if not all of their livelihood and income-generating activities are related to utilization of forest products for self-consumption or sale. Forestry is therefore crucial for improving their livelihoods.

The major objectives of forestry sector development are;

- To build capacity of government organizations and concerned parties for implementation of FS 2020.
- To control and correct various actions which lead to deterioration of forest resources in terms of both quantity and quality and at the same time for livelihood improvement of poor farmers in rural areas and for protection of forest cover.
- To develop and enforce laws and regulations related to forest.
- To ensure sustainable management of Production Forests with participation of local people and to promote commercial tree planting by individuals, groups, organizations, small and medium scale companies and foreign and national investors with government providing policies,
- To take a balance between wood processing industries and wood volume approved annually for harvest based on scientific calculation and to strongly promote domestic processing of finished products.
- To contribute to conservation of forest ecosystems, habitat and all plant and animal species in danger of extinction.
- To protect soil, watersheds and environment and to secure durability of important infrastructure by forest conservation.
- To use revenue from forests in most effective ways for development of economy and other sectors according to government's priority development plans to contribute to poverty eradication.
- To ensure sustainable management of NTFP and their contribution to livelihood improvement of rural villagers.

The major sector targets, which must be achieved to contribute to poverty eradication, are:

- To improve quality of existing forested area, which are about 70% of the total land area, by naturally regenerating up to 6 million ha and planting trees up to 500,000 ha in unstocked forest area as an integral part of a rural livelihood support system encompassing stable water supplies and prevention of natural disasters.
- To provide a sustainable flow of forest products for domestic consumption and to generate household income through sale and export, thus contributing to livelihood improvement, fiscal revenue and foreign exchange earnings whilst increasing direct and indirect employment.
- To preserve the man species and unique habitats, which are, for different reasons, threatened both within the country and elsewhere.
- To conserve environment including protection of soil, conservation of watershed and climate.

In order to achieve the targets, which are to improve richness of existing forests, to conserve environment and to supply forest products from natural forests in a sustainable way, it is

necessary to implement clear measures for management, protection and regeneration of forests as well as for quality improvement of existing forests through natural regeneration and tree planting. Natural regeneration of 6 million ha in unstocked forests mentioned above is one of important and urgent tasks. However, it should be clearly understood that a large part of unstocked and fallow forests is used in rotational shifting cultivation systems by local villagers. Therefore, natural regeneration in these areas can be achieved through comprehensive rural development including promotion of sedentary agriculture or crop production at household level, integrated agro-forestry development, development of rural finance system, development of and access to market, information dissemination and basic infrastructure development.

Summary

Lao forests made a significant though unmeasured contribution through benefits provided to the rural population. Most rural households, especially the poorest, depend heavily on forests not only for timber for house construction and other purposes but also for food, fodder, fencing materials, medicines and condiments. NTFPs consumption and sales often equate to more than half of family income.

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UNDP, sustainable development goals, Lao PDR

Sustainable Forest Management of Mangrove Forest for the Livelihood of Local Communities, Malaysia

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Abstract: Mangrove forest provides both ecological and economic benefit and many people depend on the mangrove resources for livelihood. In many developing countries, the utilisation and development of the ecosystem is considered as a vital process to support the transformation of the rural communities to higher socio-economic living standard. Realizing the importance and contribution of mangrove forest to human development especially local people that get direct benefit of its ecosystems this paper will discuss on the interaction between mangrove forest management and people living in or adjacent to mangrove areas. The contribution to the mangrove ecosystems to the socio-economic of the local inhabitants, human settlements, forestry activities, employment and income generation. It will also prompting the issues that linkages or derived from human activities to mangroves ecosystem development and also protection act taken by the authorities namely Forestry Department Peninsular Malaysia specifically.

1. Introduction

Sustainable Forest Management (SFM)

The Sustainable Forest Management (SFM) has been defined by the International Tropical Timber Organization (ITTO) as "the process of managing forests to achieve one or more clearly specified objectives of management with regard to the production of continuous flow of desired forest products and services, without undue reduction of its inherent values and future productivity and without undue desirable effects on physical and social environment". It also known as "the stewardship and use of forests and forest land in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil now and in the future, relevant ecological, economic and social functions, at local, national and global levels and does not cause damage to other ecosystems". This is in-line with the National Forestry Policy 1978 (Revised 1992) which emphasizes that the Permanent Reserve Forest (PFR) will be managed in accordance with the principles of Sustainable Forest Management for the maximization of the social, economic and environmental benefits of the nation. One of the strategies is to utilize Permanent Reserve Forest based on the inherent capability of the forest, its optimal use and on comprehensive forest land use through forest regeneration and rehabilitation.

The SFM concept balances between conservation of environment, viability of economics as well as protection of social and culture, thus sustaining forest resources for the welfare of people. The SFM recognizes and supports people's evolving sense of well-being which includes (and not limited to) the basic needs of life but also the eccentric values (a sense of connection with nature, and provision of goods and services), not only for the current but also for the future generation. It also addresses the need to manage forest lands and resources sustainably to meet the social, economic, ecological, cultural, and spiritual needs of people.

Forest Resources in Peninsular Malaysia

The forest cover in Peninsular Malaysia is divided into three categories, which is namely Permanent Reserved Forest (PRFs); State Land/Alienated Land; and National Park/Wildlife and Bird Sanctuary. The largest portion of forest cover in Peninsular Malaysia is contributed by the PRFs with a total area of 4.92 million ha (85%), followed by National Park/Wildlife and Bird Sanctuary with an area of 0.59 million ha (10%) and State Land/Alienated Land of 0.28 million ha (5%) (Figure 1).

Table 1: The total forest cover in Peninsular Malaysia

Forest Cover		Area (ha)*	Percent (%)
Permanent Reserved Fores	Protection	1.91	39
	Production	3.01	61
State Land/Alienated Land		0.28	5
National Park/Wildlife and Bird Sanctuary		0.59	10
Total		**5.80**	**44**

* Value in million

The PRFs in Peninsular Malaysia are gazetted under the National Forestry Act 1984 (Amended 1993), and are managed under Sustainable Forest Management (SFM) practices. It was classified into Production Forest and Protection Forest in accordance with Section 10(1) of National Forestry Act. The Production Forest (3.01 million ha) is managed sustainably to ensure supply of timber continuously. Meanwhile, 1.91 million ha the Protection Forest are constituted of the following 11 functional classes (a) Soil Protection Forest, (b) Flood Control Forest, (c) Water Catchment Forest, (d) Forest Sanctuary for Wildlife (e) Virgin Jungle Reserved Forest, (f) Amenity Forest, (g) Education Forest, (h) Research Forest, (i) Forest for Federal Purposes, (j) Soil Reclamation, and (k) State Park Forest. The Protection Forest within the PRFs are conserved mainly to ensure favorable climatic, physical conditions and socioeconomic activity of livelihood around it for well-being of life.

In Malaysia total area of mangrove forest is 525,626 hectares (ha) which is including Permanent Reserved Forest (PRF), State Land (SL) and Totally Protected Area (TPA). The state of Sabah has the largest mangrove forest area covering 331,325 ha about 63.0 percent of total mangrove forest areas (Sabah Forestry Department, 2016) while state of Sarawak

covering about 88,575 ha which is about 16.8 percent (Sarawak Forestry Department, 2016) and Peninsular Malaysia, about 20.0 percent or 105,726 ha.

Table 2: Mangrove Area in Malaysia

State	Mangrove Area (ha)
Peninsular Malaysia	105,726
Sabah	331,325
Sarawak	88,575
JUMLAH	**525,626**

Source:

* Statistic of Forestry Department Peninsular Malaysia, FDPM 2016

** Sabah Forestry Department, 2016

*** Sarawak Forestry Department, 2016

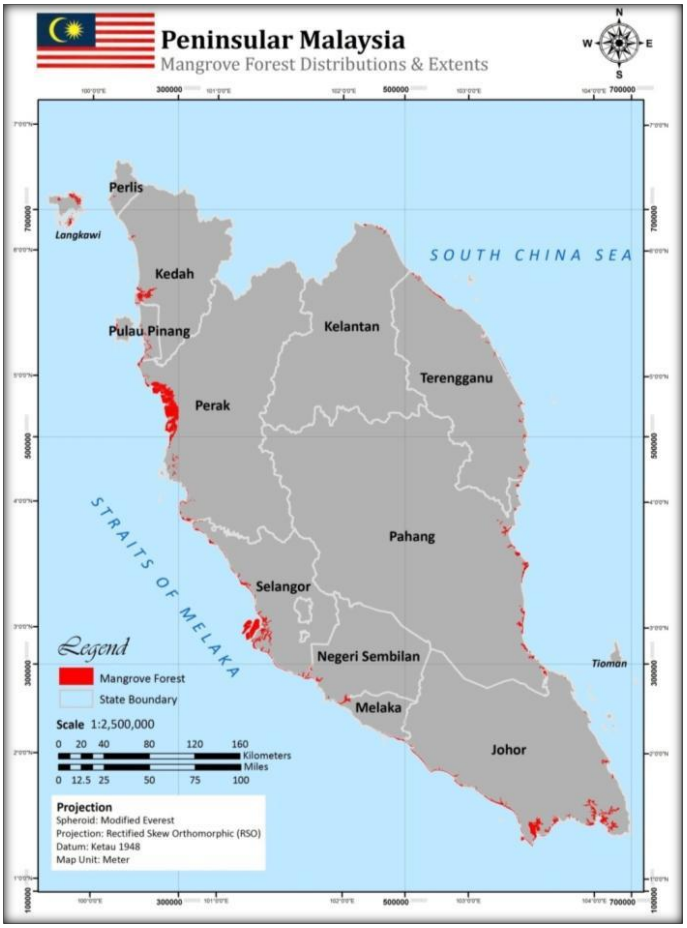

Photo 1: Distribution of Mangrove Area in Peninsular Malaysia

Important of Mangrove

Definition of mangrove forest is a type of forest with high in biological diversity and complex but yet sensitive ecosystem, making it the country's most important natural treasure. It is one

of the very unique tropical ecosystems with special scientific features and ecologically important ecological functions. Mangrove forest also referring to a group of wetland species namely flora that dominates tidal zone ranged between latitude 25 ℃U and 25 ℃S (Lugo and Snedakar 1974; Tomlinson 1986). According to Hamilton and Snedakar (1984), Mangrove forest is a forest ecosystems that resistance to salt water in tidal zone along coastal area. This ecosystem is very suitable for hot and humid climate areas throughout the year and usually form at sheltered and muddy located at the bay area and also estuary area.

Mangrove ecosystems have important ecological and environmental values (e.g Clough, 1993; Spalding et al, 2010). They play important role in the out- well of nutrients to adjacent near shore areas, function as a cleansing system for sediments and nutrients in estuaries (bio-filtration), and help in reducing carbon emissions by storing large quantities of carbon in their biomass. The inter-relationship of mangrove, pollinators and fruits trees for example which make it worthy for special mention. Not only that, it also serve as an alternative food sources, which sustains a viable population of people and animal especially bats and birds. In recent years, mangrove forest have become popular destinations for ecotourism and nature education where people are fascinated by the range of species of flora and fauna that can be easily observed such as stilt root of Rhizophora spp., primates, fireflies and birds either from boardwalks or by boat tours.

Uses of Mangrove Recourses

The socio-economic values of the mangrove have been recognising where most the peoples living in mangrove areas derived their livelihood from fishing, timber cutting for wood, collecting Nypa fruticans leave for roof making and the main socio-economic depended is on poles harvesting and charcoal making. Under the sustainable management regime, mangrove can provide tremendous economic benefit through the support of fisheries, agriculture, maintenance of water tables, production of timber and plant matter, protection against storms, pollution buffering, provision of wildlife resources, transport, recreation and tourism opportunities. In addition to these economic values, mangrove forms part of the cultural heritage of humanity. An archaeological survey in Pulau Kelumpang, Perak in late 1980s led to the discovery of proto-historic sites where they found human artefacts (dated between 200BC and 1000AD) which include remnant of boat, houses, earthen wares, ornaments including human skeletons .

2. Contribution of Mangrove Forest to Local Communities

2.1 Ecological stability

Definition of mangrove forest is a type of forest with high in biological diversity and complex but yet sensitive ecosystem, making it the country's most important natural treasure. It is one of the very unique tropical ecosystems with special scientific features and ecologically important ecological functions. Mangrove forest also referring to a group of wetland species namely flora that dominates tidal zone ranged between latitude 25 ℃U and 25 ℃S (Lugo and Snedakar 1974; Tomlinson 1986).

Mangrove ecosystems have important ecological and environmental values (e.g Clough, 1993; Spalding et al, 2010). They play important role in the out- well of nutrients to adjacent near shore areas, function as a cleansing system for sediments and nutrients in estuaries (bio-filtration), and help in reducing carbon emissions by storing large quantities of carbon in their biomass. The inter-relationship of mangrove, pollinators and fruits trees for example which make it worthy for special mention. Not only that, it also serve as an alternative food sources, which sustains a viable population of people and animal. Mangrove forest play an important functions in ecological stability where there are parallel connection in carbon sink, protective greenbelt for safeguarding against coastal storms and erosion, habitat for various flora and fauna and etc.

2.2 Social-economic Development

The socio-economic values of the mangrove have been recognising where most the peoples living in mangrove areas derived their livelihood from fishing, timber cutting for wood, collecting Nypa fruticans leave for roof making etc. Under the sustainable management regime, mangrove can provide tremendous economic benefit through the support of fisheries, agriculture, maintenance of water tables, production of timber and plant matter, protection against storms, pollution buffering, provision of wildlife resources, transport, recreation and tourism opportunities.

In recent years, many socio studies has been conducted by education institutional, research institution, non-government organisation as well as government authorities related to the socio-economic value of mangrove forest and the need of people adjacent to mangrove area. It shows that there is significant relation between mangrove and the local communities. A social study has been conducted at Matang Mangrove Forest Reserved by FDPM in Ten Years Working Plan (2010-2019) show that Matang Mangrove provides resources that meet the need of local community living within or adjacent to the mangrove area. Matang has a total of 34 permanent settlement of which 28 are the fishing villages. These villages comprise about 5,3000 household or 31,8000 people with average household size of six members. The livelihood of residents in these communities depend on forestry, fisheries and agriculture. The majority of the residents are involved in aquaculture industry either full-timed fishermen or cage culture of fish, crabs, shrimp or on-bottom culture of cockles. Some of the resident mainly Malay fishing villages who is traditional fishermen built their settlement along the mangrove. Report by Perak Fishery Department on 2012 says that Matang Mangrove Forest support about 8,849 fishermen and 4,053 fishing vessel in 2011.

Some of them involve in forestry activities such as harvesting greenwood for charcoal and poles construction. In recent years, they also involve in charcoal production. Harvesting of timber for fuel wood, construction materials, fishing gear, and poles for foundation and even tannin extraction, together with the flourishing charcoal industry as the major forestry activities. It provides employment to the local community in the harvesting of mangrove wood activities and also charcoal industry. In the present working plan (2010-2019) stated that 11,593 hectares of mangrove forest are available to for final felling in ten years which

make allocation felling area as much as 1,075.8 hectares every year. A total of 489 kilns have been approved for the operation involving 114 contractors. It is not only provide an estimated RM49 millions revenue to the government but will also benefit the local community with job opportunities to increase social-economic of the community.

2.3 Live Protection

Mangrove also plays an important role in stabilising coastal sediments and in protecting coastal area from the storm damage (Braatz et el., 2007). This role is frequently overlooked until major storm events hit coastlines where mangrove have been removed. The massive and devastating cyclones that regularly impact the coastline have drawn particular attention to this issue. The function of protecting the coastline and its livelihood from tsunami and erosion has long been recognized and various study nationally and internationally have been and are being taken after the tsunami in Southeast Asia in 2004. The area with mangroves sustained much less damage from the 2004 Indian Ocean tsunami than areas where mangrove have been removed due to coastal development (kathiresan & Rajendran. 2005:Danielsen et el., 2005; Osti et el. 2008). Despite some controversy over whether the presence of mangrove saved human lives during the 2004 tsunami, Wolanski (2006) exerted that mangrove and other coastal forest do tangible coastal protection to the extent that the establishment of coastal green belts as buffers against storm and tsunami events is justified. A study by "The Natural Conservancy, Wetlands International" and "University of Cambridge" in 2014 (Spalding M, et. al. 2014) has scientifically proved that mangrove forest has played an important role to protect the coastal area and disaster management.

Research by the Institute of Foresters Malaysia (IRIM) has done some study on Socio-Economy and Community Welfare on Costal Area, 2013 in Cherok Paloh Village, Kuantan found that erosion on the coastal area along that village cause more than 60 meters of land belongs to the villagers drifted. Detailed study shows that mangrove forest along coastal belt can reduce the impact from wind velocity, wave hit, storm surges and also coastal erosion and how natural reclamation processes at the mangrove forest floor can adapt to the implications of sea level rise

3. Initiatives of Mangrove Forest Management

3.1 Sustainable Management of Mangrove Forest

Management Objective

The Objectives of mangrove forest management are a long-term to ensure development and management of mangrove forest are efficient and effective and also to determine all assets, uses, functions and services of mangrove forest which acquired economically, environmentally friendly and accepted by all levels of society. It also can be improved and ensure the persistent of its benefit. Due to the challenge in current management practices after taken consider the community issues, mangrove management in Peninsular Malaysia emphasis not only to the economic value but also to the other sources of for protection

biological diversity and environmental values. The objective as outline in Management Plan Guideline of Mangrove Forest, 2016 focus on:

1) Forest production (including charcoal, firewood and pole);
2) Coastal protection and security and also the physical stability of river banks;
3) Conservation and preservation of habitat for wildlife survivability as well as fishery resources;
4) Recreation, education and research function.

To ensure the achievement of these objectives, the government and related agencies have been working on at so many different levels involving policy making, planning, management, implementation, and enforcement at all level.

Forest Conservation

Realising the parallel correlation between mangrove forest and its contribution to livelihood development especially in term of social-economic value, the government generally and FDPM specifically puts an effort to manage the mangrove area in Peninsular Malaysia sustainably. Reservation of mangrove forest began in 1902 started with island forest at Matang Mangrove Forest, Perak and then followed by other states such as Selangor in 1920, Kedah in 1923 and other states. With various study shows that mangrove areas are very sensitive to and disturbance or changes where it can take hundreds of years to recover, FDPM take initiative to reserve the mangrove forest under Permanent Reserve Forest. In 2015, FDPM succeeds to reserve a total of 89.8 percent of the area to be managed sustainably either for production or protection forest.

Table 3: Mangrove Forest Area in Peninsular Malaysia

States	Mangrove Area (ha)	PRF/TPA (ha)
Johor	32,301	31,915*
Kedah	11,729	6,201*
Kelantan	744	-*
Melaka	92	102*
Negeri Sembilan	101	101*
Pahang	2,416	2,416*
Pulau Pinang	1,045	1,045*
Perak	43,669	43,878*
Perlis	10	-*
Selangor	23,648	18,998*
Terengganu	1,987	1,037 *
TOTAL	**117,742**	**105,693**

Note:

* Statistic of Forestry Department Peninsular Malaysia, FDPM 2015

Policy and Governance

Mangrove forest around the world are gaining fast recognition as important natural habitats, so as the mangroves in Peninsular Malaysia, which need to be managed and conserved for the wellbeing of communities whose livelihood depends on them and their role in stabilising the coastal ecosystem. Recognising the significant important to retain the mangrove forest, the government is fully committed to the implementation of sustainable management practices within this forest. Special emphasis on the protection of the mangrove forest is duly recognised and given specific attention to be adopted and implement as a guideline in mangrove management in Long-Term Policy, Middle-term Policy and Short-term Policy such as Vision 2020 that initiated on 1991-2020, Five Years Malaysia Plan (recent plan is 2016-2020), National Forestry Policy (approve by National Forestry Council- MPN in 1977), National Forestry Act 1984 revised 1992. This policy provides guidelines and strong emphasis on the necessity for sound management, conservation, utilization, development and protection of the mangrove forest in Malaysia. The need to protect and conserve forest resources are further strengthen and highlighted in the National Economic Recovery Plan 1998.

As in Peninsular Malaysia, reserve mangrove forest was under the State Forestry Department management and its stand as Forest Management Unit (FMU). Each FMU has documented their own ten years working plan. For example, Matang Mangrove Forest Reserve which has the largest area in Peninsular Malaysia about 41% of the total area started to have a working plan since 1930 to recognise and manage the production and protection forest systematically and sustainably and Matang Mangrove Forest have been often reported to one of the best-managed mangrove forests in the world.

3.2 Mangrove Restoration Programme

In Malaysia, tsunami formed from an 8.9 magnitude quake on the Richter scale, also caused a massive damage in three states namely Pulau Pinang, Kedah and Perak which killed 43 people, 6 people missing and hundreds are injured. Almost 1,000 villages are damage during the tragedy and it took millions of Ringgit Malaysia to rebuilt and recover the physical, economic and psychology damage to the area and the people. Taking into consideration on how much coastal community relies on mangrove forest for their not only economically but survival, Malaysia government have taken approaches to strengthen it coastal area by launching so many restoration programs. Started in 2005 in Ninth Malaysia Plan (2005-2010) until 2017 is now more than a decade it’s a continues commitment not only involve the government and agencies but also Non-profit Organization (NGO), education institution, research institute, private sector and also local community. This programme called Program Of Planting Mangrove Trees And Suitable Species On The Coast Of The Country have been allocated about RM45,287,810 to not only for planting trees but also for research and development (R&D), public awareness campaign, site recovery and enforcement activities. For more than ten years, it has covered about 2,605.17 hectares with 6.32 million trees of mangrove species along Malaysia coastal area.

Table 4: Achievement of mangrove tree planting program from 2005 until 2015

Species	Area (hectare)	Number of Trees
Rhizophora	2,038.41	5,838,181
Avicennia	421.99	277,198
Others	114.77	207,912
Total	**2,605.17**	**6,323,928**

Source: Program of Planting Mangrove Trees and Suitable Species On The Coast Of The Country Annual Report 2015

Among species planted are Avicennia spp., Rhizophora apiculata, R. mucronata, Sonneratia spp., Xylocarpus moluccensis, X. granatum, Syzygium grandae, Fragrea fragrans, Callophyllum inophyllum, Bruguiera spp., Nyppa spp., Catappa terminalis etc. Planting area was selected based on the objective of the programme as below:

1) to conserve coastal areas as a natural shelter to reduce the destruction caused by natural disasters and soil erosion;
2) to create a buffer zone to withstand the strength of waves and strong winds and also prevent environmental pollution;
3) to restore coastal habitats which is known as corridors to biodiversity and enriching coastal resources; and
4) to improve the quality of the environment and its special value as an tourism attraction.

In order to ensure the successful outcome of the programme, there are 18 scientific research and development have been done in pre-implementation, during- implementation and also post-implementation to overlook and overcome issues and challenges that might occur. Not only that, there are over hundred series of awareness programme, dialogue, consultation involving the local community, students and state governance to increase knowledge and awareness on how important it is to protect, conserve and preserve the high sensitive yet complex mangrove ecosystem. All of these activities are to archives the main purposes which is to ensure the stability of the coastal area, the safety of local community settlement and to provide a suitable habitat for biodiversity of flora and fauna.

3.3 Potential for Eco-tourism

The Federal Government realizes the long-term economic benefit of tourism and related industries, and has methodically encourage, planned, promoted and provide certain amount of budget under it agencies for this wide and broad-based service industry. This effort have been encouraging and monitoring the increasing number of visitor locally and internationally. In recent years, mangrove forest have become popular destinations for ecotourism and nature education where people are fascinated by the range of species of flora and fauna such as stilt

root of Rhizophora spp., primates, fireflies and birds. Recently, there are some place offer eco-tourism activities such as boat trip, elevated walkways, boardwalk for people to experience the diversity and complexity of mangrove ecosystems for example Matang Natural Education Centre (NEC) in Perak. In addition to that, mangrove forms part of the cultural heritage of humanity. For example, an archaeological survey in Pulau Kelumpang, Perak in late 1980s led to the discovery of proto-historic sites where they found human artefacts (dated between 200BC and 1000AD) which include remnant of boat, houses, earthen wares, ornaments including human skeletons. All of these unique habitat and features can contribute to the development of local community's livelihood. Even though it can be manage for eco-tourism but physical development must be minimal and degraded area should be restored. However, feasibility study must be properly done to ensure that the mangroves in the area are not destroyed by physical and infrastructural development.

4. Conclusion

People acknowledge the important of mangrove forest and that sustainable management had provided resources for their livelihood and contributed to their socio-economic well-being as well as live protection. These day, many has realised that conversion of mangrove forest for other uses especially development purposes could adversely affect their livelihood. Knowing the fact that, to restore the natural ecosystem of mangrove forest after the destruction is very complicated and costly. So these people are now voluntarily and actively work together with the authority in managing mangrove area and its valuable resources. They become the eyes and ears for the government authority to uphold prevention and enforcement programmes in order to manage the mangrove forest sustainably. It's a long and difficult journey, but as long as we are together we can archives the core objectives of sustainable forest management to use the forests and its resources without cause any damage to it ecosystems.

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Study on Contribution of Non-timber Forest Products (NTFPs) Income to Rural Livelihood in Myanmar

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Abstract: Non-timber forest products (NTFPs) play an important role in the household economy of the rural forest dwelling communities not only for subsistence but also for cash income even inside the protected areas in Myanmar. This study examines the dependence of local people on NTFPs and identifies the relation between household socio-economic characteristics and cash income generated by NTFPs collection. Data were collected through face-to-face interviews to 184 households, focus group discussions and key informant interviews in ten villages located around the Popa Mountain Park (PMP) in Myanmar during September and October 2015. There were six types of non-timber forest products collected by local people. According to multiple regression analyses, the NTFPs cash income dependency was negatively related to proximity to market. The incomes from other livelihood activities such as agricultural income and off-farm income were also negatively related to the NTFPs cash income dependency. The study aims to help provide the necessary information for sustainable forest management.

Keywords: non-timber forest products, income, socio-economic characteristics, dependency

Introduction

Myanmar is a forest resource rich country in Southeast Asia and forest resources are important not only for basic needs of over 70% of rural residents but also for earning national income. Currently, the natural forest cover of the country is about 29,041,000 ha which equivalent to 42.92% of the country's total land area (FAO 2015). Major forest types are Mixed Deciduous forest (38.3%), Hill and Temperate Evergreen Forest (26.9%), Tropical Evergreen Forest (17.2%), Dry Forest (9.8%), Deciduous Indaing (Dipterocarp) Forest (4.2%), Scrub Land (2.2%) and Mangrove Forest (1.47%) (FD 2011). These diverse forest ecosystems in Myanmar are habitat for nearly 7,000 plant species, 96 bamboo species, 36 rattan species, 841 orchid species, 360 mammal species, 360 reptile species and 1,000 bird species - an outstanding biodiversity not only on regional but also on a global scale (FD 2011). Teak (*Tectona grandis*), Pyinkado (*Xylia xylocarpa),* Tamalan (*Dalbergia oliveri)* , Padauk (*Pterocarpus indicus),* Thitya (*Shorea obtusa),* Ingyin (*Shorea siamensis)* etc are well-known commercial tree species while non-timber forest products provide diverse goods for the livelihood of rural poor people.

All of Myanmar forests are state-owned national forest although there are some private and community forest plantations established with 30-year land lease contract. There are three major categories under state-owned national forests or Permanent Forest Estates (PFE) namely Reserved Forest (RF), Protected Public Forest (PPF), Protected Area Systems (PAS). Forest department under the Ministry of Natural Resources and Environmental Conservation targets to establish 30% of the total land area as RF and PPF for sustainable forest management and 10% as PAS for biodiversity conservation. So far, 24.05 % (18% RF, 6.05% PPF) of the total land area has been gazetted as RF and PPF and 6.67% of the country area has already been declared and protected under PAS (FD 2016).

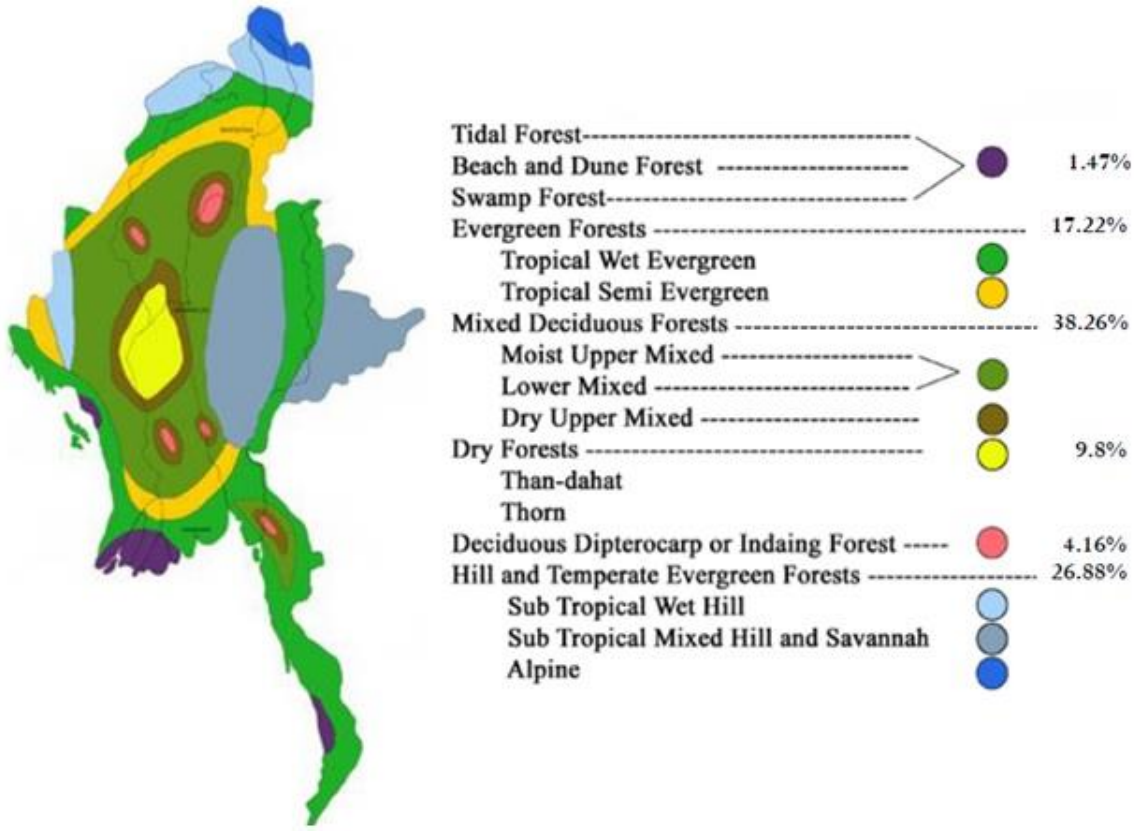

Figure 3: Distribution of Major Forest Types in Myanmar

Source: A checklist of the Trees, Shrubs, Herbs and Climbers of Myanmar, Contributions from the United States National Herbarium, Volume 45:1-590 published in (2003)

Non-timber-forest-products (NTFPs) contribute significantly to maintain livelihoods in rural Africa, Asia and elsewhere in developing countries (Campbell, Luckert, and eds 2002; Cavendish 2000; C. Shackleton, Shackleton, and others 2004). They play an important role in the household economy not only for subsistence but also for cash income even inside the protected areas. According to Shackleton et al. (2011), for about 60 million people, NTFPs are essential, while further 350 million use NTFPs in times of crisis, and between 500 million and 1 billion people manage remnant forests for subsistence or sale of NTFPs and further 45 million people are artisans or employees transforming NTFPs into marketable products. Moreover, income from environmental sources plays an important role in rural livelihoods and the livelihoods of rural households are directly or indirectly linked with the natural

resource base in developing country (Babulo et. al. 2009). Therefore, estimating the incomes of people whose livelihoods depend on forest products is a key to understand their wellbeing and use of forest (Wollenberg and Nawir 1998).

In Myanmar, there are several types of NWFPs that provide alternative opportunities of livelihood development. Therefore this study used the definition **"any product or service other than timber which are derived from forests, other wooded lands and trees outside forests".** In this definition, NTFPs includes all biological matter of wild plants, i.e. fruits and seeds, vegetative textures (bulbs, leaves, flowers, bark, roots) as well as various small stems, twigs and firewood (Cunningham, 1996).

One of the major factors that influence the extraction of forest products is poverty (Aung et al. 2012) and this is strongly affected by the lack of alternative income opportunities for local people. In Myanmar, rural people essentially rely on the wealth of forests for their livelihood, such as food, fodder, fuel, and shelter, and cultural survival because of the poverty (Zin 2009; Ministry of Forestry 2010; Ministry of Environmental Conservation and Forestry 2012). Consequently, the socio-economic condition of local people strongly influences sustainable forest management in Myanmar (Oo 2012).

Livelihood, in simplest term, is a mean of gaining a living. To be more specific, livelihood is defined as adequate stocks and flow of food and cash to meet basic needs (Chambers and Conway, 1991: p.5). And a livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, without undermining the natural resources base (Scoones, 1998: p.5).

In Myanmar, although rural people essentially rely on the wealth of forests for their livelihood, such as food, fodder, fuel, and shelter, and cultural survival because of the poverty, there is limited information of how much the community gets the contribution from forest resource for their livelihood. In case of income, a recent study including "distribution of forest income among rural households" was measured by Pyi Soe Aung et. al. (2014) in Natma Taung national park, Chin State of Myanmar revealed that the forest income is the first most important source of household income, contributing to about 50 % to 55% of the total household income in two study villages. Analysis of the significant of NTFPs in rural household economy in Thayarwady District(Moe and Liu 2016) , Bago Region showed that NTFPs income contributes 44.37%, and farm income and non-farm income contribute 32.55% and 23.07% to the total household income respectively. The lower and middle income level households derived more NTFPs income than high income level households. For low income households, share of NTFPs income in the total household income is over 75%. Major NTFPs include bamboo, thatch, firewood, charcoal, bamboo shoot, broom grass, bark and root, and others. Therefore, this case study was carried out to explore the dependency of local people on forest resources particularly NTFPs in Central Dry Zone of Myanmar which is one of the poorest region in Myanmar.

Objectives

The overall objective of the study was to understand the contribution of NTFPs to local people livelihood living around the Popa Mountain Park. Base on the overall objective, the specific objectives are divided as following.

1. To find out the different types of non-timber forest products that households collected for subsistence and cash income
2. To estimate the value of NTFPs that households benefitted from selling of different NTFPs
3. To determine the socio-economic characteristics that influence the household dependence on NTFPs

Materials and Methods

The study was conducted in Popa Mountain Park which covers approximately 100 km2 and located in the Central Dry Zone of Myanmar. Mean maximum and minimum monthly temperatures respectively are 42˚C and 12˚C and the mean annual rainfall is about 1148 mm (Popa Forest Department office, 2015, unpublished data). More than 100 springs in PMP supply drinking and irrigation water to thousands of people in the surrounding area. Mount Popa is famed for high plant diversity and as a source of medicinal plants. The objectives of Popa Mountain Park are to conserve the forest, to protect the watershed of the Kyet-mauk-taung dam located at the southern edge of the park, to conserve the medicinal plants for sustainable use, to preserve of existing religious sites and to ensure sustainability of water sources, including natural springs There are very limited populations of small mammals such as wild dogs (Cuon alpinus), muntjac (Muntiacus muntjak), wild pigs (Sus scrofa) and monkeys (Macaca assamensis, Presbytis phayrei), and hunting pressure is low (Htun, Mizoue, and Yoshida 2012).

The PMP includes a diverse range of vegetation types such as dry mixed deciduous forest, and dry dipterocarp forest (scrub indaing forest), dry forest (Than-dahat forest) and dry hill or evergreen forest (Htun, N.Z., Mizoue, N, and Yoshida, S. 2011). All forests in PMP are second or third growth forests as results of timber harvesting and clearing for agriculture in the early twentieth century (FD, 1981).

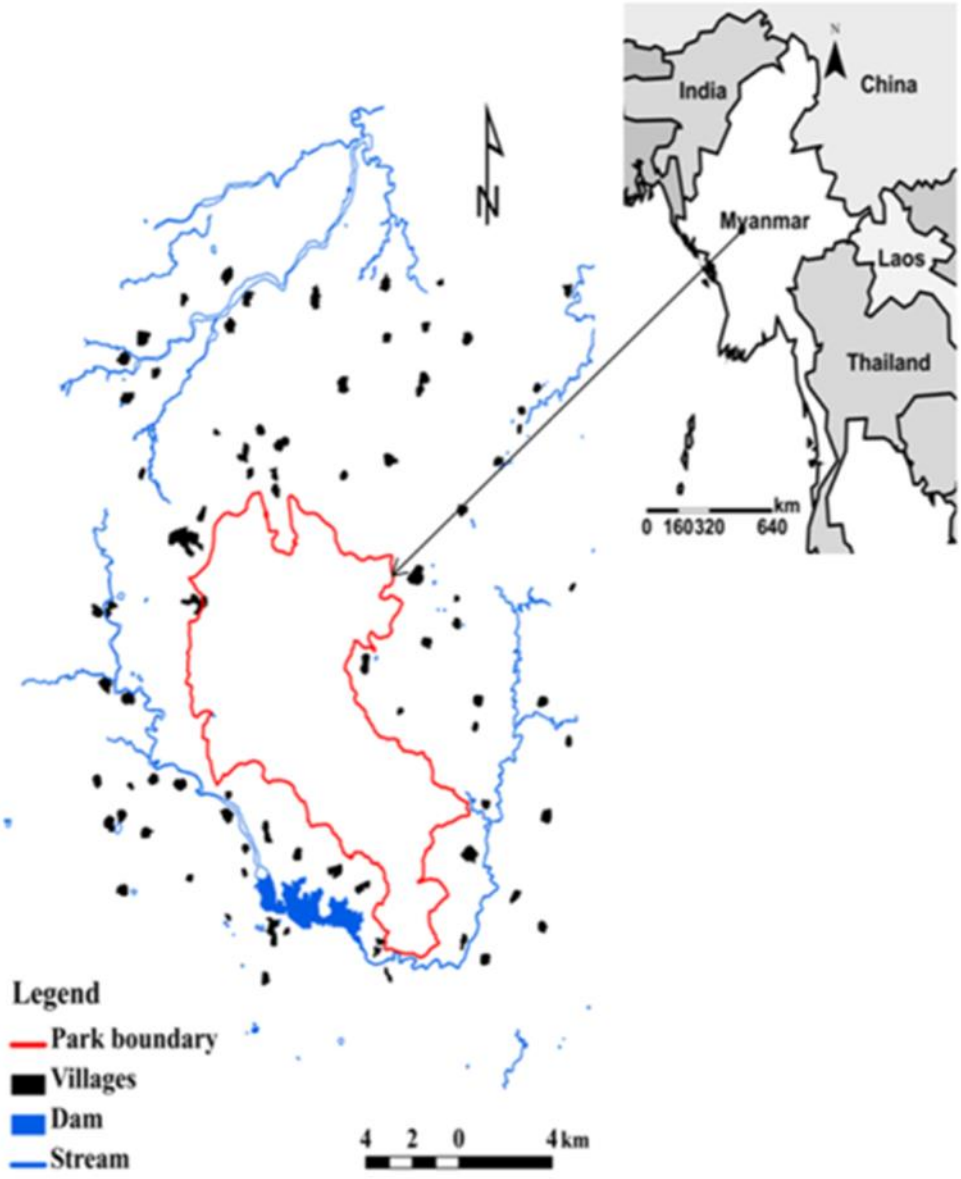

Figure 4: Location map of Popa Mountain Park

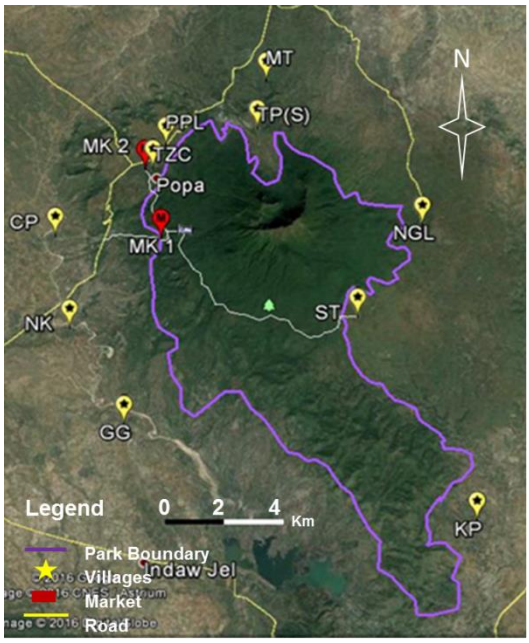

Figure 5 Location map of sampled villages and markets

Ten villages were chosen based on the information from market survey and the informal focus group discussion with the park rangers depending on the following criteria such as (1) representativeness of the region, (2) the dependence on forest resources (3) distance from the local market place and (4) accessibility. Locations of studied villages are indicated with the mark points in the Figure 3. A total of 184 households were interviewed and the number of sampled households per village varied from 5 to 25 household.

Key Elements Relating to the Case Study and Lessons Learn

Results

Livelihood Activities

Other than forest activities, sampled households in villages engage in three major livelihood activities which are agricultural production, livestock breeding and off-farm employments, each of which is briefly discussed below:

Agricultural Production

In PMP area, the agricultural practices are different between western side villages and eastern side village. The major agricultural practices on the eastern side are cultivation of bananas, fruits and other seasonal crops, while the main activities on the west side are cultivation of rain-fed rice paddies, palm-sugar production, small-scale fisheries, and seasonal crops (Htun, Mizoue, and Yoshida 2012). The major crop species that are grown as cash income for the households of the west side include green-gram (Vigna radiate), sesame (Sesamum indicum) and peanut (Arachis hypogaea) tomato, chili, corn, pigeon pea and sunflower. Other crop species that are grown as self-consumption or animal feeding are paddy (Oryza sativa) and sorghum. In the eastern side villages, the major cash income fruit species are banana, papaya, mango, tamarind, custard apple, guava, jack fruit, cashew nut and dragon fruit (Hylocereus

undatus and Hylocera costaticensis). The banana cultivation is the major cash income generating activities in that area since long time ago and some of the banana cultivated lands in the PMP have been removed from PMP when that area is delineated as protected area. Therefore, the villagers started to change their cultivated crops and the market demand for dragon fruit is increasing in that area since two or three years ago. Therefore, some households started to plant the dragon fruit plants in their farms and homesteads in order to get cash income. The other cash income fruits included custard apple, guava and mango and the villagers also got high income from cultivation of that fruit trees.

In general, most of the households in all sampled villages own about one or more small plots of land with an average area of 1.59 ha per household. The distribution of agricultural land is found to be significantly different across the villages. The average annual income from agriculture in all sampled villages is about 533,080 kyats (US$ 410) per household. The distribution of agricultural income is found to be significantly different across the households in different villages where CP, TZC, KP and GG villages have the lower agricultural income (Table 1). (1 US $ = 1300 Kyats at the time of survey)

Table 3 Average agricultural land of households in different villages

Villages	Agricultural Income		Kruskal Wallis Test
	Mean	SE	
TZC (n=8)	63750	62334	$p = 0.001$, $X^2 = 27.51$, df = 9
CP (n=21)	327257	97726	
PPL (n=13)	587846	229531	
ST (n=5)	587800	309878	
TP(S) (n=22)	795193	132983	
MT (n=25)	623260	129064	
KP (n=25)	295720	71947	
NGL (n=25)	727300	146985	
NK (n=15)	779200	420451	
GG (n=25)	391360	82418	
Total (n=184)	533080	53943	

n= number of households, SE = Standard Error
(Data Source: Interview survey in 2015)

Off-farm Employment

The most common off-farm activity in all sampled villages is working as wage labour in the farms of other households. The average daily wage for an adult labour in villages is about 3000-4000 kyats (US$ 2.31) per day for men and about 2000-2500 kyats (US$ 1.92) per day for women. However, the season available for wage labour is very limited since most of the farmers require labour for their farm during planting, weeding and harvesting season (June - September) only. The second major off-farm activities in the region is the carpentry works for construction of houses and the hired labour in the construction of building by contracts in surrounding villages as well as in Popa. However these types of job are also limited since it requires skill labour and are only available during the open season (November - April). Other

types of off-farm employments include selling goods, transporting banana from farm to collecting place to transport to the town, transporting goods from village to the town and government staffs and company staffs. There are also some households who got the remittance money from the family members who are working outside the villages such as in other capitals and at the abroad (Malaysia and Thailand). In this study, the remittance money from the family members are also included in the off-farm income categories and it constitutes the major income share to off-farm income. On average, household in all sampled villages receive about 886,660 kyats (US$ 682) per year from off-farm employment activities and remittance from family members (Table 2).

Table 4 Average off-farm income of sampled households in different villages

Village	Off farm Income		Kruskal Wallis Test
	Mean	SE	
TZC (n=8)	731562	235017	p = 0.027, X^2 = 18.813, df = 9
PPL (n=12)	728077	219157	
CP (n=21)	603524	200578	
ST (n=5)	456000	151050	
TP(S) (n=22)	862182	280586	
MT (n=25)	794720	146562	
KP (n=25)	488800	141030	
NGL (n=25)	1066520	226757	
NK (n=15)	1328333	238104	
GG (n=25)	1409200	274122	
Total (n = 184)	**886660**	**76070**	

n= number of households, SE = Standard Error
(Data Source: Interview survey in 2015)

Livestock Breeding

In most of the sampled villages, the livestock breeding is not very intensive livelihood activities. Households raise livestock mainly for farming activities and to supply the meat requirement for self-consumption as well as to generate supplementary cash income. The most commonly raised livestock include cows, pigs and chicken. In general, households in all sampled villages received the average income from livestock about 76,462 kyats (US$ 59) for the last twelve months. The distribution of average livestock income is significantly different across the villages (Table 3).

Table 5 Average livestock income of sampled households in different villages

Villages	Livestock Income		Kruskal Wallis Test
	Mean	SE	
TZC (n=8)	0	0	p = 0.001, X^2 = 31.506, df = 9
PPL (n=13)	115077	99248	
CP (n=21)	102381	65214	
ST (n=5)	1800	1800	
TP(S) (n=22)	9091	9091	

MT (n=25)	32600	24955
KP (n=25)	178600	67654
NGL (n=25)	70560	38732
NK (n=15)	118000	105822
GG (n=25)	56000	42458
Total (n = 184)	**76462**	**18375**

n= number of households, SD = Standard Deviation, SE = Standard Error
(Data Source: Interview survey in 2015)

Different Categories of Non-timber Forest Products that the Households Collected

There were six categories of non-timber forest products that the local people collected such as (1) medicinal plants, (2) firewood, (3) mushroom, (4) wild fruits, flowers and leaves, (5) bamboo shoot and (6) bamboo culm. 100 % of sampled households reported to use firewood for subsistence and therefore, firewood is the most common products collected by households. Among them, 31 species of medicinal plants were sold by the local people at the small market place near the PMP to get cash income . Other non-timber forest products that the households get the cash income are firewood, mushroom and other wild fruits and flowers. The proportion of sampled households that practiced the collection of different categories of non-timber forest products for subsistence and sale is shown in Figure 5.

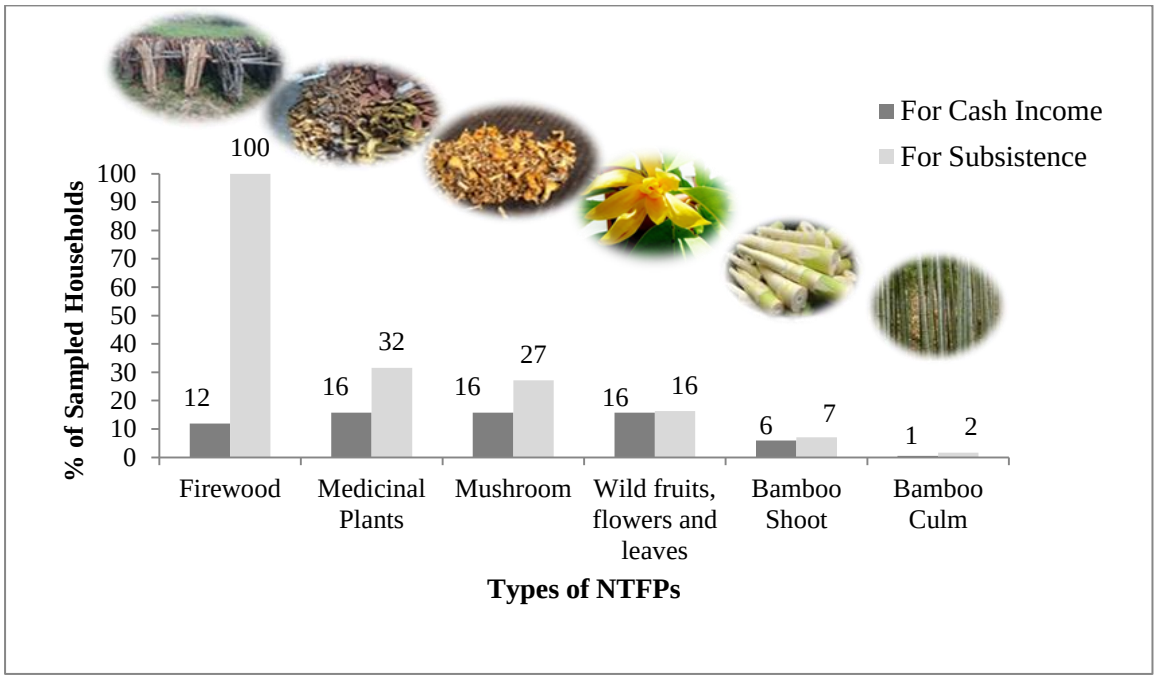

Figure 6 Proportion of sampled households that collected different categories of NTFPs

Comparison of Non-timber Forest Products Cash Income of Sampled Collectors' Households

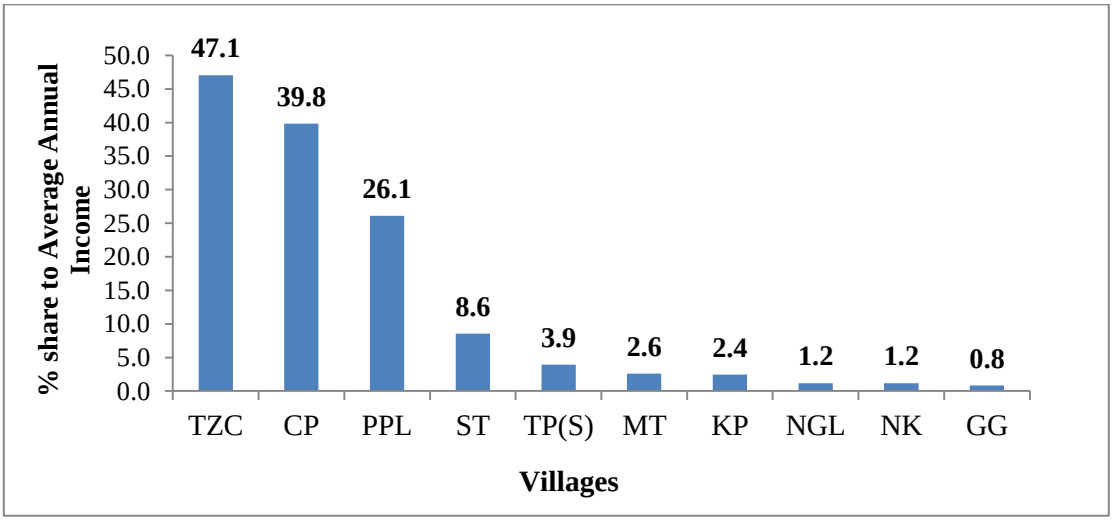

Figure 7 NTFP income share (%) to total annual household income

In term of absolute value, the cash income of NTFPs is relatively higher in TZC village, CP village and PPL village (Table 4). The income from NTFPs contributes 1% to 47.1 % of total annual income among 10 villages (Figure 5) and the income showed significant different among villages ($p<0.001$) (Table 11). But the proportion of NTFPs cash income share percentage to total income of household are relatively higher in 3 villages such as 47.1 % in TZC, 39.8 % in CP village and 26 % in PPL village. The average annual cash income from NTFPs is about 684,333 kyats (US $ 526) in CP village. In TZC village, the amount is about 706,750 kyats (US $ 543) per household per year and in PPL village, the average income amount is 505,923 kyats (US $ 389) per household per year. Among the studied villages, the collectors' households in GG village reported the minimum cash income from NTFPs. Average annual cash income of NTFPs by households in different villages is described in the Table 4.

Table 6 Comparison of average NTFPs cash income of the households in different villages

Villages	NTFP Cash Income (Kyats)	Min	Max	SE	Kruskal Wallis Test
TZC	706,750	45,000	2,207,000	243050	p=0.001, X^2= 110.911, df=9
CP	684,333	99,000	1,275,000	78434	
PPL	505,923	0	1,260,000	114130	
ST	97,800	0	324,000	59108	
TP (S)	68,045	0	505,000	28667	
MT	38,360	0	370,000	20259	
KP	24,000	0	430,000	17521	
NGL	22,200	0	430,000	17286	
NK	26,533	0	300,000	19842	
GG	15,216	0	240,000	10055	
Total (n=184)	171,089			86520	

Comparison of Non-timber Forest Products Cash Income among Three Villages

When comparing the villages that got the high NTFP cash income, the mean annual average income was the highest in TZC village, the second highest in CP village and the lower in PPL village. There were no significant different among the three villages in term of absolute income of NTFP income. But the dependence on NTFP income is the highest in TZC village (47.1%) and the second higher dependence is the CP village (39.8%). For agricultural income, the result showed a significant different among three different villages ($p<0.01$). The agricultural income from TZC village was significantly lower than the other two villages and the households from PPL village got the high income from agriculture. This is because the agricultural land owned by TZC village was 0.2 ha and the households did not owned the cattle for farming activities (Table 5). But they had the significant high income from off-farm activities comparing with other two villages. The sampled collectors' households of TZC village did not get the income from livestock. Table 6 shows the comparison of average annual income from different sources livelihood activities by using Kruskal Wallis Test.

Table 7 Demographic information of TZC, CP and PPL villages

Households Characteristics	TZC	CP	PPL	ANOVA
No of family members	5	4.86	4.46	p=0.693, F=0.37,df=2
No of adult labour	2.5	2.81	2.62	p=0.657, F=0.425, df=2
HH head education	5.5	4.95	5.77	p=0.563, F=0.583, df=2
HH head age	50.88	47.9	46.31	p=0.689, F=0.376, df=2
No of cattle owned	0	0.76	0.62	p=0.211, F=1.621, df=2
Total Agricultural land	0.2	1.88	1.21	p=0.012, F=5.003, df=2

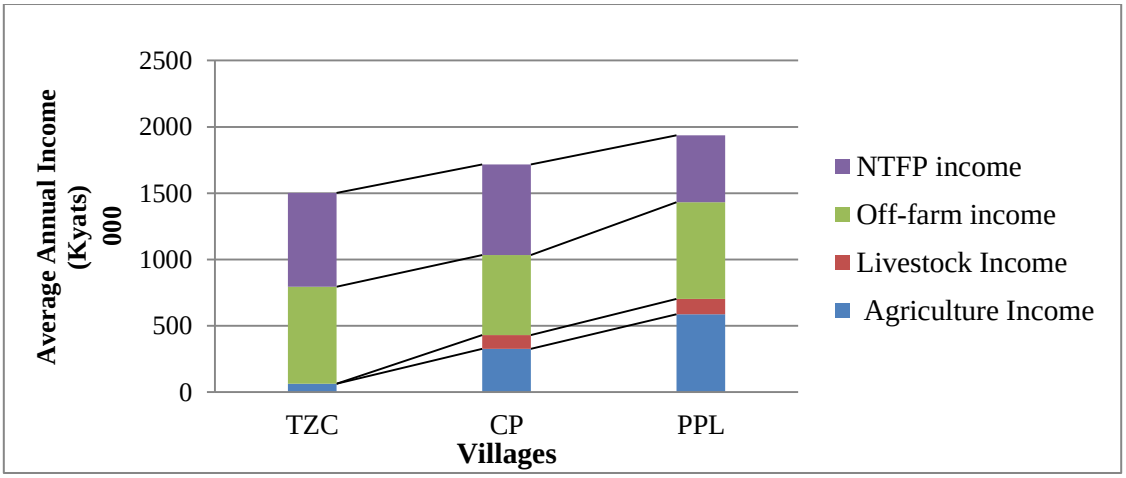

Figure 8 Comparison of average annual income from different sources of livelihood activities among three villages

Table 8 Comparison of average annual income from different sources livelihood activities

Income	TZC		CP		PPL		Kruskal Wallis Test
	Income	%	Income	%	Income	%	
Agriculture Income	63,750	4	327,257	19	587,846	30	p=0.009, X2=9.334, df=2
Livestock Income	0	0	102,381	6	115,077	6	p=0.05, X2=6.007, df=2
Off-farm income	731,563	49	603,524	35	728,077	38	p=0.501, X2=1.383, df=2
NTFP Income	706,750	47	684,333	40	505,923	26	p= 0.333, X2 = 2.220, df = 2
Total Income	1,502,063	100	1,717,495	100	1,936,923	100	p=0.45, X2=1.598, df=2

Household Characteristics and NTFPs Dependency

Factors Relating to NTFPs Income

In order to identify the factors relating to the NTFP income, the principal component analysis was carried out. The three principal components account for 51% of total variation. The PC 1 represented the relationship between NTFPs income and the proximity to markets and it can explained 23% of variance. It indicated that NTFPs income is positively correlated with the income from MP and the income from firewood and wild fruits, flowers and leaves. But the NTFP income is negatively correlated with the proximity to the local markets. The PC 2 represented that the variation in agricultural land explaining about 16% and it is positively correlated with the agricultural income and number of labours. The PC 3 represented the variation in off-farm income explaining the 12 % and it indicated that the off-farm income was positively correlated with the total annual income of households and number of adult labours. From this result, we could also imagine that three villages TZC, PPL and CP were the NTFPs high income earned villages (Figure 7).

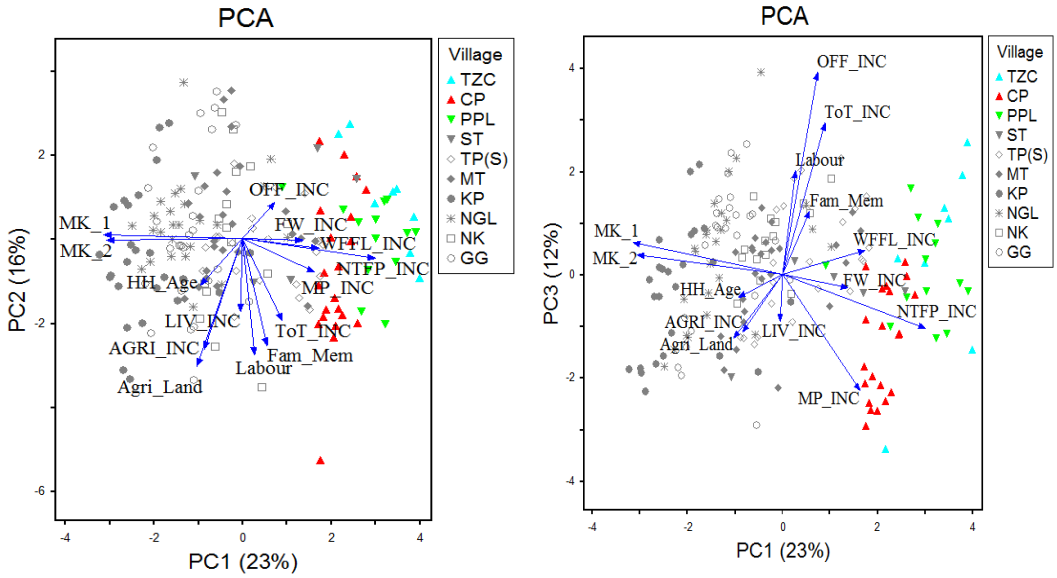

Figure 7 Principal Component Analysis (PCA) showing the factors relating to the NTFPs income and variation among villages

Based on the PCA result, forward Stepwise Multiple regression models were carried out. The NTFPs income and share of NTFPs income in the total household income are considered as the dependent variables and household characteristics, age of the household head, education

of the household head, household size, agricultural land holding, and proximity to market place are considered as independent explanatory variables. Therefore two multiple regressions, NTFPs income against socioeconomic variables and NTFPs income share in the total household income against household socioeconomic variables, are run.

Relationship between Household Characteristics and NTFPs Income

In the first model, regression of NTFPs income against household socioeconomic variables, the F-test of the model showed that the regression model is significant at 1% probability level. The model has a reasonable explanatory power with the R2 value of 0.42. Two explanatory variables, proximity to local market place and age of the household head showed the negative relationship with the income from NTFPs. Proximity to the market was significant at 1% significant level and the age of household head was significant at 5% level (Table 7).

Table 9 Forward Stepwise Multiple Regression of NTFPs income against socio-economic characteristics of households

Variables	B	SE B	Beta	p value
(Constant)	832460.955	48668.372		0.001**
Proximity to Market	-6779.651	619.061	-0.623	0.001**
	(-8001.16, -5558.15)			
HH head age	-3359.804	1478.948	-0.129	0.024*
	(-6278, -441.607)			

N= 184, R= 0.65, R^2 = 0.42, Adjusted R^2= 0.41, F= 64.96, *; p <0.05, **;*p* < 0.01

Table 10 Forward Stepwise Multiple Regression of Relative NTFPs Income against socio-economic characteristics of households

Variables	B	SE B	Beta	p value
(Constant)	52.505	3.493		0.001**
Proximity to Market	-0.444	0.042	-0.583	0.001**
	(-2.792, -1.565)			
Off-farm income	-5.62E-06	0.0001	-0.244	0.001**
Agriculture Income	-6.64E-06	0.0001	-0.204	0.001**

N= 184, R= 0.68, R^2 = 0.46, Adjusted R^2= 0.45, F= 51.58, *; p <0.05, **;*p* < 0.01

Relationship between Household Characteristics and NTFP Relative Income (NTFP Dependency)

In the second model, regression of NTFPs income share against household socioeconomic variables, the F-test of the model shows that the model is significant at 1% significant level. R2 value of 0.46 in the second model means that the second model has a better explanatory power than the first model. In the second model, proximity to local market place, off-farm income and agricultural income are significant at 1% significant level. All three variables are negatively related to the relative NTFPs cash income. But the age of household head did not show the significant in the second model (Table 8).

Since the focus of this study is cash income from NTFPs, the proximity to market have significant influence on the NTFPs income is reasonable. Both models show that the distance to the market is negatively correlated with NTFPs income and also the NTFPs income share. This means that the households located near to the market place are more likely to received NTFP income and depend on the NTFPs for their livelihood.

Agricultural income is the major income source for rural households in Myanmar. Higher agricultural income is the important factor that is likely to reduce the dependency on forest resource. In this study, the agricultural income shows the negatively associated with the dependency on NTFP income. This means that the households who get the lower agricultural income are more likely to depend on NTFPs income.

The off-farm income shows the negative correlation with the relative NTFPs income. Non-farm (off-farm) income is one of the important livelihood strategies for a rural household which is one of the alternative livelihood strategies for households when the major income is not enough to support to household economy. When the households who did not receive the enough agricultural income also did not have income from other sources, they have to participate in the forest related activities.

In the second model, age of household head is not statistically significant though it had negative relationship with NTFPs income. But in the first model, age is negatively and statistically significant at 5% significant level. Therefore it can be said that the household with younger household headed are likely to receive more income from NTFPs than the households with older head.

In summary, a combination of household characteristics such as household head age, and proximity to the local market places are observed to influence significantly on the total NTFPs income in that study area. In term of forest dependency, it is observed that the proximity to local market shows negative relationship with the dependency of NTFPs income suggesting that the households who lived near to the local market depend more on the NTFP income for household economy. There is also negative relationship between income from other income sources and the NTFPs income dependency suggesting that the households who did not get the income from major livelihood activities are likely to depend more on NTFPs.

The Way Forward

Based on this research, there are some implications for conservation of the PMP and development of that area.

For Conservation of Forest Resources in PMP:

The first option is to look up the distribution of NTFPs resources especially for medicinal plants in order to understand how the population of different medicinal plants species are distributed in PMP and the impact of extraction of medicinal plants on the forest ecosystem as the local people are depend on these products for cash income generation activities. Since one of the objective of establishing PMP as the protected area is to conserve the medicinal plants for sustainable use, it is needed to understand that the extraction of medicinal plants is in

sustainable or not. But sustainability is a complex concept and there are many definitions of what the sustainable means.

As households depended on the products from the national park, complete protection and restriction of access will affect a number of households that depend on forest resources for necessity. Therefore, second possible measure for conservation is to develop and designated zonation plan for extraction of medicinal plants and firewood. But for the species which has low population in the wild area should be control to extract.

The next option is awareness raising for local people. It is also necessary to conduct the extension activities especially in villages which are the most dependent villages for income generation in order to realize the role of the forest and forest resources for regulating climate change and local people basic livelihood and to participate in conservation activities of PMP.

The last option is to initiate the semi-domestication of medicinal plants by local people and to support the techniques and finances for cultivation. This strategy is reasonable not only to relief the pressure of dependence on forest resources but also to improve the livelihood of the collector households in that area.

For Development of the Livelihood of Local People:

The provision of training and skills to be able to produce value-added products instead of marketing raw should be encouraged. It could reduce excessive utilization of certain resources and increase the benefits obtain from NTFPs.

Various NGOs, INGOs and park managers should collaboratively take into account to find the way how the local community can diversify their livelihood options instead of depending on the forest resources for example changing the cultivated crops (from crops to fruit trees) to increase the income from agriculture and supporting subsidies for agricultural and livestock.

Summary

The major objective of this study is to understand the extraction of NTFPs by local people living around the Popa Mountain Park, one of the protected areas in Myanmar. The results of this study were presented with three main components. Firstly, the different types of NTFPs extracted by local collectors' households in order to fulfil their basis need and to support the households' economy by getting the cash income. Second part is the estimation the income from NTFPs by comparing the different villages and the households in three villages. And then, as the final part, the influence of household socioeconomic characteristics on the NTFPs income was investigated.

As a summary, there were generally six different types of NTFPs collected by the local people near PMP. The common product collected by all households is firewood mostly for subsistence use and it also generated cash income. Other important cash income products are medicinal plants and flowers. Therefore, if I conclude my research question, the types of NTFPs collected for subsistence use is commonly the same among the villages. But for the cash income, the interest of collection is different among three high NTFPs dependence villages.

For the second question, the income distribution is totally different among collector households of different villages ranging from 1% to 47% of total income. When comparing the three high income share villages, CP village got the high cash NTFPs income share from medicinal plants (97%), PPL village earned from the firewood (76.8%) and TZC villages got from the flowers (49.6%). Comparing the distribution of income from different NTFPs among the cash income households (n=78), the medicinal plants is the high income share products (53.48% of total NTFPs income) for all cash income collector households. According to the NTFP dependency analysis by using multiple regression model, the income from other income sources such as agriculture and off-farm incomes and the characteristics of villages and households such as the proximity to market and age of household head are the major factors to be consider in order to make the conservation and development activities in that area.

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Community Forestry Program and Livelihood of Local people: An Experience from Doti District, Nepal

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Abstract: This paper aims to share (presents) the experience of community forestry program and its contribution in livelihoods of local people in Doti district of Nepal. At the beginning the paper describes the evolution of community forestry program in national context and then focused on particularly in Doti district. The success of community forestry program in Doti has led to improved forest condition, financial income and employment generation from harvest and sale of forest product, creation of human and social capital. The paper also highlights the issue and challenge of community forestry, lesson learn from the implementation of the program and suggest the way forward.

Background (Community Forestry in National Context):

Nepal is a small mountainous country in the central Himalayas between India and China. It borders China in the north and India in the south, east and west. The total area of the country is 147,181 Sq. Km. According to the census of 2011 the total population of the county is 26.4 million, with 1.35 percent annual growth rate. The population density of the country is about 180 per square kilometer and 83 percent people live in the rural areas.

Forest resource is one of the major natural resource in Nepal. It provides multiple benefit to country and very important to livelihoods of rural people. Large proportion of the nation's population is depending on forest for their subsistence needs. The forestry sector is the backbone of the subsistence farming system of rural people. Sustainable management of forest resource is crucial for the country's overall development and always a policy priority in Nepal. Sustainable management of the forest resource can only be implemented if the multiple and often divergent interest of stakeholders are taken into account. The community based forest management is at present the most important aspect of forestry development in Nepal. Within this program the local communities and farmers are given legal powers to conserve, manage and utilize the forests.

According to the definition of FAO (1978) community forestry is "a situation which intimately involves local people in forestry activity". This definition includes a wide spectrum of activity such as allowing local communities to completely manage their forest for local needs; giving them access to the economic benefits derived from forest, and protecting forests

maintains ecological wellbeing along with generating income for rural communities from the processing of forest products.

Policy Evolution of Forestry in Nepal

Forest belonged to individual people before their nationalization in 1957. The nationalization of forest brought all the forests of the country under government jurisdiction. However, nationalization of forests created a mistrust among people towards efforts made by the government for forest protection. At the same time, increasing population was bound to depend on adjacent forests meeting their basic needs such as firewood, fuel, fodder and timber. As a result of this, forests were exploited in manners that were not conducive to sustainable management practices. Consequently, this led to deterioration of forests particularly in the hills in the form of accelerated forest encroachment, illegal logging and continued deforestation. To stop the rapid decline and deterioration of forest conditions, the government initiated policy and program to involve the local community in the protection and management of forest in the early 70s.

The need of a community involvement in forest management was first emphasized by government policies in the National Forest Plan,1976. This resulted in amendment of the Forest Act (1961) in 1977, by making provisions for handing over part of government forests to the smallest local government unit, then known as "Panchyat". It further produced regulations called Forest Rules, in 1978. The local panchayats had ownership over plantation forests (Panchyat Forest) and existing natural forests (Panchyat Protected Forests). A decade of trial of the concepts showed that the local government unit was not a proper unit for such handover. Because it was the local households, who had to be involved to protect the forest, contribute their labor for forest management activities and very often had to sacrifice their traditional use of forests. Therefore, there was no feeling of ownership among the local people. Thus, local panchayat was not able to motivate local communities sufficiently for forest management. However, in terms of policy formulation, this is considered as a great leap forward from the conventional forestry to community forestry. On the basis of this experiences, the Master Plan for Forestry Sector (MPFS) 1989, recommended to handover all accessible forests in the hills to the communities of user groups 'to the extent that they are able and willing to manage them. MPFS placed community forestry program as one of its six primary programs.

After the collapse of a panchayat system and restoration of multi-party democracy the policy received legal backing with Forest Act 1993 and Forest Regulations 1995. The forest Act elaborated operational modalities for community forests. The regulations allowed local people to manage forests and to use the forest products according to the management plan approved by District Forest Office (DFO).

Community Forestry to Community based Forestry:

Community forestry (CF) is the most successful forestry resource management program and had a significant positive environmental and socio-economic impacts. However, equity

remains problematic: many community forestry user groups are dominated by the local elite, while socially and economically disadvantaged people's participation is often lacking, and poor households tend to benefit less than the relatively better off (Baral 1999, Malla 2000, Shrestha 1996, Winrock International 1998). Apart from environmental services, improved forest condition increases the availability of forest products to the local people which in turn is expected to improve their livelihoods. Nonetheless, the ability of community forestry to improve the livelihoods of the poor people has remained questionable.

In terai, southern part of Nepal there were problems in managing forests. In terai the situation is quite different. Large block of national forest or productive forest are located in the north while majority of population lives in south. Forest was being depleted day by day by both people near the forest and far from the forest. State could not monitor and enforce usage, and so the forests were essentially open-access areas that anyone can use.

To address these two issues; livelihood issues of poor and disadvantaged people in hilly area and the management of block forest and supply of forest product to distant user in terai, government introduced pro-poor leasehold forestry program (LHFP) in hills and collaborative forest management approach in terai. Both LHF and Collaborative Forest management (CFM) are participatory forest management approach and focus on the local communities. Pro-poor leasehold forestry program, a community-based forest management approach specially designed to benefit the poorest communities came into implementation in 1993, through the Hills Leasehold Forestry and Forage Development Project (HLFFDP). That had been implemented in ten districts beginning in 1993 and now it has been implemented in 37 districts. There are mainly two objectives of leasehold forestry the - first one is to improve the livelihood of (poverty alleviation) rural people by providing them forest land and other inputs and second is improve the ecological conditions of the hills by conserving those forest given to communities.

Collaborative forest management(CFM) is an approach of sustainable forest management in collaboration with local communities, local government and department of forest to achieve multiple benefits, maintaining ecological balance, generating economic returns and improving livelihoods from the forest (CFG WG 2003). The main objective of CFM is to develop sustainable forest management in order to: 1) Fulfill needs of forest products 2) Help in poverty reduction by creating employment 3) maintain and enhance biodiversity and 4) increase national and local income through active management of terai forest. (Dhananjay paudel 2007)

Besides the intervention of pro-poor leasehold forestry program, the government of Nepal revised the community forestry guideline in 2008 provisioning that at least 35 percent of income of CF need to be spent for pro-poor activities to address the livelihood issues of poor and disadvantaged people within community forestry program.

Schematic flow diagram 1. different forest management regimes in Nepal

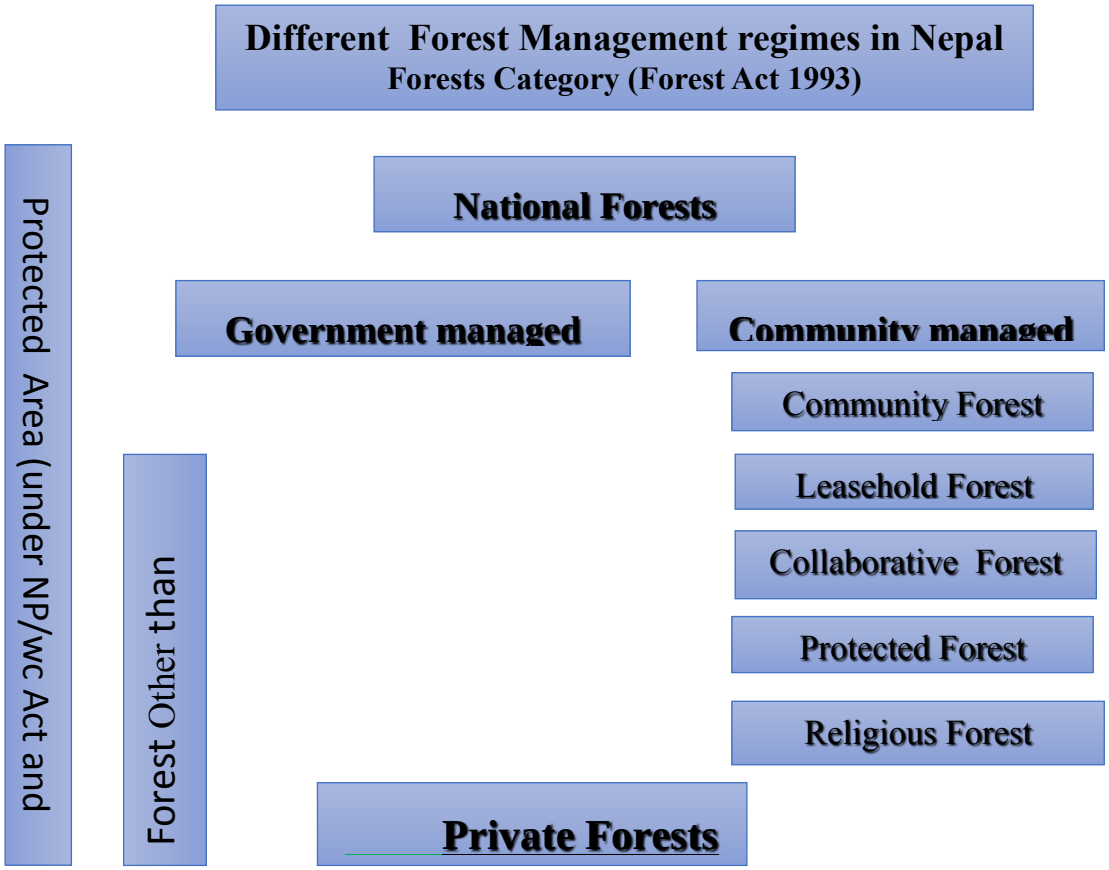


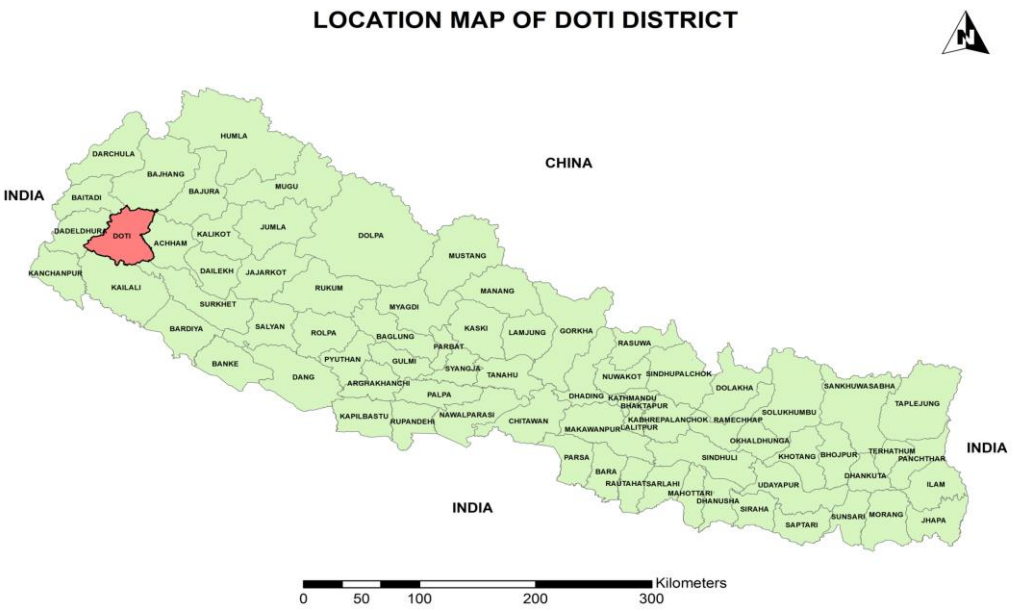
Table 1. Area of forest under community based forestry program at National level:

S.N.	Management regime	No of group	Handed over forest area (ha.)
1	Community Forestry	19916	1,879,998
2	Leasehold Forestry	7240	42337
3	Collaborative Forestry	28	70423
4	Protection Forest	8	133685
	Total		**2,126,443**

Source: Hamro ban, Annual report of Department of forest August 2017

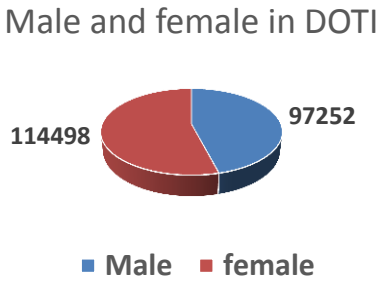
Brief Introduction of Doti District

Geographical location: Doti District is one of the seventy-five districts of Nepal and ninth district of seventh province with abundant natural resources. Geographically, it is located in 28 °54' - 29 °28' latitude and 80 ° 30' - 81 °14' longitudes. The total area of the district is 2,054 sq. km. Almost area of the district is lies on Mid-hill area and few areas lies on inner terai and high hill. The lowest elevation point is 600 meters and the highest elevation point is 4,000 meters from mean sea level. Elevation of District Headquarter Silgadhi is 1390 m.

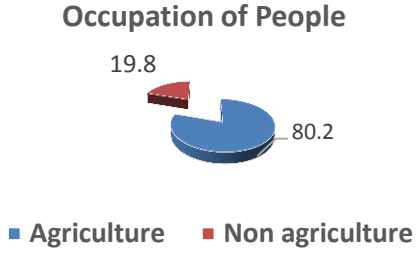


Socio-economic condition: According to the National Census 2011, the population related information of this district are as follows:

Total Population	211,750
Females (54.04%)	114,498
Males (45.93%)	97,252
Household no	41,440
Population density	105 / sq. km
Average life expectancy	53 years
Average family size	4.99



Occupation: The main occupation of the people is agriculture. More than 80% people are depended on agriculture. Subsistence agriculture farming, mainly small-scale livestock is the main source of occupation and livelihood of the majority of the population.



Development index:

Particulars	Index	Position of district
Human development index	0.402	60
Human poverty index	53.40	64
Gender development index	0.368	62

Human empowrment index	0.22	73
Political empowerment index	0.293	45
Per capita income	12779.00	

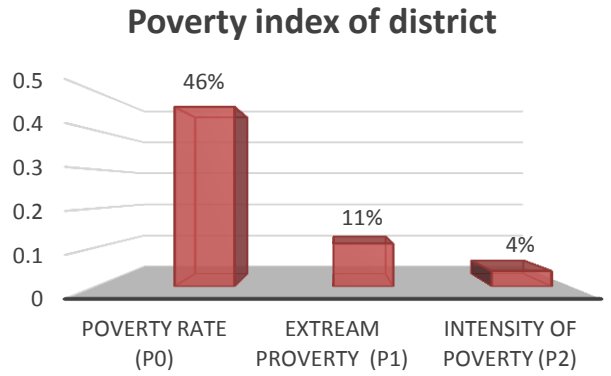
Source: District profile of Doti district

Poverty index and Food security condition:

Poverty index of Doti district
poverty rate (P0)= 46%
Extreme poverty (P1) = 11%
intensity of poverty (P2) = 4%

Food security condition of Doti District

Per capita food requirement (kg)	201
Total production of food grain (Mt)	42754
Annual required food grain (Mt)	43540
Food deficit (Mt)	-786

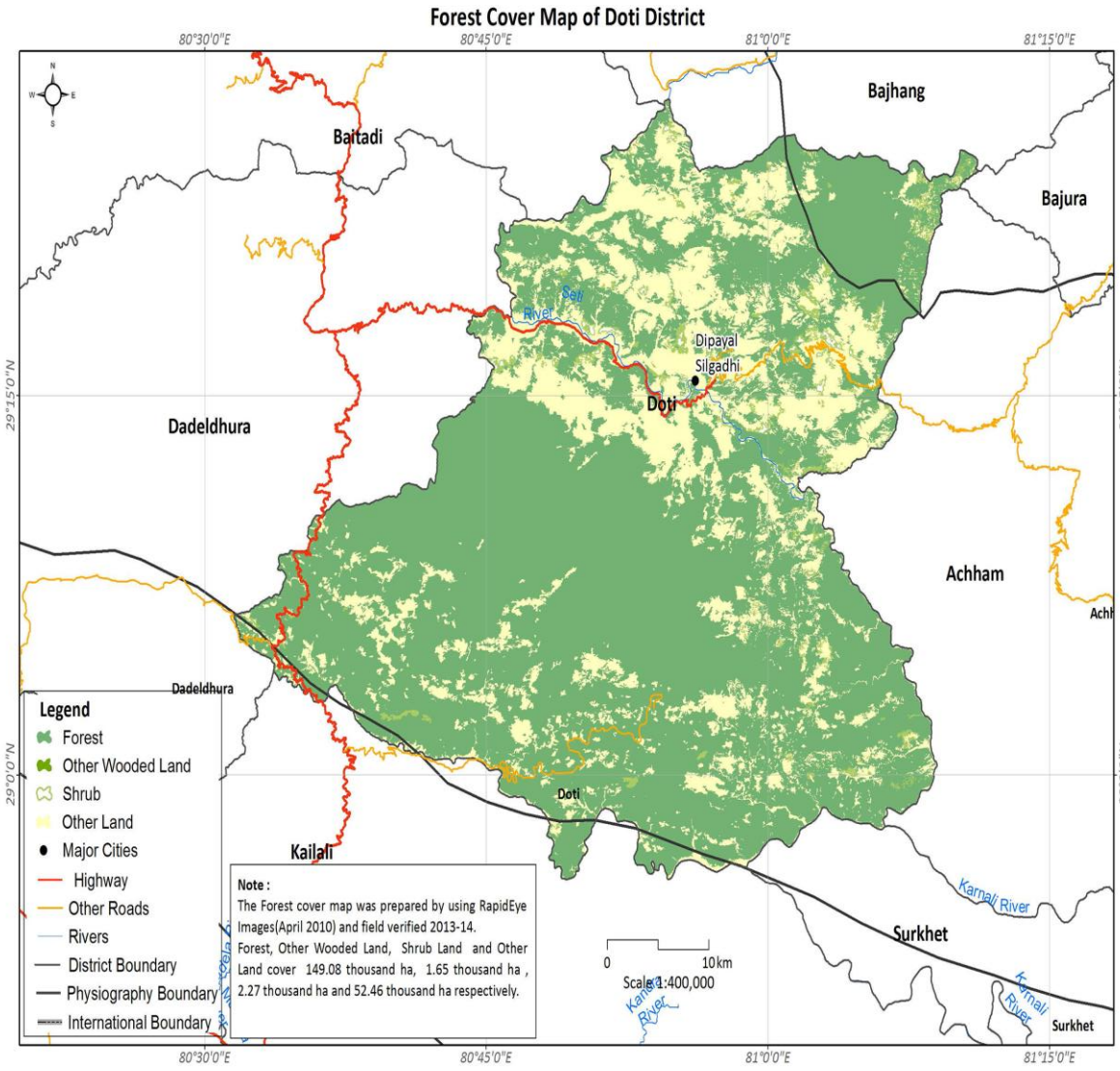


Land Use / forest area:

S.n.	Particulars	Area (hac.)
1	Total area of district	205463.00
2	Forest Area (including Khaptad NP 9445.10)	1,49083.00
3	Other wooded land (including Shrubland)	3915.00
4	Other Land (Agriculture land and others)	52465.00

Source: Forest Resource Assessment (FRA) 2015

Map: Forest cover map of Doti District .



Climate: As a result of the elevation differences, the district has four different types of climate: tropical up to 1,200 m where temperature increase more than 440 Celsius, subtropical from 1,200-2,100 m, Temperate above 2,100-3300m and Alpine above 3300m. The annual rainfall is about 1,347 mm and temperature varies from 0.2 ℃ to 40 ℃.

Vegetation Types: More than 65 % land area is covered by forest and rich in biodiversity. Due to altitudinal variation, there are various types of vegetation found in the district. The major types of vegetation on the basis of climatic zone are as follows: (Table 1):

1.Lower Tropical Sal Forest: This type of vegetation is found in up to 1,200 meters, where tropical Climate is avail. The major species of vegetation is Shores robusta, Acacia catechu, Dalbergia sisoo and Bombax shiba.
2. Sub-Tropical Forest: This type of vegetation is found in the altitude of 1,200-2,100 m where sub-tropical climate is avail. The major species of vegetation are Pinus roxburghii, Toona ciliata, Shores robusta, Alnus nepalensis Cinnamomum tamala. Castanopsis spp.

3.Temperate Forest: This type of vegetation is found in 2,100-3300 m. where temperate Climate is avail. Lower Temperate Mixed Forest and Upper Temperate Mixed Forest come under this climatic vegetation type. The major species of vegetation is Qurqus semicarpifolia, Rodhodendron spp, ,Cedrus deodara.

4. Sub Alpine forest: Sub alpine vegetation is found in 3000- 3300m. The major species of vegetation is Qurqus spp .Rodhodendron spp, Abies spp, Cedrus deodara and caragana spp in midow of Langtand National park etc

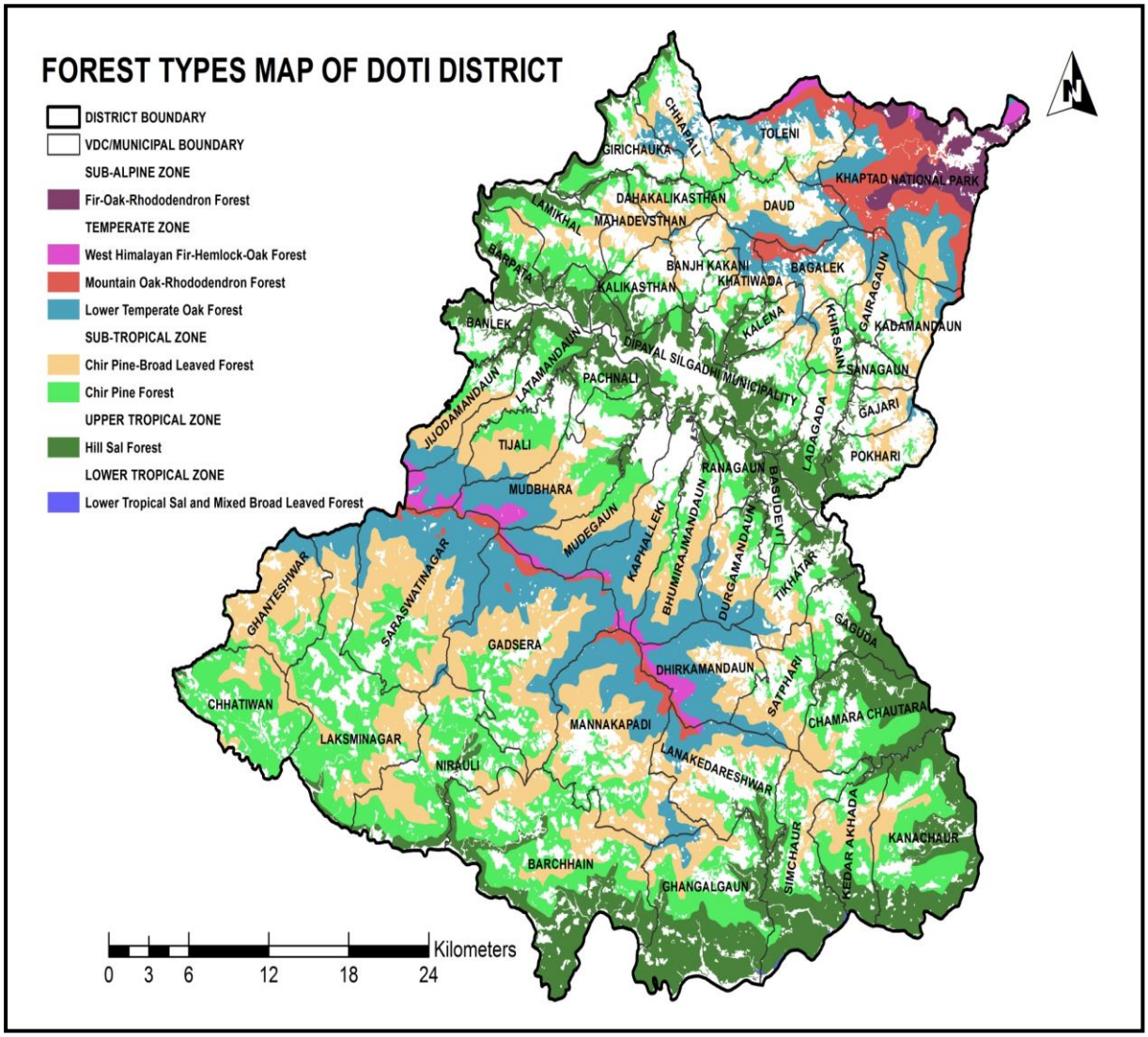
Table 1. Classification of forest based on species

S.n.	Species	Area Ha.	Remarks
1	Chir pine forest	38069.40	
2	Chir pine mixed forest	37400.20	
3	Hill Sal forest	26240.80	
4	Lower Temperate oak Forest	22323.10	
5	West Himalayan Fir hemlock oak	2303.60	
6	Mountain oak Rhododendron	2546.40	
7	Lower Tropical Sal and mixed broad-leaved forest	37.00	
	Total	**1,28,920.50**	

Source: LRMP 1978

Fauna (wild animal and birds): Doti district is not only rich in floral diversity also in fauna. Major species of wildlife found in district are: Leopard, Beer, wild pig, jackal, deer, Ghoral, rabbit, Pecupine, monkey, wild cat. Likewise in birds; Pheasants, Himalayan bulbul, peacock, crow, Dove, Koili, Titra, kalij, Bhangera, fisto etc are found in the districts.

Map 1. Vegetation type/ Forest type map of Doti district:



Community Based Forest Management in Doti

In the context of Doti district two types of community based forestry management modalities (program) are being implemented. One is Community Forestry (CF) and the other is Leasehold Forestry (LHF). Both are parts of national forests and the conservation, management and utilization of forest resources and the livelihoods of the local population are common agenda of both the management modality. Though both tend to have a common concern about environmental as well as livelihood issues, LHF, by objectively and provision of law, focuses on the people below poverty line. CF, which is also focusing on the equity in benefit sharing amongst the participating HH, does not limit itself to the poor.

Here, in this paper, we are going to discuss the community forestry program and its contribution on livelihood of local community. The community forestry program was initiated in the district after the restoration of multiparty democracy in the in 1990. Where the state introduces new policies as a new forest law in 1993. Since then to date now there are 389

community forestry user groups have been formed and total 57972.00 hectare of forest handed over to the local community (handover trendline 1 and status of CF in table 2).

Trend line 1. Community Forestry handover trendline:

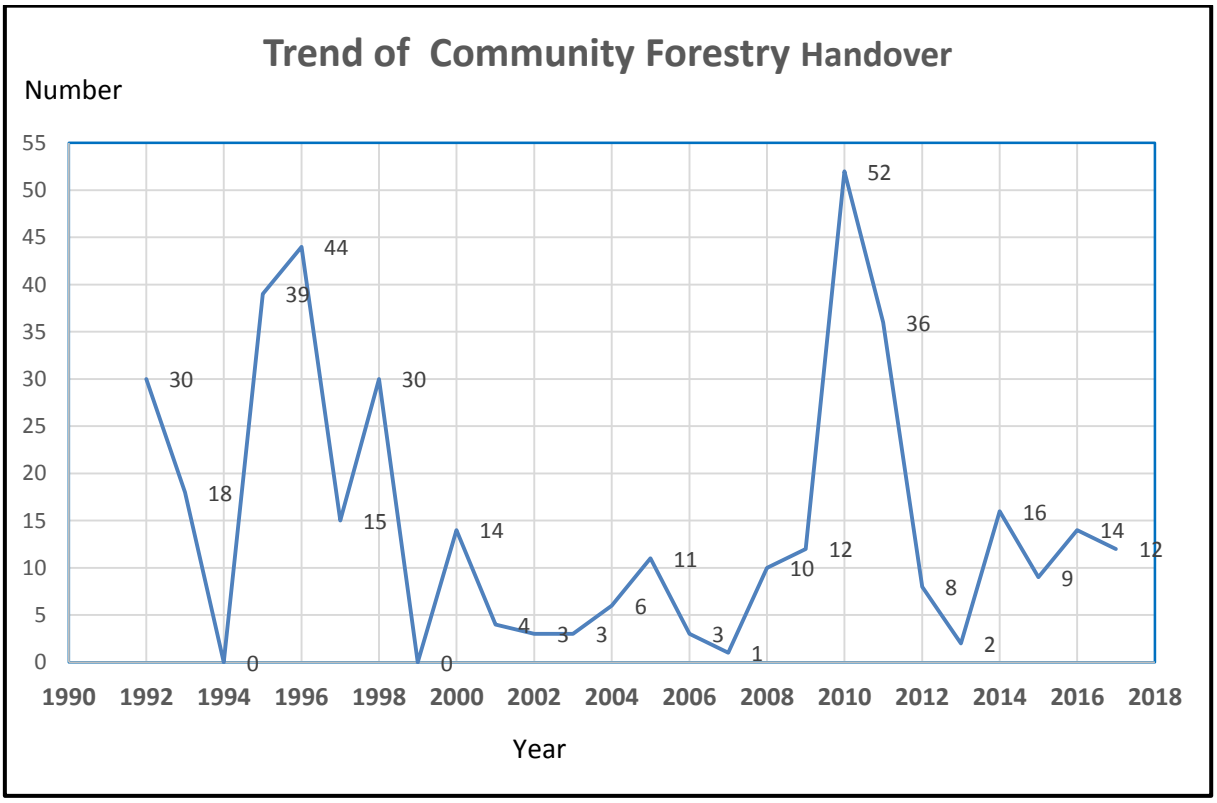


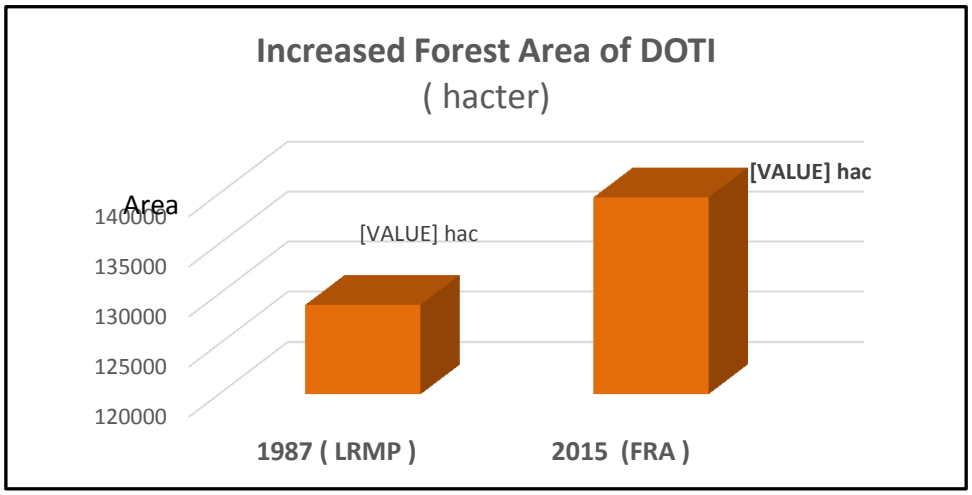
Table 2. Status of community forest in district:

Community forestry
• Total area handed over to community = 57972,00 hac • Total number of CFUGs = 389 • Households involved = 31132 (population involved: 198585) • Average size of Community Forest User Group = 80.03 hh • Average size of the Community Forest = 149.02 • Average CF area per household = 1.86

Livelihood Contribution of Community Forestry:

1. Increased forest area and improved forest condition: FRA report of 2015 published by Forest Research and survey Department shows that the total area of forest in Doti has increased by 7.7 percent in the interval of 28 years (chart 1). Those area which was shrub and bushland in 1987 has changed or converted into forest area due to conservation under community forestry program. This change is not only quantitative but also qualitative: increase in growing stocks too. This improvement in forest condition obviously has made local people's life easy by supplying of fodder and fuelwoods easily and saving the time used to spend for the collection.

Chart 1. Increase in forest area:



2. Increased biodiversity (both flora and fauna): After the handover of forest to community there are noticeable change in biodiversity. It can be easily observed that many species are regenerated with some threatened species and remarkable changes have been found in ground coverage with different herbs, shrubs and ground grasses and clippers. At the same time, the presence and movement of wild animal has increased. More frequent sighting of animal as well as the increasing incident of human wildlife conflict is the evidence of increased wildlife number.

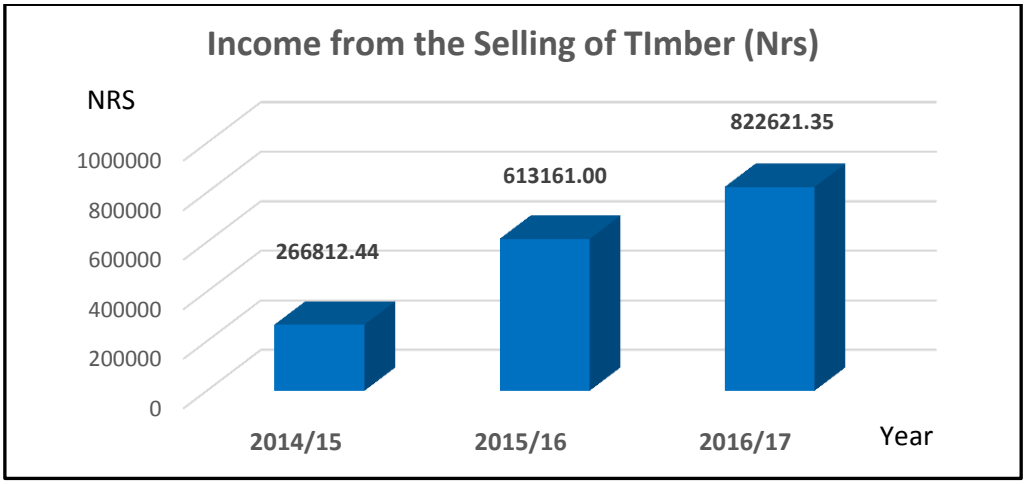
3. Increased income of community: Those CF which have access to road network, they harvest and sales the forest products outside the community after fulfillment of their user's demand. That is a major source of income of CF. There are mainly three types of forest products in this district: first one is timber, second is resin tapping and third is other NTFPs than resin.

1) Income from timber: timber is the one of major source of income in community forests of the district. According to the records of DFO the CF earned total NRs 14393873.00 by selling timber outside community in 2014/15 -2016/17 (Table 3 and chart 2).

Table: Quantity of timber produced and sold

S.N.	Fiscal year	Sold outside user (Cft)	Consumed by user	Total
1	2014/15	7899.66	19745.5	27645.16
2	2015/16	22216.37	20976.76	43193.13
2	2016/17	32005.03	22564.36	54569.39
	Total	62121.06	63286.62	125407.68

Chart 2. income from selling of timber outside users:

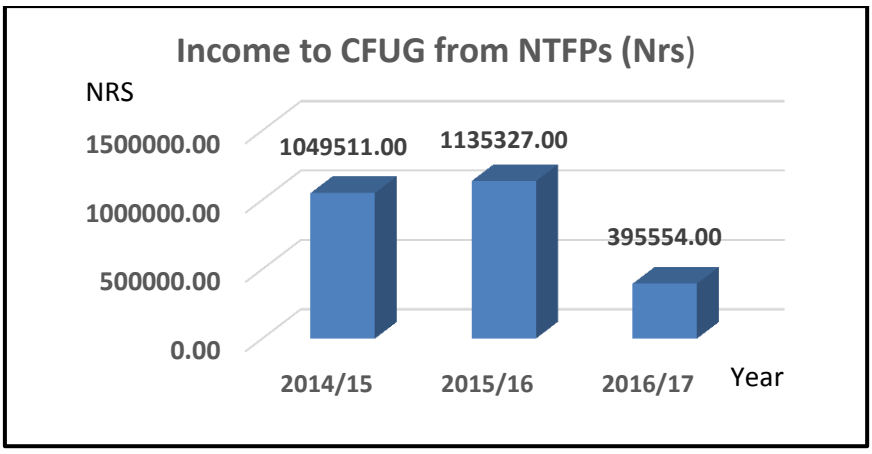


2) **Income from the NTFPs:** Non-timber forest product is another important source of income of forest user group of Doti . Main species of non-timber forest products are leaf and bark of Cinnamon tamala, bark of Alostonia scholaris, fruit of Embilica officianlis and Sapindis murkoshi, nettle leaf etc (Table 4 and chart 3).

Table 4. Quantity of NTFPs collected and income:

S.N.	Fiscal year	Quantity (kg)	Royalty(Nrs)
1	2014/15	207154	1049511
2	2015/16	170935	1135327
3	2016/17	104727	395554
	Total	**1049615**	**5888031**

Chart 3. Income from NTFPs:



3) **Income from Resin tapping:** Resin tapping is one of most potential area of income of CFUGs in the Doti. Out of total forest area of Doti district (1,28,920.5 hac.) , 58.5 percentage (75469.6 hac) of forest is of Pinus roxburghii. From this forest 2000-2600 metric tons of oleo-resin can be tapped per year. In the district

150 community forests are tapping the resin in their forest and the amount of resin tapped and income earned from that is given below (Table 4 and chart 4,5):

Table 4 : quantity of resin collected and income to CFUG:

S.N.	Fiscal year	Quntity (k.g.)	Royalty (CFUG) Nrs	Vat (GON) NRs
1	2014/15	1078714.10	8629712.80	841397.95
2	2015/16	1938493.00	15453416.00	1868033.40
3	2016/17	2763008.40	21677650.40	2833181.28
Total		**8334976.63**	**61098478.00**	**7536512.63**

Chart 4. Income from resin tapping:

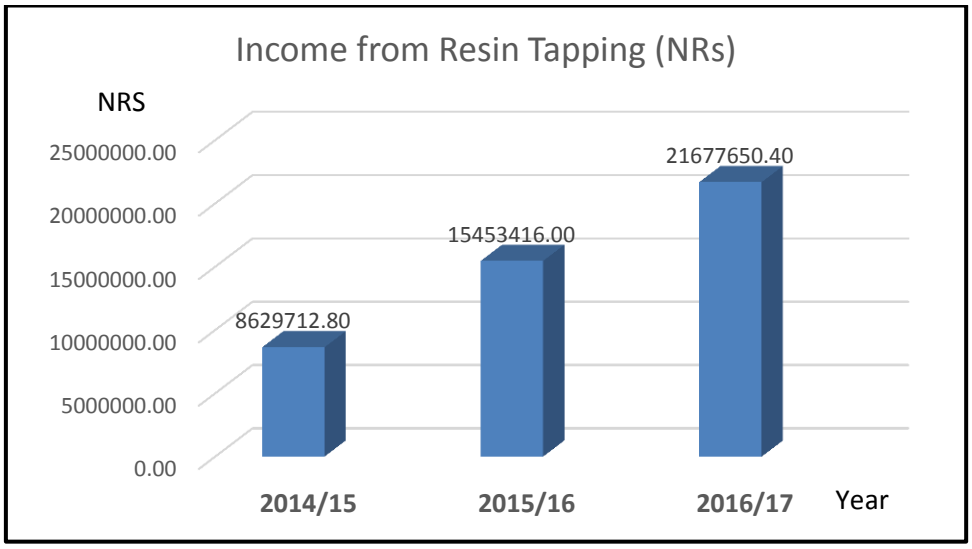
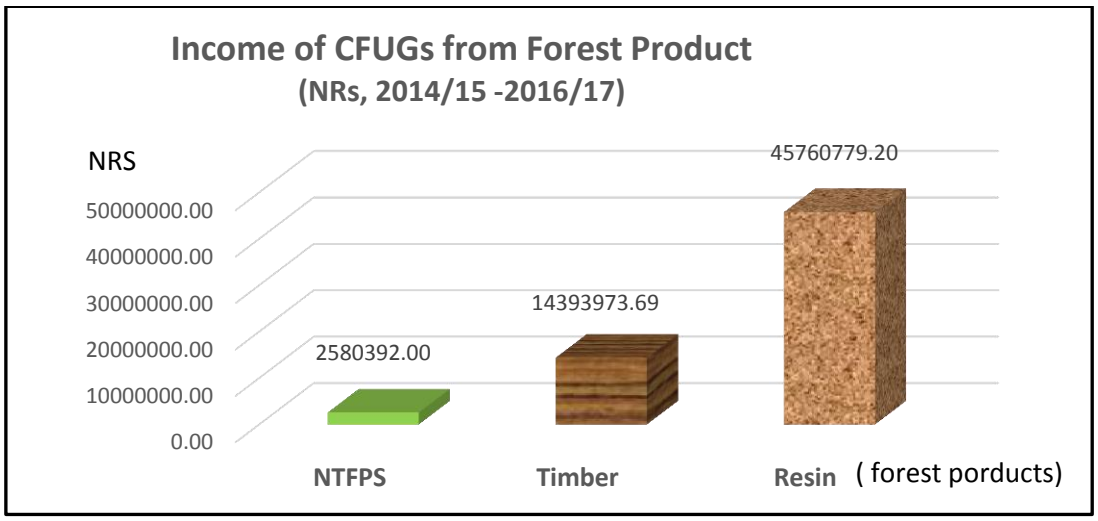


Chart 5 . Overall income from forest product in three years (2014/15-16/17)



4. Increased employment opportunity: Harvesting of forest products mainly timber and NTFPs and resin tapping, increased the opportunity of employment to local community. The overall employment generation from different forest product harvesting and utilization in the district are given below (Chart 6,7, 8, 9):

Chart 6. Employment generation from timber harvesting and selling:

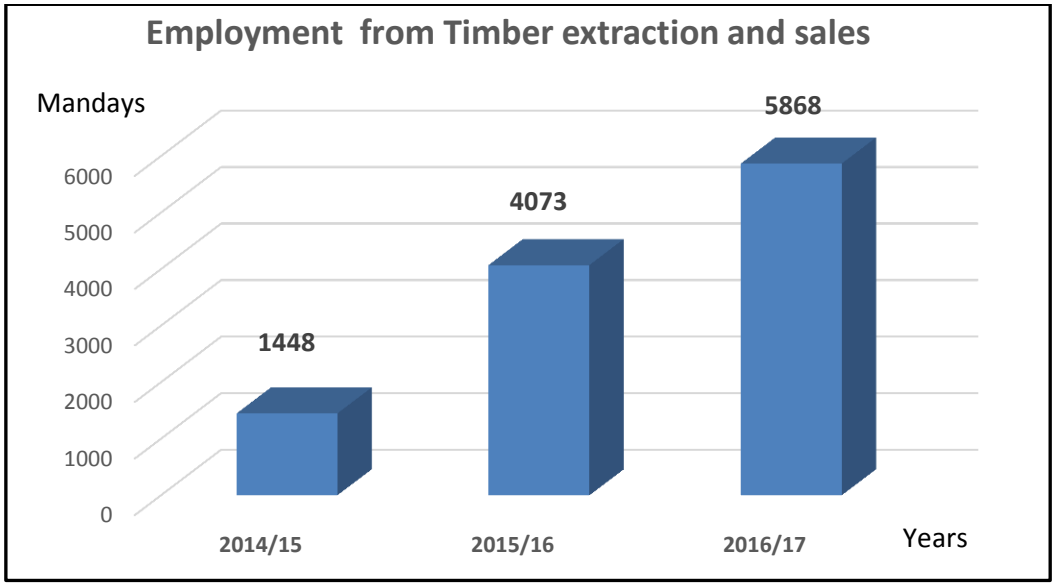


Chart 7. Employment generation from NTFPs:

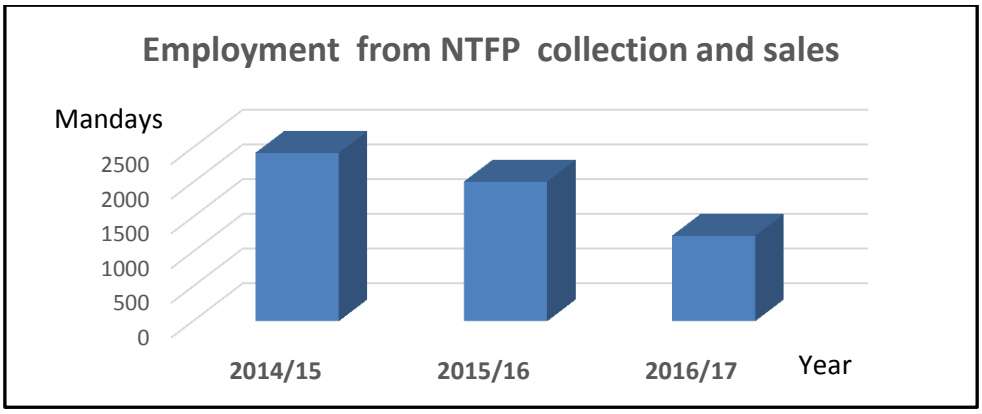


Chart 8. Employment generation from Resin tapping:

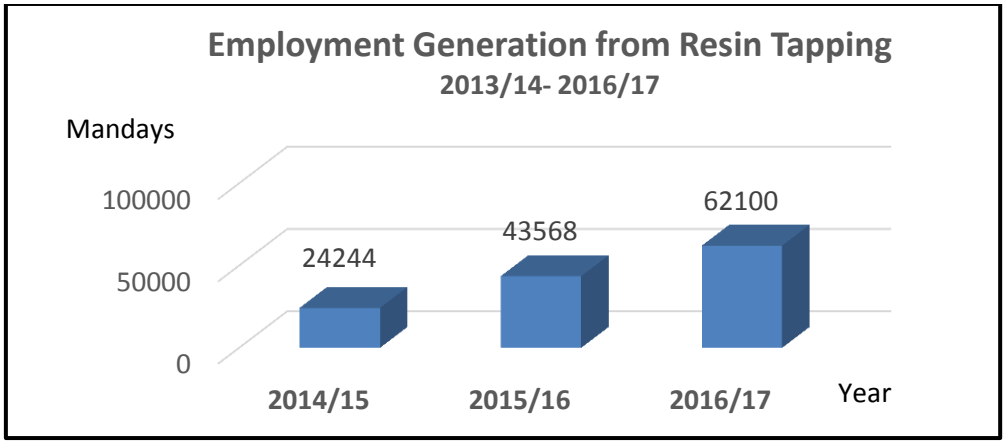
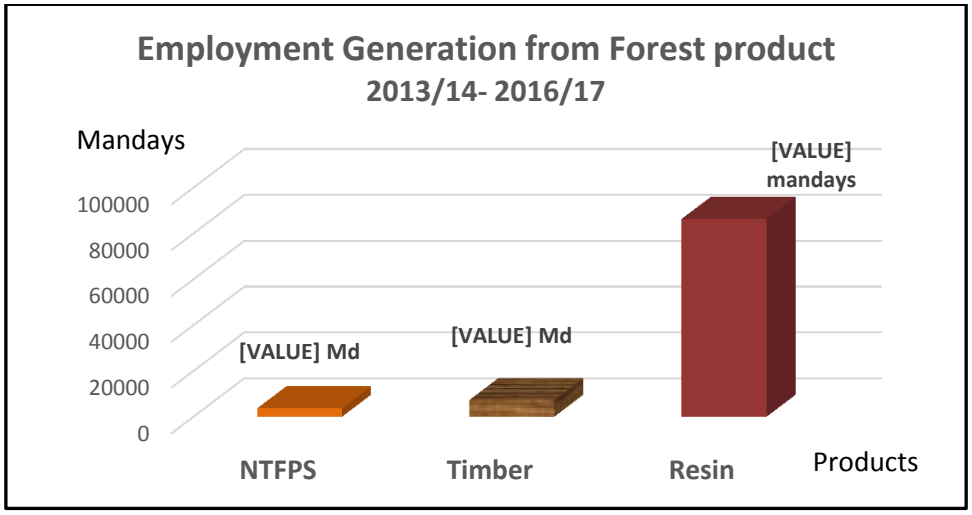
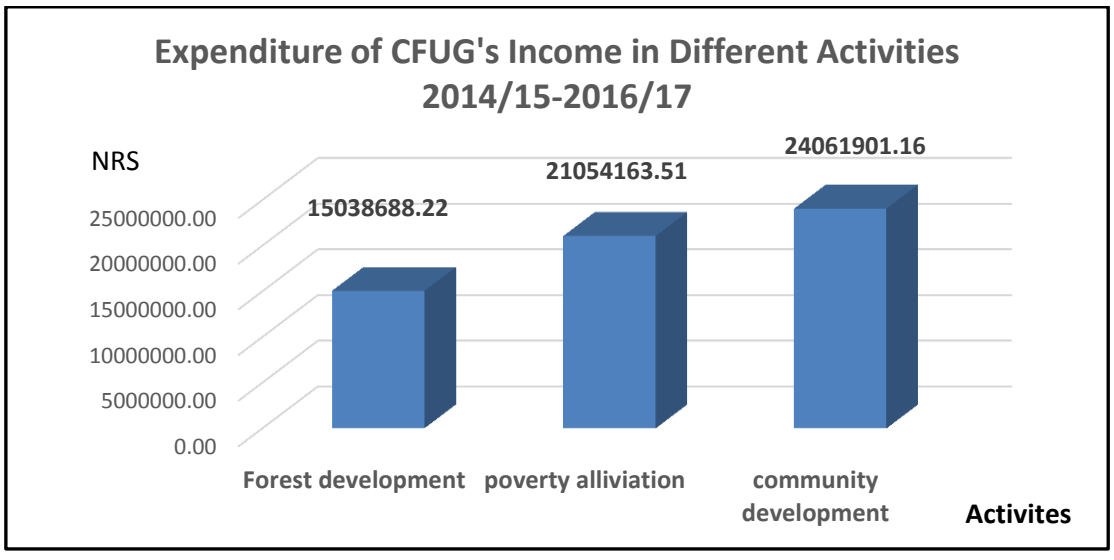


Chart 9. Overall employment generation from Forest product harvest and utilization:



5. Increased community development and pro-poor activities: There are provision in community forestry guideline (2008) that CFUGs need to spend 25, 35 and 40 percent of their income in forest development, poverty reduction and community development respectively. Under forest development CFUGs spend money mainly on forest watcher, plantation, thinning, pruning etc and under poverty alleviation grants has been given to poor people for goat farming, hatchery, bee keeping, ginger farming, vegetable farming and scholarship and soft loan to poor. Under community development money spent on construction of school building, village trail and rural road, drinking water and in some cases in micro hydro. As per that provision the amount were to be spent in CFUGs in Doti in three years (2014/15 to 2016/17) are as follows (chart 10):

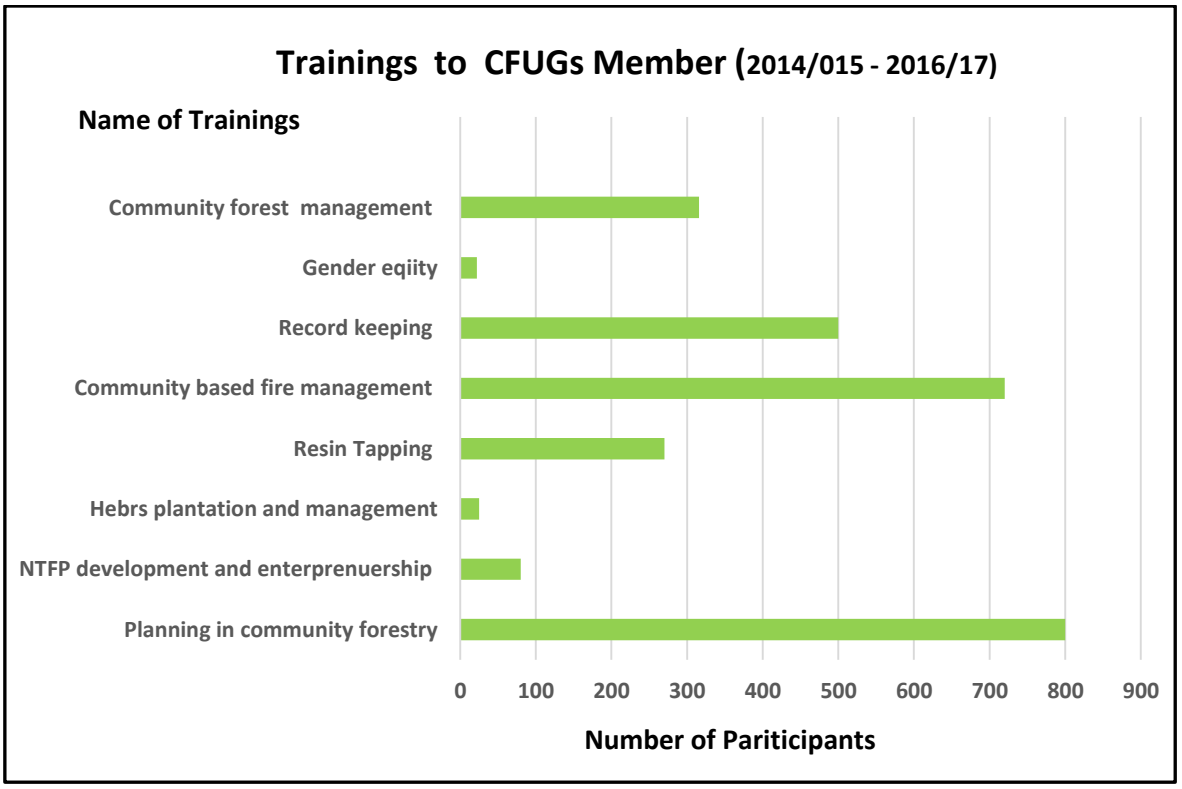
Chart 10. Expenditure of CFUG's Income in Different Activities.



6. Capacity Development, empowerment and governance: More than 45 percent of forest of district is managed by community and elected representatives of these CF (11*389=4279) make decisions on forest, funds and other activities and engaged in different

committees and network. Moreover, there are at least 389 women are working in major post of CF (executive committee) and taking active part in decision making process. The regular meetings with CF members and forest officials and different trainings provided by DFO have empowered them. From the records of DFO, there were 2733 user were trained in FY 2014/015 to 2016/17 to enhance capacity and skill in different field (chart 11). All these activities have increased their leadership capacity and created a huge human and social capital. With the result of that, in recently held local level election many of them won leadership positions mainly one woman in chairperson of Municipality and one woman in vice chairperson in VDC. All these capacity development and empowerment of community people ultimately supports them to improve livelihood.

Chart 11 : Training to CFUGs member :



Issue and Challenge of CF in Doti :

- The extreme poor people are still excluded from the community forestry mobilization process.
- Infrastructure development is main priority of leader of community forestry than forest development and poverty alleviation.
- Weak enforcement of provision of community forestry guideline to spend in poverty alleviation.
- Increasing politicization of group.
- Domination of elite in decision making.
- Non-transparent resource mobilization.
- Conservation focused conservative forest management instead of productive management.
- Weak linkage between resources and forest enterprise.
- Emerging issue of benefit sharing between FUG and local government.

Lesson Learnt from the Community Forestry Program in Doti.

- Sustainable forest management can play vital role for livelihood improvement of rural people. Forest and ecosystem health can be maintained by adopting sustainable approach to forest management.
- Strong Enforcement of community forestry guideline is necessary to mobilize the resource in livelihood of community.
- The need based income generating activities are more effective than the program imposed by center.
- Private public Partnership is very important and can bring resources and expertise needed for forest based enterprise development in community forestry.
- Private public Partnership is very important and can bring resources and expertise needed for forest based enterprise development in community forestry.

Way Forward

The analysis of the data of District forest office, clearly shows that community forest management programs has made remarkable contribution on livelihood of local people. The development of five capital or assets: natural capital (e.g.; good forest conditions), physical capital (e.g.; community development/infrastructures), financial capital (e.g.; income and fund generation), human capital (e. g; empowered and trained user), and social capital (e.g.; user group, network) in CF are playing a vital role in rural development and development of livelihood assets.

Sustainable management of forests through community participation has the greatest benefits for the local community as well as for the state too. Therefore, it is needed to move to production oriented forest management from a conservation-based forest management in community forestry. If we do so, there will be many opportunities for community members to increase their livelihood from forests, as well as contribution to environmental sustainability. Likewise, forest based enterprise development through community can offer a potential for the utilization of resource and income generation and employment opportunity for community people to lift their livelihood. Improved forest stock and forest cover in mountainous District like Doti has also contributed significantly in mitigating adverse impact of climate change and also indicated that sustainable forest management could be one of the effective tools of climate change adaptation.

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Overview on the Concept of Community Forestry in Papua New Guinea

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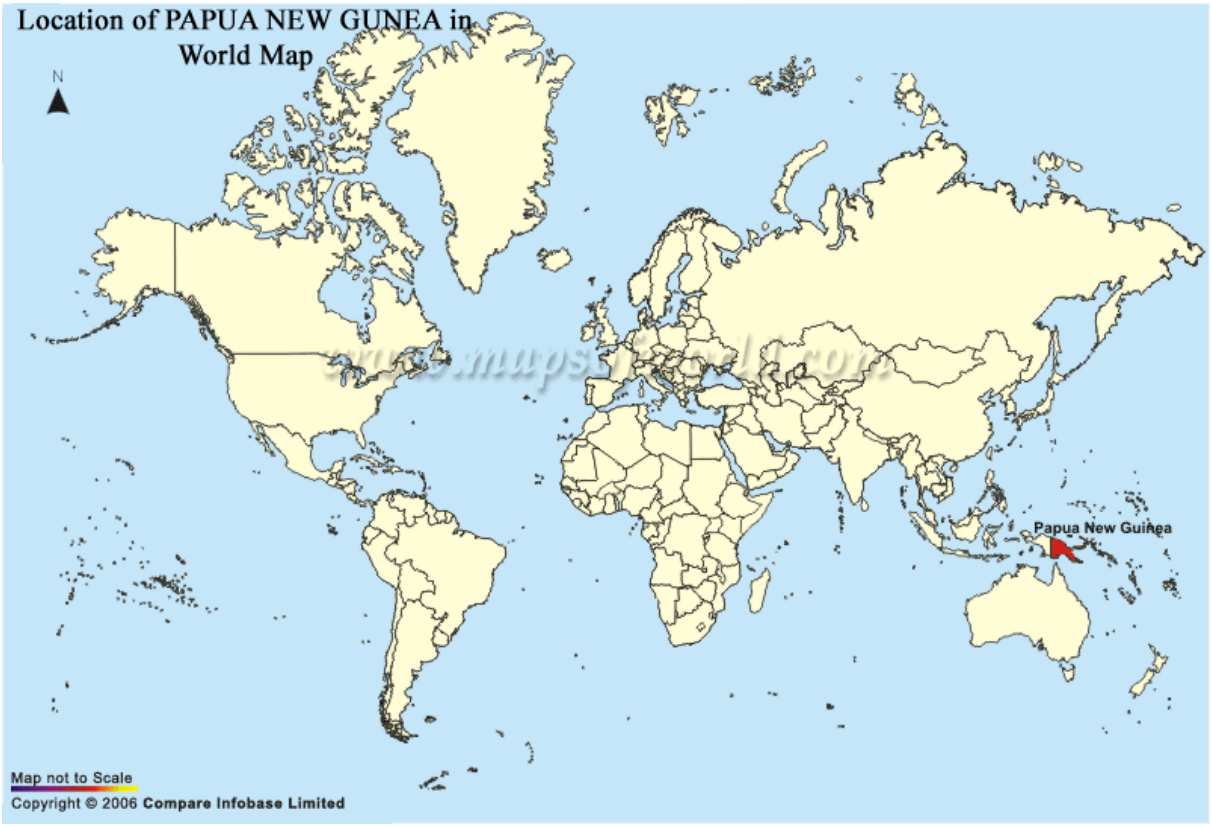
Community Forestry Officer, Community Forestry Section, Field Services Directorate
PNG Forest Authority

1.0 Background Information



The island of New Guinea is the largest tropical island in the world and contains the third largest tropical rainforest after the Amazon Basin (Brazil) and the Congo Basin (Africa). The country of Papua New Guinea (PNG) in the Pacific comprises the eastern portion of the island of New Guinea as well as numerous islands and archipelagos. PNG is a well-known country for biological endemism and diversification. Currently, PNG's tropical rainforest is relatively well conserved (i.e.) 80% of PNG land area is covered by forest and 60% is still intact or virgin forest.

Figure 9: Niugini Hornbill

Nevertheless, the forest is coming under increasing pressure, due to shifting agriculture and resource extraction, especially through logging, but also from clearing for mining, oil and gas exploration and large scale agriculture. Despite their extent, size and rich diversity, PNG forests are poorly known scientifically but traditionally they are the "supermarkets" and provide for and enhance the livelihoods of 79-85% of the rural population.

Figure 10: Cassowari

1. Land Mass: 462, 840 sq km (size of California)
2. Cities: Port Moresby, Lae and Mt. Hagen
3. Climate: Tropical Monsoon
4. Population: 6.5 million (2% growth)
5. Constitutional Parliamentary: Democracy
6. Economy: GDP GR – 6.5%, IR-7%, GDP $1012/ capita / Forestry 4%, Marine 1%, Minerals and Oil 82%, Agriculture 13%, Industry 25%
7. Currency : Kina and Toea
8. Language: Over 800 languages, English as the common medium of Communication
9. Cultures: Diverse Culture

2.0 Facts about Papua New Guinea's Tropical & Montane Forests

PNG in itself contains over 5% of the world's biodiversity in less than 1% of the world's total land area. The flora of New Guinea is unique because it has two sources of origin" the Gondwana flora from the south and flora with Asian origin from the west, as a result New Guinea shares major family and genera with Australia and the East Asia, but is rich in local endemic species. The endemicity is a result of mountainous isolation, topographic and soil habitat heterogeneity, high forest disturbance rates and abundant seasonal rainfall year-round.

Figure 11: Pidgeon

PNG boasts some 15-21,000 higher plants,

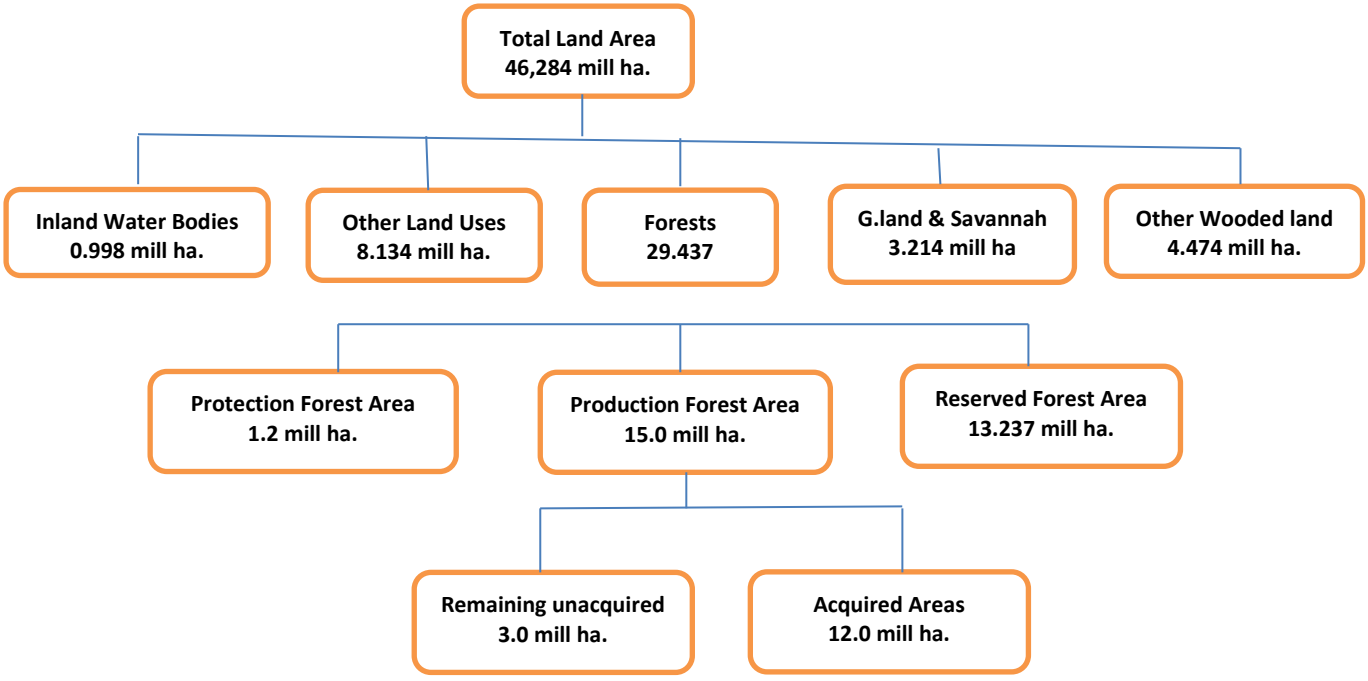
- 3,000 species of orchids,
- 800 species of coral,
- 600 species of fish,
- 250 species of mammals ;
- 760 species of birds;
- 8 species of tree-kangaroos (Marsupials) , and
- many more including amphibians (frogs etc..)

this biodiversity is only just 1% of the world land mass, it has both global and local significance

Out of which 84 genera of animals are endemic. Ecosystems range from lowland forests to montane forests, alpine flora down to coastal areas which contains some of the most extensive pristine mangrove areas in the world.

Much of this biodiversity has remained intact for thousands of years because the ruggedness of the terrain made the interior lands inaccessible; furthermore low population density and restrictions on the effectiveness of traditional tools, ensured that these biodiversity was never overexploited

3.0 Forest Resource Base



4.0 Land Tenure

Land and Forests in PNG are mostly under customary title (un-documented in most cases) and is currently estimated to cover 97 percent of the total land area of 46 million hectares.

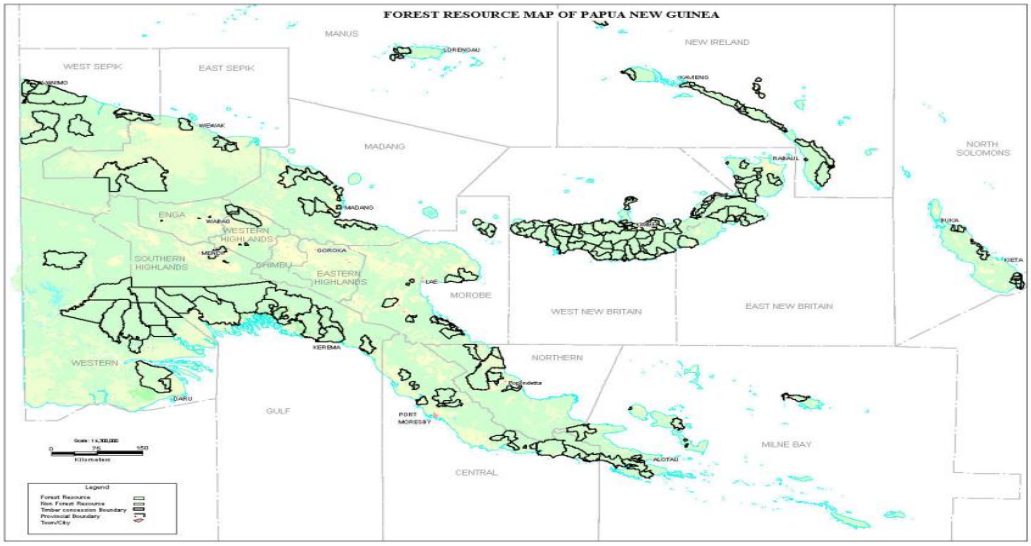
Native Forests

- The present estimated natural forests cover is 80 percent (36 million hectares). The potential forest areas for economic development is estimated to be about 15 million hectares and of this 11 million hectares have been secured, licensed and are in operation.
- Furthermore, note that 60% of the native forests are primary forest or forest that is still intact.
- State has title to about 3% of the land by way of purchase or 99–year lease
    - The PNG Forest Authority established and managed a few plantation forests.

- Sustainable forest management is practiced under this category of land.

5.0 Abstract

The forests of Papua New Guinea (PNG) make a critical contribution to the economic, social, environment and cultural well-being of the nation. Today, PNGs forests are under pressure from increasing demands for land-based products and services, which frequently leads to the conversion or degradation of forests into unsustainable forms of land use.



Jump to first page

The concept of promoting Community Forestry in the National Context is new in PNG because it is a shift from large scale operations operated by big timber companies, mostly foreign owned to small to medium scale operations with direct participation from the indigenous communities who are landowners themselves.

Whilst good policies may not guarantee good outcomes, it is clear that, without enabling policy environment, community forestry is unlikely to deliver the beneficial outcomes that are its promise. If community forest is to have a significant impact on forest conditions and rural livelihoods, the initiatives need to expand to become a national program. This expansion must include three key components;

1) An enabling policy environment to empower local communities to exercise real authority over management of forests in their vicinity, and thereby to obtain economic and other benefits. This will include legislation, policy, rules and regulations, implementation guidelines etc.

2) Continuing institutional reforms to support decentralization and devolution including mandating communities as legal entities.

3) Capacity building of all partners including re-orientation of government staff to shift from policing/licensing role to community facilitation role.

6.0 Introduction

Forests are crucial for the well-being of humanity. They provide foundations for life on earth through ecological functions, by regulating the climate and water resources and by serving as habitats for plants and animals. Forests also furnish a wide range of essential goods such as wood, food, fodder and medicines, in addition to opportunities for recreation, spiritual renewal and other services.

Figure 12: Cuscus

The biodiversity of PNGs natural forests is widely acknowledged and these forests provide many of the products that sustain livelihoods of the people of PNG. The strong international demand for many forest products has resulted in the substantial depletion of natural resources across many areas of PNG. With demand for such products expected to rise, there is an opportunity to establish small-holder based planted resource to service these markets.

Figure 13: Gourier

Many parts of lowland Papua New Guinea with a high rural population have few timber resources remaining, as these areas were the first to be commercially logged due their accessibility. Considerable interest among small holders in these areas exists to establish a planted timber resource to meet their own needs as well as providing an income. As small holders in Papua New Guinea are seeking alternative cash crops there is potential to develop appropriate tree growing regimes that complement their existing agricultural activities.

7.0 Land Tenure System in Papua New Guinea

It is one of the few places in the world where traditional land tenure is intact and enshrined in the constitution. Less than 3 percent of the total land area in Papua New Guinea is alienated from the traditional system of land holding and held by state, as private freeholds or on state leases.

97 percent of the land remains unalienated, i.e. held under the unwritten customs and usages of the indigenous inhabitants. This system varies, for example, there are patrilineal and matrilineal societies, and it is further characterized by flexibility and corporate nature i.e, the landholding unit, tribe clan or extended family.

The government has approved a legislation involving a two stage system of voluntary customary land registration involving:

1) The incorporation of ILGs but with the injection of appropriate accountability mechanisms and management process for transparent and effective governance of and management of ILGs by causing appropriate amendments to the existing Land Group Incorporation Act;

2) Subsequent voluntary customary land registration utilizing the ILG as the corporate person and vehicle for perpetual ownership for and on behalf of all the customary land owners by causing appropriate amendments to the existing land registration Act.

This simply means that to register a customary land, you will have to incorporate a Land Group (ILG) first based on the amended Land Group Incorporation Act Or to Incorporate a Land Group (ILG), you will have to own a customary land.

8.0 Plantation Forest

There is currently less than 100,000 hectares of forest plantation established and managed in the country. The potential for expansion and the establishment of forest plantation for export in the form of logs and for further processing of logs exists within the country.

Figure 14: Planted Teak

The PNG Forest Authority (PNGFA) through the Government of PNG, Vision 2050 stated that it plans to establish 800,000 hectares of forest plantation that should be supported by the Government of PNG through appropriate budgetary and manpower support.

This is because forest plantation establishment and management is sustainable and will create greater employment opportunities and provide greater socio-economic benefits to the country after the current log exports from the native forest is reduced or cease to exist in 2020.

9.0 Establishing Community Forestry Projects

Figure 15: Community Participation

Papua New Guinea poses many challenges for investors in the resource extraction industries. These include mainly poor governance, poor physical infrastructure, serious law and order problems and poor delivery of goods and services to rural areas.

Community Forestry in Papua New Guinea plays a significant and unique role in promoting sustainable forest management at the community level. The benefits derived from harvest and utilization of forest resource

through community participation can contribute to improve livelihood of communities thus meeting the Millennium Development Goal (MDG) Number Seven and the Medium Term Development Strategies (MTDS) in rural income generation and poverty alleviation.

Taking ownership of the Community Forestry concept introduced under IREDCP and the Eco Forestry Programme by PNG Forest Authority (PNGFA) requires it to be reviewed for it to be co-opted into the operational mechanism of PNGFA consequently maintaining unique features which community forestry has developed.

There are three (3) major areas which the Community Forestry Section has been tasked to review and present for management for endorsement. They are policy and Legislation, Regulation and Code of Conduct and Operational mechanisms. Community Forestry has always been a grey area thus it is now the challenge of this section to map out a way forward to address this dynamic evolving concept of community Forestry.

10.0 Developing Policy, Legislation and a Regulatory Framework

The Global Trend in Sustainable Forest Management is that, Governments are moving from Public sector control of natural resources to private and community control. Community Forestry fits into this global trend and is a strategy that has been adopted by many countries in Asia and beyond. The experiences are mixed, but there are numerous examples of community forestry becoming a national movement, and one that is capable of delivering significant socio-economical and environment benefits.

In all forms, the approaches to acquiring access to forests have been through the ILG process ruling out the involvement of the Ward Councilors, Local Level Government and the District Administration. Even Community Forestry in its approach has overlooked this factor because we have put too much emphasis in the ILG and less emphasis on the community structure governance.

The Community Structure of Government and incorporating of Land Groups should go hand in hand but giving overriding powers and authority to the Ward Councils through the LLG who themselves become the monitoring agents of any operators going in their Forest areas.

The Development of Ward Land Use plans developed by the Community themselves identifying different areas of Land uses would be the baseline for any regulatory framework giving mandated power and authority to local village court system to sue and persecute community members of breaking the law.

11.0 Objectives

The ACIAR funded project has 5 Objectives which are:

1) To advance the teak genetic improvement program in PNG through first generation selection to produce high quality germplasm.
2) To ensure maximum realisation of genetic gains made by the project through the development of robust and smallholder appropriate silviculture.

3) To develop capacity for an ongoing genetic improvement program for sandalwood in PNG.

4) To advance the sandalwood genetic improvement program in Cape York Peninsula for use by local landowners.

5) To communicate and disseminate research outputs to improve uptake and impact.

In PNG, the project activities are focused in 5 general locations: East New Britain, Central Province and Morobe Province for teak; and Gulf and Central Provinces for sandalwood. Since the commencement of this project the PNG Government has released plantation development targets as part of its rural development strategies under the Vision 2050.

This will require the plantation estate to be increased to 150,000 hectares by 2030 and to 800,000 hectares by 2050. These challenging targets have been translated into an operational program "Painin Graun na Planim Diwai" by the PNG Forest Authority.

Partnership and confidence building for effective compliance and enforcement of a regulatory framework for community forestry takes time and requires the support of national and local governess institutions and process. Among the many challenges that need to be addressed include the following;

- Balancing the cultural dimensions of customary practice with contemporary values of equality, democracy and sustainable natural resource management.
- Demarcation of boundaries between different categories of land uses, gardening, water shed management, hunting and wildlife management areas and production forests.
- Clarification of tenure of trees and forests in particular, community and individual rights to use trees for subsistence and commercial purposes on various land categories.
- Agreeing on authority and responsibility of community and government partners.
- Agreeing on benefit sharing arrangements.

12.0 Expected Outcomes in Result Areas

The impacts through achieving the research and developing objectives of Community forestry projects will lead to significant social, economic and environment benefits. Where an increased availability of planting of improved germplasm from these two valuable species will:

1) Generate Social Benefits through:

- Enhancement of household financial security in regard to cash needs due to potential liquidity of the trees once of a merchantable size and Promotion of intergeneration benefits due to moderate period of production (long term 20 years).

- Enhance tree assets underpinning business opportunities eg, nurseries can add to rural development, providing benefits beyond the families developing the trees.
- Provision of opportunities for female directed activities eg. Nursery development.
- Delineation of land boundaries with trees to reduce land tenure issues.

2) Stimulate Economic Activity through:

- Seedling Sales
- Small holder log sales
- Subsequent processing and sales.

3) Promote Environment benefits through:

- Strategically located planted resource from improved germplasm progressively becoming more economically viable to source timber compared with increasingly distant and dimished natural stands.
- Reinvigoration of the genetically eroded natural sandalwood populations and potential reduce its current threatened status by village and enrichment plantings with variable seed sources.
- Increased utilization and/or restoration of marginal or idle agricultural land and logged forest since teak and sandalwood are adapted to and most likely planted in such areas.

13.0 Community Forestry Specific Guided Projects in Southern Region for year 2016.

Tabulated below are some of the planned and existing Community Forestry projects since 2010.

No.	Project Name	Type of Project	Status
1	Babagarubu - Rigo	TA & Sawmilling	Not Active
2	Dubanatebua - Rigo	TA & Sawmilling	Not Active
3	Rarai – Mekeo/Kairuku	Teak Woodlot	Active
4	Vanuamai/Biotou - Kairuku	Sandalwood Woodlot	Planned/Active
5	Girabu - Rigo	Sandalwood Woodlot	Active
6	Iokea - Gulf	Sandalwood Woodlot	Active
7	Kubuna/Omeome - Kairuku	*Cryptocarya massoy* rehabilitation	Planned/Active
8	Sogeri - Koiari	*Cryptocarya massoy* rehabilitation	Planned/Active

14.0 PNGFA Community Forestry Approaches

Community Forestry Section in the Field Services Directorate is fortunate to be working alongside with Aid coordination and Plantation Branch in partnership with ACIAR by developing the projects mostly in the Gulf and Central Province. The focus has being to ensure the Resource owners are trained and skilled in necessities and other vital areas of good leadership qualities to enable to participate and utilise their resources in a more sustainable way.

The question of how Community Forestry can fit itself within the current Policy and regulation under the provisions of Forestry Act 1993 (as revised) without contravening it needs to be addressed by higher Authorities. Specifically, in the situation of resource owners and communities who are interested in venturing into small forest resource based business projects under the 500m3 cut or Non Forest Products businesses.

Figure 16: Community Training

Unlike Timber Authority (TA) process which caters for 5000 m3, there are some requirements which foreign companies can cover whilst simple resource owners cannot meet at the village level for instance bond fees of K20, 000.00. There needs to be appropriate considerations given to 500m3 undercut in the sense that our local resource owners are also given the chances of participating in the forest business entrepreneurs without demeaning their potential to advance at a village level.

Since its inception, CF in a broader sense requires ultimate support through continuous field support in terms of technical advice and field training if needs to be; What has being identified so far is that CF projects need to operate as business entities which requires the presence of our Business Development Officer to assist in giving advice on the wise use of the monetary part of these projects. Moreover, people affected from these projects can be tuned on the long term basis.

15.0 Training

Generally, no formal training processes were done to train the landowners on the aspects of germination and raising of sandalwood and hosts seedlings. But the great deal of knowledge and skills regarding semi parasitic characteristics of sandalwood, need for host in the nursery and the field and other necessary information has been passed onto the landowners during our many visits to the project sites.

The landowners are now aware of the importance of these things and are actually implementing which is very encouraging to the project team. On the Training part of this programme ACIAR through PNGFA has taken ownership of delivering to the people such training programmes.

16.0 Development basis through Nursery

Some make shift nurseries has been established to cater for the germination and raising of seedlings while the landowners were advised to build a nursery on the site using the materials supplied by the project.

Apart from the Santalum macgregorii, Santalum album (Indian sandalwood) is also germinated and raised in the nursery for the trial in Girabu but not in the project site as advised against.

The reason is that cross breeding of S. macgregorii and S. album might bring some negative result that might affect the result of our project as we are not aware of what might happen if cross breeding takes place between the two species.

Attempts are being made with the landowners to continue awareness and stop and prevent fires within the site that may once again destroy the sandalwood population.

17.0 Expected Outcomes in Result Areas

17.1 Current CF Projects.

With the abandoned Small scale timber sawmilling Projects as a result of Landownership issues, Concentration is focussed on establishing woodlots of high value species (Teak, Sandalwood and Massoi sp) in Papua New Guinea.

Activities have included Site preparations and planting of sandalwood seedlings, training of landowners to prepare sites, preparing seedlings and other requirements for the continuity and progress of the work on the site.

17.2 Reforestation & NTFP Initiative in Southern Region.

Apart from the other result areas, I have been engaged in activities/projects such as Agro forestry, Reforestation and afforestation and also awareness on sustainable harvesting & utilization & export of *Cryptocarya massoy* in the rural areas, The key factor is our continuous support in such areas so that whatever we provide through technical support will build the morale of resource or Landowners and continue to take ownership thereon.

18.0 Constraints

There are factors or constraints which have impeded in achieving forest programs such as community Agroforestry program, Reforestation and afforestation in PNG.

These have been identified as:

1. Land

1) Complicated land tenure system has hindered development in PNG.
2) Land disputes often arise where land previously not considered important by local people assumes important in view of a proposed development promising monetary benefits.

3) Landowners reluctant to release their land for projects where they do not see immediate benefits to them and their community

4) Continuous compensation demands and legal challenges on state land which the original owners feel land was not properly acquired.

2. Finance

1) Budget constraints – ongoing problem of government funding or investor funds for PNGFA officers to roll out planned programs.

2) Starting Capitals for interested Landowner or their Local companies to venture in start Agroforestry projects.

3. Wood for Village Consumption

1) Fuelwood is becoming scarce in many parts of the country due to population pressure and forest clearance for Agriculture and urban development.

2) Wood for building houses is also increasingly becoming scarce.

4. Silviculture Techniques

1) Silviculture techniques and prescriptions that are already in place for major plantation species have to be reviewed and information documented and disseminated for implementation at rural community level.

5. Research and Development

1) There are gaps in the translation of research results into policy directives for implementation at the technical level.

2) Where patches of forest have been, savannah grassland has dominated much of the area.

3) Fallow periods are not observed hence, the land turns to be over used,

4) Wild animals take to destroy the gardens and farms,

5) Prolong change in weather patterns have mere effects and have impacted the lives of the people where long droughts have water problems and wet season has flooding and erosion.

6) There is shortage of food and cash flow;

6. Community Ownership and Participation

1) Communities willingness to take ownership and fully participate

2) Realization of gender equality where woman and children are equally represented.

19.0 The Achievements against Activities and Outputs/Milestones are based on the Objectives

To ensure maximum realization of genetic gains made by the project through the development of robust and smallholder appropriate silviculture and to develop capacity for an ongoing

genetic improvement program for sandalwood in PNG through review of existing silviculture practices for Teak and Sandalwood around the world

Past PNG silviculture manuals have been reviewed of previous practices resulting in the current mature plantations. This has been followed by discussions in the field with OISCA, UNRE and PNGFA staff to gain further insights into teak and Sandalwood silviculture. Meetings with project partners and smallholder growers have been conducted to understand their thoughts and needs by way of;

1) A literature review which has commenced and key include: initial spacing and subsequent thinning, form pruning of stumps to a single dominant stem, branch pruning to enhance stem form and volume and target log size. An important point is that the local road network (e.g. corner radius of curvature and road conditions) and woodlot locations provides significant logistics challenges.
2) Select communities and/or individual smallholders to host silvicultural trials, based on interest and capacity
3) Undertake land management and needs assessment with each candidate community
4) Source and germinate seed and establish teak stump beds and sandalwood seedlings.
5) Produce extension materials for smallholder systems for teak and sandalwood.
6) Engage with local landowners to work collaboratively on seed collections from across the natural range of S. macgregorii
7) Identify and introduce seed from exotic commercial sandalwood species
8) Review of existing literature for sandalwood nursery production and development of specific training materials
9) Provide training to participating nurseries for seed propagation of wild-collected sandalwood

20.0 Lessons Learned to Date

Despite all troubles more people are now been informed that a section of Community Forestry is in place, thus more awareness into the requirements of CF has being brought through to interested resource owners and with positive response from the communities, there would be more Community Forestry Projects established in Papua New Guinea.

Research on tree germplasm improvement and dissemination requires long time horizons and therefore a commitment to ongoing linked projects in order to achieve impact. Capacity building within partner agencies, the program has reached the stage where improved teak germplasm or santalum spp progeny/provenance trials is becoming available to local farmers and there is increasing demand and support for planting high-value timber on their land.

There have been some unforeseen challenges in PNG, such as the El Nino drought, cuts to government budgets and some staff changes, which have affected the implementation of some of the planned research activities. Despite these challenges, the flexibility of the project

design and the strong commitment from the range of partners has enabled the team to forge on and achieve substantial outputs in the first two years.

21.0 Overall Findings and Way Forward

Despite its relatively complex array of R&D activities, the project is progressing very well against all of the planned activities, with good intermediate outcomes at the community level evident in both PNG and northern Australia.

The PNG partners: PNG Forest Authority, Forest Research Institute, UNRE, OISCA and PIP; have demonstrated their ability to work with the Australian project staff to make good progress in the four locations where project activities are occurring.

The activities being undertaken in this project have the potential to have a big impact on the likely success of the substantial plantation development targets set by the PNG Government in the 2050 Vision, through both the provision of increased quantities of high quality tree germplasm and the development of working models for implementation with local communities in different regions of PNG.

The work on improving teak germplasm (led by FRI and UNRE) and the excellent activities on dissemination (led by OISCA) via lead foresters and schools is progressing very well and provides good confidence that there will be tangible outcomes and benefits emerging for next users by the end of the project.

The activities to develop farmer friendly silvicultural practices and investment information for teak is progressing well, reflecting the ability to draw on existing planted teak stands, whereas the related activities for sandalwood are still at an early stage of development.

Despite a previous ACIAR project having had limited success with the conservation and replication of the indigenous sandalwood species in PNG, this project's sandalwood activities (led by PNG Forest Authority) are already showing good results through the production of sandalwood seedlings and their planting by communities in the three project sites.

The PNG communications activities, which build on a long term collaboration with PIP, are of a high quality and are having impact within the project (via the schools program) and beyond the project (via the incorporation of the Tree Growers Toolkit into the PNGFA's Painin Graun na Planim Diwai Program.

For a variety of reasons there has been only limited application of the Monitoring and Evaluation plan and reporting documents that were prepared following the ACIAR sponsored M&E workshop at the beginning of the project.

22.0 Specific Issues and Recommendations

The need for a Community Forestry project to fully function and operate legally in PNG needs to follow the process and requirements by registering to be members of the FORCERT group certification scheme and all operations tied under a Timber Authority permit. Moreover, the CF project must be guided by a Forest Stewardship Council certification that strictly complies to the PNG National Forests Management Standards. Being the stepping stone CF –

Southern will ensure that any projects current or ear marked must be properly screened and follow procedures and requirements to function in accordance with the regulations of Forestry Act 1991 (as amended).

The current monitoring and evaluation plan needs to be reviewed to identify one monitoring and one evaluation question related to the desired outcomes for each of the 5 objectives. The project team then needs to ensure that sufficient information related to these questions is being collected to enable their evaluation at the end of the project.

Partners such as ACIAR need to consider ways of developing good communications stories on the teak and sandalwood activities for PNG and Australian audience.

Resource owners and Communities who are landowners to voluntarily register their land for future development on a leasehold arrangement or utilizing their land themselves through support from government or potential international partners.

It is worth noting that some of PNG's major operators have already obtained International Certification such as the Forest Stewardship Council (FSC) Control wood, FSC Forest Management and the TLTV standard.

These certification systems will enable them to continue trading with existing and new markets. At present forest certification in PNG is voluntary and self-regulated by market requirements.

The forest industry in PNG will continue to be a key development partner with Government in bringing tangible development and services to the rural and less development areas throughout the country in terms of providing community services such as education, health, communications, and transport and generate income and revenue for the nation.

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The Implementation of National Greening Program (NGP) in Caraga Region, Mindanao, Philippines

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Abstract: The degraded state of the country's environment and natural resources is felt most intensely by the poor, especially the rural communities given that they depend on these resources for their primary source of living. On the other hand, poverty frequently aggravates environmental stress as the marginalized population presses upon limited resources, such as unregulated activities and upland cultivation.

The poverty threshold, or poverty line, is the minimum level of income deemed necessary to achieve an adequate standard of living in a given locality. It is the level of income that a household must obtain annually so that it can adequately provide the basic needs of its members in terms of food, clothing, and basic services like health and education.

This paper introduces the implementation of National Greening Program (NGP) in Caraga Region thru the issuance of Executive Order No. 26 dated February 24, 2011. In six years, the NGP has envisioned to plant some 1.5 billion of trees (i.e. premium/indigenous, forest tree species, fruit trees, high value crops and mangrove species) covering 1.5 million hectares spread nationwide within public domain such as forestlands, mangrove and protected areas, ancestral domains, civil and military reservations, urban areas under the greening plans, inactive and abandoned mine sites and other suitable lands.

Pursuant to Section 2.6 of E.O. 23 mandating the DA-DAR-DENR Convergence Initiative to develop the NGP in coordination with the Department of Education, Commission on Higher Education, Department of Social Welfare and Development, Department of Budget and Management, the private sector and other concerned agencies and institutions.

The National Greening Program (NGP) is not just a reforestation project. It is an opportunity to put dream into reality. Who would think that through this government program, you can be a millionaire someday?

Introduction:

The Philippines has a total area of about 30 million hectares is legally classified as forest land and alienable and disposable land. Classified forest lands cover 15.81 million hectares or 52.7 percent of the area; alienable and disposable lands encompass 14.19 million hectares or 47.3 percent. Based on the result of the 2010 forest/land cover mapping exercise, total forest cover for the whole of the Philippines was 6 839 718 hectares or 23 percent of the country's total

land area of around 30 million hectares. Of the total forest covered area 1, 934, 032 hectares were closed forest or 28.28 percent; 4, 595, 154 hectares or 67.18 percent were open forest; and 310 531 hectares or 4.5 percent were mangrove forest.

In terms of forest cover change, the country's total forest cover had decreased by 328,682 hectares (4.59 percent) from 7,168,400 hectares in 2003 to 6,839,718 hectares in 2010. Among the 17 regions of the country, 11 have experienced forest cover decrease while six have improved/increased their forest cover. Significant deforestation and forest degradation occurred in the Philippines from 2003 to 2010 as the total forest cover decreased by 328, 682 ha. (4.59 percent) or at a rate of 46, 955 hectares annually. Forest degradation was also apparent in the conversion of closed forest to open forest as well as reduction in canopy cover percentage within the closed and open forests, amounting to 996,431 hectares or 142,347 hectares annually. These data validate that the government has sufficient grounds for the implementation of Executive Order (E.O.) 23 (Logging Moratorium in Natural and Residual Forests) and E.O. 26 (National Greening Program or NGP) which are the main policies/programs being implemented by the Department of Environment and Natural Resources (DENR) since 2011.

Caraga Administrative Region 13 was created by virtue of Republic Act No. 7901 on February 23, 1995 by President Fidel V. Ramos. This new born region is a region with colorful historical background represented by the famous Balanghai Boat. Caraga is an extensive land mass covering five (5) provinces in the north-eastern seaboard of the island of Mindanao.

The Department of Environment and Natural Resources (DENR)-Caraga Region was formally established on October 13, 1995. It manages an area of 1,913,842 hectares of which 30 percent are alienable and disposable lands and 70 percent are timberlands. The region is composed of five provinces namely Agusan del Norte, Agusan del Sur, Surigao del Norte, Surigao del Sur and Dinagat Islands.

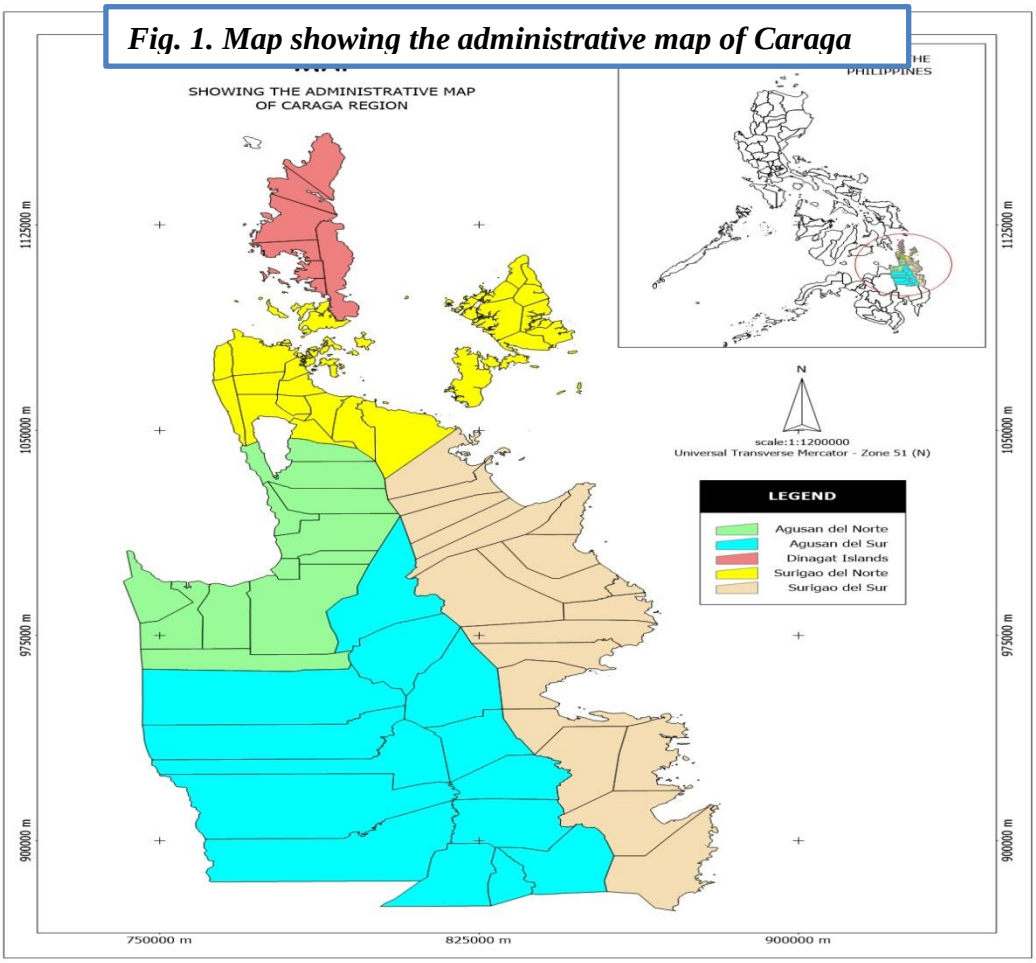


Fig. 1. Map showing the administrative map of Caraga

Agusan del Norte - 288,438 hectares

Agusan del Sur - 829,719 hectares

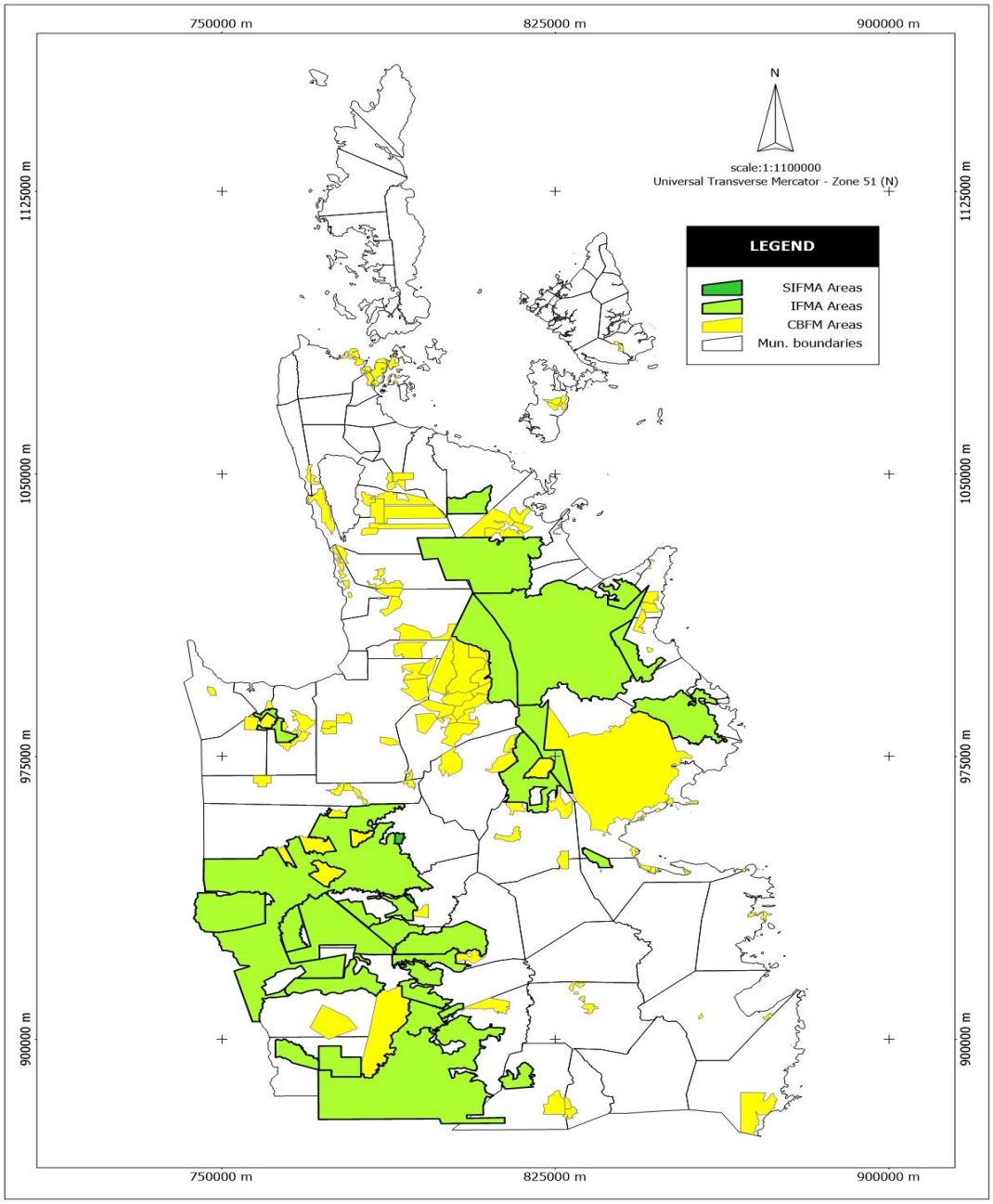
Surigao del Norte- 201,710 hectares

Surigao del Sur - 513,770 hectares

Dinagat Island - 80,205 hectares

DENR Caraga Region was issued several tenurial instruments like Certificate of Stewardship Contracts (CSC), Community Based Forest Management Agreements (CBFMA), Integrated Forest Management Agreements (IFMA), Socialized Integrated Forest Management Agreements (IFMA) and others. These tenurial instruments were awarded to legitimate Peoples Organizations, Private Companies and upland individuals for a period of 25-year and renewable for another 25-year in accordance to the existing rules, laws and regulation.

Fig. 2. Map showing the tenurial instrument



Prior the implementation of the NGP, series of Information, Education and Campaign (IEC) were conducted to the different People's Organization (POs), Local Government Units (LGUs), Colleges, State & Universities (CSUs) and other stakeholders who are qualified as NGP partners.

Fig. 3. Picture shows the IEC activities

Pursuant to the existing rules and regulation on the NGP implementation, a Memorandum of Agreement (MOA) / Letter of Agreement (LOA) were executed by and between the DENR and legitimate Peoples Organization (POs)/Local Government Units (LGU). It was stated in the MOA/LOA the respective roles and responsibilities of both parties including the approved budget.

In support to this noble program of the government, Caraga Region has able to accomplish a total of 104,648.10 hectares covering the period CY 2011-2016 with equivalent of 98,692,529 seedlings of various species. Hereunder is the breakdown of accomplishment per province, to wit;

Fig. 4. Area planted (ha.) by PENRO covering CY 2011-2016

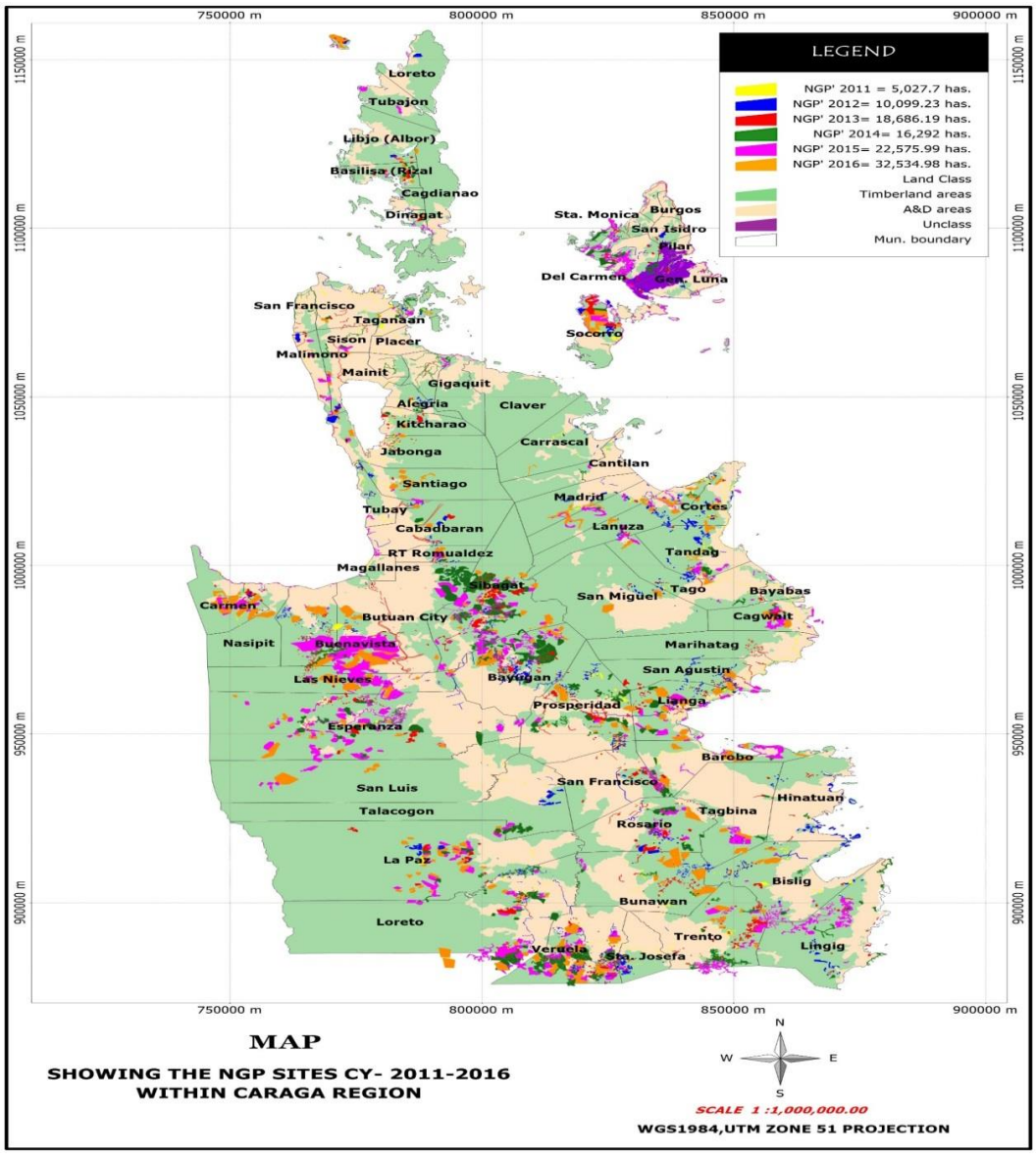
AREA PLANTED (ha) BY PENRO FOR CY 2011-2016

Year/Office	MIXED	MONO COMMODITY									TOTAL
		TIMBER	COFFEE	CACAO	RUBBER	FRUIT TREES	INDIGENOUS	MBFDP	BAMBOO	FUELWOOD	
CY 2011-2016											
Regional Total	18,089.34	48,432.00	3,289.00	3,566.00	9,916.79	3,759.12	9,692.70	6,825.14	960.00	118.00	104,648.10
Agusan del Norte	3,181.70	9,033.00	50.00	1,063.00	442.00	395.41	1,616.13	248.64	222.00	20.00	16,271.88
Agusan del Sur	9,815.34	26,536.82	1,437.00	1,142.00	8,159.79	1,873.42	4,217.05	-	290.00	40.00	53,511.43
Surigao del Sur	3,848.23	9,885.18	1,008.00	1,161.00	1,315.00	894.68	842.03	2,964.78	217.00	38.00	22,173.90
Surigao del Norte	1,008.19	1,993.00	764.00	200.00	-	430.61	2,203.81	3,354.71	206.00	20.00	10,180.32
Dinagat Islands Province	235.88	984.00	30.00	-	-	165.00	813.68	257.01	25.00	-	2,510.57

Fig. 5. Seedlings planted by PENRO covering CY 2011-2016

SEEDLINGS PLANTED BY PENRO FOR CY 2011-2016											
Year/Office	MIXED	MONO COMMODITY									TOTAL
		TIMBER	COFFEE	CACAO	RUBBER	FRUIT TREES	INDIGENOUS	MBFDP	BAMBOO	FUELWOOD	
CY 2011-2016											
Regional Total	9,203,595	58,607,481	1,742,600	1,729,101	4,280,095	1,588,226	4,791,582	16,306,897	204,952	238,000	98,692,529
Agusan del Norte	1,869,479	12,365,660	9,800	531,500	212,117	154,504	807,116	618,001	44,400	50,000	16,662,577
Agusan del Sur	4,780,486	27,834,748	654,500	548,701	3,499,141	834,747	2,056,849	-	69,100	110,000	40,388,272
Surigao del Sur	1,928,850	13,726,334	504,000	588,900	568,837	352,111	416,933	7,038,868	43,400	28,000	25,196,233
Surigao del Norte	505,190	3,033,819	559,300	60,000	-	164,364	1,089,014	7,935,575	43,052	50,000	13,440,314
Dinagat Islands Province	119,590	1,646,920	15,000	-	-	82,500	421,670	714,453	5,000	-	3,005,133

Fig. 6. Map showing the NGP sites of CY 2011-2016 within Caraga Region CY 2011-2016



In Caraga Region, a total of 207,028 jobs generated during the implementation of National Greening Program (NGP). As poverty-reduction driven program, NGP engaged site-based individual and organizations in the seedlings production, site preparation, maintenance and protection and such other activities. Many were employed from the technical and labor force throughout the implementation of the program.

Fig. 7. Drift of Jobs generated covering CY 2011-2016

PROVINCE	No. of Jobs Generated							GRAND TOTAL
	2011	2012	2013	2014	2015	2016		2011-2016
						Target	Accom.	
Regional Total	**5,009**	**4,649**	**9,918**	**31,547**	**54,141**	**38,507**	**101,764**	**207,028**
Regional Office	2	3	3	4	15	10	15	**42**
Agusan del Norte	434	537	1,691	7,472	16,664	7,801	16,442	**43,240**
Agusan del Sur	2,416	2,265	5,545	13,887	24,270	14,442	44,088	**92,471**
Dinagat Islands		77	88	394	1,067	1,726	6,695	**8,321**
Surigao del Norte	819	588	804	5,259	4,596	2,926	22,153	**34,219**
Surigao del Sur	1,338	1,179	1,787	4,531	7,529	11,602	12,371	**28,735**

The National Greening Program (NGP) provided additional source of income. The beneficiaries were planted with falcata, rubber and mahogany while waiting for the harvest time, they inter-cropped it with bananas for alternative source of income. Also, NGP not only helps the people but it is a great tool in the battle against climate change. The program is truly beneficial for the people.

Further, the National Greening Program (NGP) truly helps alleviate poverty and helps in the increase of the farm production. In fact, thru this program the farmers were able to send their children to school and provide livelihood to the people within the community. It is indeed a successful project.

Key Elements Relating to the Case Study/Overview Paper:

In the course of the NGP implementation, various problems were being encountered both by the DENR and NGP partner-implementers. Listed below are some of the identified factors affecting the NGP implementation:

Weather Conditions

Long dry season which cause the low survival rate of some established plantations. The long drought was experienced from January to October which resulted to higher mortality rate of planted seedlings.

Location and Accessibility of NGP Sites

Location of the NGP sites is located in remote areas which demands higher cost for transportation and travel time period for the monitoring of accomplishments.

Safety of the Field Workers

The safety of the extension officers and the NGP coordinators is at risk due to the unstable peace and order in some area.

High Mortality of the Delivered Seedlings

Seedlings suffered from higher mortality rate as these were transported from the nursery to the distant planting area especially when travelling through the rough roads.

In order to address the technical challenges, the following are the strategies and activities that will be implemented in the areas, to wit;

1. **Survey, mapping and planning including establishment of baselines:**

Procurement of high resolution images (50 cm resolution) shall be done to establish baselines. Protection and production forest shall be clearly delineated and defined on the ground and shall serve as a basis for target setting of specific restoration and protection interventions including survey, GIS mapping of identified areas and preparation of site development plans.

2. **Conservation and protection of natural forest landscapes and protected areas:**

Areas with natural forests and protected areas shall be protected from all forms of disturbance to allow the natural processes within to flourish and to improve degraded portions through enrichment planting and assisted natural regeneration.

3. **Rehabilitation and restoration of degraded watersheds and coastal areas:**

Rehabilitation of these areas shall be done via reforestation of suitable species based on site-species matching. Degraded mangrove forests in tidal and coastal areas that extend inland along streams and rivers shall be rehabilitated by planting appropriate mangrove species. Narrow strips of lands along the sandy part of the seaboard shall also be enriched with trees. Agroforestry systems shall be applied in partly wooded and open spaces where farmers can grow short-term crops such as vegetables and root crops, high-value and tree crops to enhance their livelihoods.

4. **Setting up or restoration of livelihood projects by affected communities:**

Within the five-year time frame, appropriate livelihood projects shall be established or refurnished through use of available raw materials within the community established through partnership. Livelihood projects can take the form of implementing adaptation and mitigation measures against the impacts of climate change. Livelihood support shall include the establishment of processing and post-harvest facilities for value addition.

5. **Vegetative and structural measures for soil stabilization and conservation and water impounding structures:**

Based on the geohazard mapping and site validation/assessment, highly vulnerable and erodible areas shall be managed by establishing appropriate soil stabilization and conservation measures as well as water-impounding structures.

6. Organizational development and management:

In order to address the social dimension of this initiative and considering that local communities are partners of the government in forest management, community organization and strengthening of local communities/peoples' organizations shall be given priority.

Moreover, the NGP accomplishments cannot be achieved / attained without any funding support from the government. Below is the NGP budget of Caraga Region amounting to Php 1,985,546,000.00 covering the period from CY 2011-2016;

Fig. 7. Total budget by PENRO covering CY 2011-2016

PROVINCE	BUDGET IN PHILIPPINE PESO						
	2011	2012	2013	2014	2015	2016	TOTAL
TOTAL	**65,670,000.00**	**123,390,000.00**	**245,095,000.00**	**332,818,000.00**	**534,008,000.00**	**684,565,000.00**	**1,985,546,000.00**
Regional Office	24,507,000.00	1,638,000.00	2,923,000.00	61,759,000.00	74,136,000.00	102,043,000.00	267,006,000.00
Agusan del Norte	8,364,000.00	14,927,000.00	29,258,000.00	22,100,000.00	61,466,000.00	104,204,000.00	240,319,000.00
Agusan del Sur	13,426,000.00	47,351,000.00	150,979,000.00	198,214,000.00	267,519,000.00	279,399,000.00	956,888,000.00
Surigao del Norte	6,081,000.00	17,592,000.00	20,130,000.00	15,591,000.00	33,277,000.00	47,592,000.00	140,263,000.00
Surigao del Sur	9,834,000.00	37,381,000.00	38,346,000.00	31,546,000.00	91,715,000.00	126,989,000.00	335,811,000.00
Dinagat Islands	3,458,000.00	4,501,000.00	3,459,000.00	3,608,000.00	5,895,000.00	24,338,000.00	45,259,000.00

Way Forward

The National Greening Program has been one of the most successful programs of DENR. This is an effective tool in climate change mitigation and adaptation. Aside from environmental benefits, it continuous to uplift the lives of the people.

This paves the way to the signing of Executive Order No. 193 entitled "Expanding the coverage of the National Greening Program (NGP)". This is in line with the international commitment of the Philippines to reduce its carbon emission and help combat climate change. Under the E.O. 193, the coverage of the program was expanded to cover all the remaining unproductive, denuded and degraded forestlands of the Philippines and its period of implementation was extended from 2016-2028.

The DENR will continue to intensify its Information, Education and Communication (IEC) campaign to increase the level of awareness of the people, create partnership and mutual trust and capacitate the communities in the advocacy to protect and conserve our environment and natural resources.

The DENR looking forward to the Enterprise Development activities for the upland communities / Peoples Organization in order to develop their capabilities to start-up, manage and sustain enterprise activities. We believe that our PO's can become effective managers of our forest resources. Also, there is a need to improve the knowledge and skills of the farmers

in conducting market survey, product development as well as establishing network and linkaging with other government agencies, Local Government Units (LGUs) and financial institutions.

Summary

The implementation of National Greening Program (NGP) is not an ordinary reforestation/regreening program. It also aims to:

- Reduce poverty among upland and lowland poor households, indigenous peoples and in coastal and urban areas;
- Implement sustainable management of natural resources through resource conservation, protection and productivity enhancement;
- Provide food, goods and services such as timber, fibre, non-wood forest products (NWFPs), aesthetic values, air quality improvement and water regulation;
- Mitigate climate change impacts by expanding forest cover that serves as a carbon sink;
- Promote public awareness as well as instill social and environmental consciousness on the value of forests and watersheds;
- Enhance the formation of positive values among the younger generation and other partners through shared responsibilities in sustainable management of tree plantations and forest resources; and
- Consolidate and harmonize all greening efforts of the government, CSOs and the private sector.

By 2020, the country's forest cover is expected to reach 8.34 million hectares. The increase can be attributed to the additional area that will be developed/rehabilitated under the NGP and protection of existing forests through continuous implementation of intensified forest protection and law enforcement activities nationwide as well as the governing policy of E.O. 23 and other forestry laws, rules and regulations. Significant increase is expected in terms of forest cover in planted forests which are mostly within forest land. The increase in forest cover will affect the total volume of growing stock.

References

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An Overview of How Forest Management is Accommodating Livelihood Concerns at the Economy Level of Sri Lanka

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Abstract: The government of Sri Lanka has lunched various community forestry programs to minimize the impacts of forest depletion on the livelihood of local communities and the natural environment. Poverty of the country is also identified as one of the main underlining causes for the deforestation and forest degradation as it is often associated with landlessness and poor land tenure system. The forestry sector master plan introduced in 1995 provides particular emphasis to build partnership and empowering rural communities to manage and protect forest resources and also to involve communities in forestry development activities and benefit sharing. Accordingly, The Forest Department has implemented various projects with the participation of communities and main outcomes in relation to livelihoods are considered as income generating from woodlots, and intercropping in woodlots at early stages, introduction of income generation activities, and performances CBOs and women empowerment. Lack of financial and human resources, and inadequate knowledge on improved extension capacities are the main problems encountered. Therefore, it is essential to empower Forest department staff on improved extension capacities and increase the role of community in managing forests

Introduction

The island of Sri Lanka is located at 60 55'nothern latitude and 790 52' eastern longitude and covers an area of 65,610km2 including inland water bodies. Sri Lanka is considered as a middle income earning country with a per capita GDP of US $ 3,625 and a Per capita GNP of $3536 at the end of year 2014 (Central Bank of Sri Lanka, 2014). Clothing and textiles, gems, tea, rubber, coconuts and other agricultural products are among the country's main exports. According to the Central Bank of Sri Lanka (2015) the agricultural sector accounted for 10.1% percent of the gross domestic product, while the forestry sector contributes 0.5% (Perera, 2015). Population of Sri Lanka is 20.1 million and its growth rate is 0.9 % per annum (Central Bank of Sri Lanka,2016). Countries labour force is 8,973,000 while the unemployment rate is 4.6of the labour force.

According to the forest cover assessment made in 1999 by the Forest Department, the country has a total of 1.94 million hectares of forests covering 29.5% of the total land area. An extent

of 1.47 million hectares or 22.4% of the land area is classified as dense forests (over 75% canopy cover) while the balance 0.47 million hectares or 7% of the land area classified as open forests (40%-75% canopy cover) (figure 1). Different forest types classified based on soil type and elevation is shown in table 1. In addition, there are about 90,000 hectares of forest plantations comprising of Teak, Mahogany, Eucalypts, Pine and other local species which accounted for nearly 1% of the land area. Rubber and Coconut plantations and other agro-forestry systems such as home gardens, which cover approximately another 20% of the land area were not considered as forests in this assessment (Forest Department, 2016). The status of forest land agriculture and other land uses of the country are illustrated in figure3 (Sri Lanka Forestry outlook study, 2009)

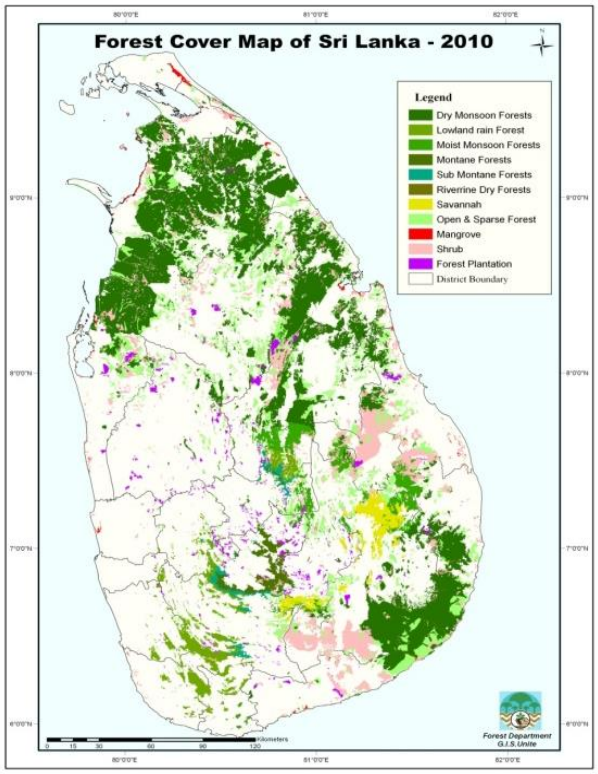

Figure 1: Forest Cover of Sri Lanka

Source: Edirisinghe et al., 2012

Forest Type	Extent-ha	Percentage
Lowland Rain Forests	123,302	1.9
Moist Monsoon Forests	117,885	1.8
Dry Monsoon Forests	1,121,392	17.1
Montane Forests	44,758	0.7
Sub Montane Forests	28,513	0.4
Riverine Dry Forests	2,425	0.0
Mangrove Forest	15,669	0.2
Savannah Forest	68,043	1.0
Open and Sparse Forest	429,485	6.5
Total	**1,951,472**	**29.7**

Table 1: Forest types

source: Forest Department, 2016

However, Forest cover of Sri Lanka, is in decline as most other countries in South and South East Asia. However, considerable changes have occurred to the forest cover of the country in the past. Annual forest loss between 1990 and 2005 is estimated at about 1.3%.

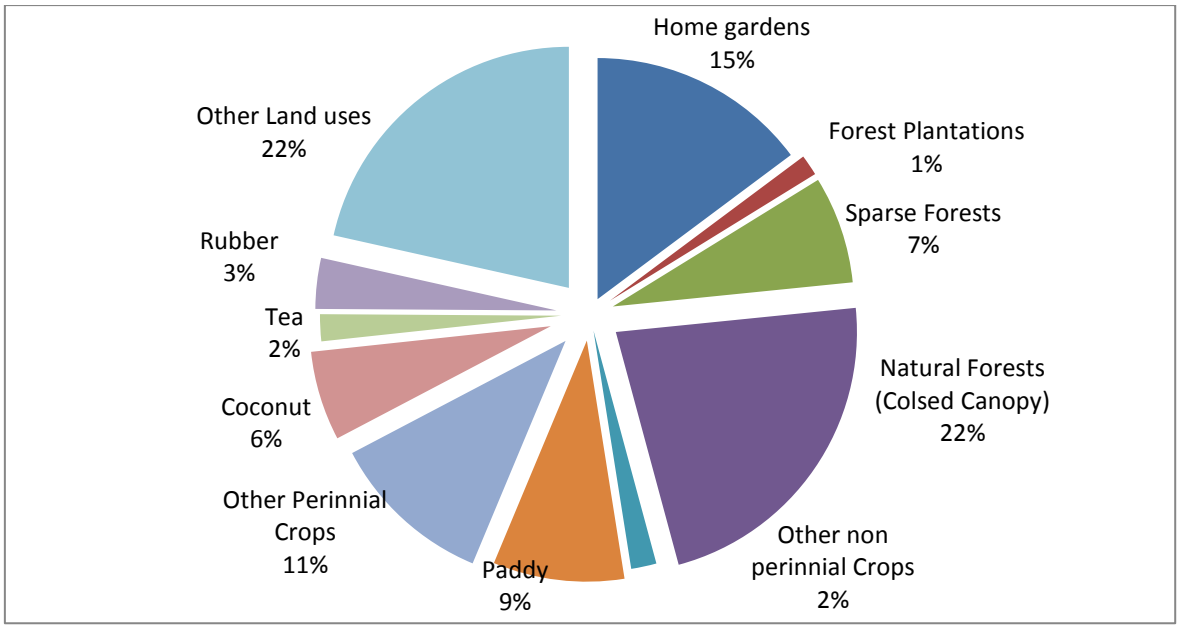

Figure 3: The status of forest land agriculture and other land uses

Source: Sri Lanka Forestry outlook study, 2009

One of the main causes of deforestation and forest degradation is the poverty that is often associated with landlessness and poor land tenure system. Community who live around the forests interact the forest in various ways. They overexploit forests for Permanent agriculture and shifting cultivation, fuel wood, Illegal timber extraction, home garden expansion, and for new settlements. This causes conflict between communities and the Forest Department for protection of the forests. As the Forest Department staff and resources are limited and the pressure on natural resources due to rising population of the country control of forest offences by policing and prosecution is very challenging. So The Forest Department has identified the importance of community forestry approach in forest conservation and management. Thus this paper discusses the different approaches of community forest management in the country, outcomes, lessons learned and way forward.

Poverty Alleviation, Policies Programs and Land Tenure in Relation to Livelihood Improvements of the Forestry Sector

The Government of Sri Lanka has declared year 2017 as the poverty alleviating year (Government information department, 2017) as the pledge given in the manifesto of the 2015 Presidential Election and according to the UN sustainable development goals. It is the view of the Government that economic development should consider social security, minimizing income differences, of marginalised communities (Colombo Gazette, 2016).

Accordingly, the Government has introduced various strategies to alleviate the existing poverty level under various national programs such as Divineguma, Samurdhi, and Gamaneguma. These programmes are intended to benefit 1.45 million households with low income which represents 27 per cent of the total population of the country.

With regard to forestry sector, the Forest Department has also implemented various strategies and has taken various policy decisions to improve the livelihood of rural people who live in the fringe of the forests which consequently give greater concerns to solve deforestation problem and improve forest resources through sustainable manner.

Since independent of Sri Lanka from the British rule in 1948, the forest policy sector was modified in 1953, 1980 and later in 1995. The priorities of the policy changes focus on conservation of forest, raising the productivity of the forests and enhance their benefits to the rural population.

Community participation was addressed for the first time by the new set of policies introduced in 1980 with the objective of incorporating community participation in forestry sector through social forestry approach. Corresponding to these objectives the "Community Forestry Project" was stared with Asian development Bank funds in 1988. The establishment of woodlots, fuel woodlots and the home garden development were the components of the project. In addition, "Participatory forestry Project" was started giving main emphasis on establishing Agro forestry established in 18 districts of the country with the community with long term agreements.

The new forestry sector policy and the Sri Lanka Forestry Sector Master Plan were introduced by the government in 1995 which is the policy for forest conservation in operation today.

National Forest Policy of Sri Lanka -1995

The forestry policy approved by the government in 1995 states that all the forest areas are to be managed in a sustainable manner in order to ensure the continued existence of important ecosystems and flow of forest products and services. It also recognizes and respects the traditional rights, cultural values and religious beliefs of people living in and adjacent to forest areas. There are adequate provisions for collaborative management of protected areas and for benefit sharing.

The three main objectives of the National Forest Policy are,

To conserve forests for posterity, with particular regard to biodiversity, soils, water, and historical, cultural, religious and aesthetic values.

To increase the tree cover and productivity of the forests to meet the needs of present and future generations for forest products and services.

To enhance the contribution of forestry to the welfare of the rural population, and strengthen the national economy, with special attention paid to equity in economic development.

Text box 1 : National Forest Policy of Sri Lanka

The Forest Department has been involved in community forestry activities for many years and the following are the key programs currently in operation.

Village Reforestation Program

This program is carried out in areas which are identified by the Forest Department for reforestation. The farmers living adjacent to the areas are involved in this program and each farmer is provided with 2 hectares of land for a period of 4 years on a forest agreement. Farmers are responsible for planting and the planting materials provided by the Forest Department and they are allowed to intercrop the lands with cash crops. Farmers are paid the amount that would otherwise spend by the department on hired labour and they are also entitled to the entire harvest of cash crops. After 4 years the lands are to be is handed over to the Forest Department.

Joint Forest Management Program

The management of isolated patches of natural forests with the help of local communities is carried out under this program with an agreed system of benefit sharing on a forest agreement signed between the local community and Forest Department.

Home Garden Development Program

The home gardens are the main source of timber in Sri Lanka that provides nearly 42% of the national timber needs. The Forest Department supports the development of home gardens providing the timber tree species, technical knowhow on planting and tree management practices free of charge (Forest Department 2016) .

In addition various foreign funded projects are implemented time from time in order to support other livelihood of community adjacent to forests. Different foreign funded projects implemented in the country is shown in table 2

Table 2 :Foreign funded projects implemented in the country

Donor Agency	Duration	Name of the Project
Participatory Forestry Project (PFP)	1993-2000	Asian Development Bank, World Bank, Australian Agency for International Development (AusAID)
Participatory Forest Management Project (PFMP)	1996-1998	Overseas Development, Government of UK
Upper Watershed Management Project (UWMP)	1998-2004	Asian Development Bank
South West Rain Forest Conservation Project (SWRFCP)	2000-2005	United Nations Development Program (UNDP)-Global Environment Facility (GEF)
Forest Resource Management Project (FRMP)	2000-2008	Asian Development Bank
Protected Area Management and Wild Life Conservation Project (PAM&WLCP)	2001-2007	Asian Development Bank, UNDP - GEF, and Government of Netherlands

Sri Lanka Australia Natural Resource Management Project (SLANRMP)	2003-2009	Australian Agency for International Development (AusAID)
Sri Lanka Community Forestry Program (SLCFP)	2012-2016	Government of Australia

Source: Participatory Management of Forests and other Natural Resources in Forest Areas in Sri Lanka, Workshop Proceeding; November 2007

The Community Forestry Project was the first community participated forestry project implemented by the Forest Department. The objective of this project was to increase replanting in degraded areas and create employment opportunities for the poor people who live in the fringe of the forests. This project supported the establishment of farmers woodlots, multipurpose tree planting in home garden, protective woodlots and fuel woodlots. Furthermore, this project issued ration coupons to community participants to get their rations from cooperative retail shops for their labor inputs.

The Participatory Forest Project started giving main emphasis on establishing Agro forestry woodlot in 18 districts of the country. This was implemented with the communities who live near the forests with long term agreements. this was funded by Asian Development Bank. This project has paid special emphasis on management plan preparation and sustainable use of natural resources.

The Upper watershed management project was carried out buffer zone planting and small timber farms through individual famers or famer organizations .and home garden development as well. The famers benefitted with cash payments for their labour work.

The South West Rain Forest Conservation Project promoted sustainable use of non timber forest products and improved forest protection. In addition this project strengthened community institutions to involve the community in decision making and Integrated buffer zone community development focusing on biodiversity conservation and livelihood problems. This project also provided seed money to run small credit operations among group members of the community.

Forest Resource Management Project was funded by Asian Development bank was by was implemented during the period of 2000-2008. This was implemented in 17 districts of the country .The basic objective of this project was to demarcate the forest boundaries. Establishment of Agro forestry woodlots, rehabilitation of degraded lands, Establishing Community based organizations mobilizing the community were considered as other activities of the project .

The Protected Area Management and the Wild Life Conservation Project aimed to empower buffer zone communities, development and implementation of conservation aspects and reduce dependency on natural resource.

Sri Lanka Australia Natural Resources Management Project was implemented from 2003-20011 under two stages. This project involved the local community in a more practical way to management of the forests. The project objective was to involve local community into

participatory forest management and enhancing the skills of community groups. Further officers of the government

Figure 2: Livelihood development programs done under Sri Lanka Australia Natural Resources Management Project

The Sri Lanka Community Forestry Program was implemented in 2012 and ended up in 2016. It was funded by the Government of Australia. The goal of this program was to improve the management of Natural Resources to support livelihoods and contribute to poverty reduction in the Dry and Intermediate zones of Sri Lanka. The components of this project were Participatory reforestation, introducing alternative livelihoods to the community living near the forest, developing infrastructure for the villages around the forests and home garden development. Moreover this project enhanced the capacity of rural community and offers of Forest Department (Figure 3).

Figure 3: Livelihood development programs done under Sri Lanka Community Forestry Program

The community can extract Non Timber Forest products (NTFP) from buffer zones areas and enriched forests through permits issued by the Forest Department. The woodlots are allocated to the farmers with long term legal agreements.

Mechanisms to Encourage Increase Community Participation

The recent participatory forestry projects, especially Sri Lanka community Forestry Program have many components to attract community participation. One important component is

preparation of Site specific Forest management plans including reforestation, home garden development micro finance, micro enterprise development, gender equality minor infrastructure such as access roads minor irrigation tanks and other socio economic benefits (Fernando 2017). In addition another component that encourage community participation is the way of payment. The payments done for direct labour, infrastructure development and resource sharing directly to registered Community Based organizations(CBOs). These CBOs have their own constitution to maintain the monitory transparency. Further, it was observed that CBOs developed their own community forestry models suit to their environmental conditions and other socio economic requirements. Thereby farmers were successful in increasing their income through intercropping in farmers woodlots and micro enterprises. The performance of such successful sites directly influenced the other program sites and CBOs for better results. The empherical evidence show that the level of participation in community forestry activities is determined by the socio economic characteristics of forest users and the benefits obtained from the forest resources they are managing (Fernando 2017).

In addition, micro enterprise facilitation introduced by community forestry projects particularly SLNRMP project and SLCFP program are encouraged people to engaged in the community forestry activities.

Lessons Learned

Overall Outcomes of Ongoing Efforts to Strengthen the Livelihood Contribution of Forest

The establishment of Famers woodlot is the generally popular component of most of projects implemented in the country where the farmers grow different tree species depending on the environment and socio economic conditions of the site. The famers have legal ownership of the planted trees and maintain them until the rotation period is over. After the rotation period is over famers are allowed to cut 80 percent of trees and the value of remaining 20 percent of the trees should be paid to the Government as Royalty. According to Fernando (2017) Farmers could earn more than a million rupees through the sale of logs at farm gate price. In addition, famers are allowed to plant cash crops as intercrops in famers woodlots. The average income from intercropping is more than Rs.100,000 per crop.

The families which are engaged in the Sri Lanka Community Forestry Program have improved their income levels and livelihoods with such incentives granted by Sri Lanka Community Forestry program (Table 2). The livelihood programs particularly supports the unemployed youth and women to be engaged in income generating activities. The key Income Generating Programs introduced by the community forestry programs and the income is shown in table 2

The bulk payment for the community forestry activities are done directly to the Community Based Organization (CBO). Usually CBOs are not utilizing the total fund and save the remaining money for other purposes as per their constitution. Some of the CBOs utilize the remaining money to provide micro loans at a lower interest rate which will help community to expand or to start new livelihoods.

The community forestry concept is widely recognized and accepted by the government agencies, communities NGOs as well as donor agencies (Fernando,2017).

The Economic and Policy Analysis conducted in 2008 highlighted that the attitude of the Forest Department staff from field level to central level and community members have changed towards the participatory approach. Both believe that collaborative effort is only the means of management of fragmented Forest resources FD staff and community members has changed from police and offender to collaborative partners (Dangal et al ,2014).

Empowering women is considered as an effective strategy of Rural Poverty Eradication. 21.2 % of poor families are women headed families (Department of Census and Statistic 2010) 2010 and There are 2,262 women headed families involved in Sri Lanka Community Forestry program and were empowered in decision making, forestry activities and participating livelihood trainings and start an own business at household level. The participation is considerably higher than the male participation.

Table 2: Income Generating Programs introduced by the community forestry program beneficiaries and income

Industry/ Livelihood Activity Type	Female	Male	Income (Rs/month)
Livestock and poultry management	563	399	168,900
Bee keeping	169	251	74,500
Handicrafts production	56	5	75,000
Compost production	30	34	NA
Plants/ seedlings production	70	62	NA
Rice flour products	26	4	19,000
Vegetable cultivation	171	152	30,000
Driving	3	2	12,500
Tailoring	262	6	244,500
Cinnamon Cultivation	18	37	NA
Pottery	1		1,000
Soap production	10	4	12,000
Mushroom cultivation	150	67	NA
Pepper cultivation	130	135	NA
Aloe cultivation	60	15	NA
Shoe production	67	10	12,000
Yoghurt/ Ice Cream production	7	4	10,000
Food processing	131	49	NA
Beauty culture	1	0	8,000
Floriculture	90	30	181,000
Bag production	48	0	47,000
Fruit juice production	2	0	51,500
Small industries	37	16	18,000
Laksha products	1	3	6,000
Short eats	0	1	8,000
Sweet production	69	11	33,500
Incense stick	3	0	3,500

Bombay onion cultivation	0	5	75,000
Broom manufacture	57	18	5,000
Carpentry	1	0	810,000
Ginger cultivation	55	47	40,000
Betel cultivation	65	81	27,000
Jaggary production	28	0	136,000
Medicinal plant collection	5	5	NA
Ornamental fish cultivation	5	14	7,500
LED bulb and shoe making	1	0	20,000
Cultivation inside Green houses	1	0	20,000
Indigenous food	4	2	54,000
Grinding mills	2	2	NA
Rest house	1	0	6,000

Table 3 Current livelihood activities

source: Annual Report, SLCFP 2015

Major Courses for Poor Performances

Forest Department with limited human and other resources and lack of community support has recognized the requirement of extensive institutional reform and capacity building for conflict resolution and to promote forest governance. Lack of financial resources and inadequate knowledge on improved tension capacities are also considered as major courses for poor performance.

Factors Have Contribute to the Success of Community Projects

Most important factor that contribute to the successes of the community forestry program is preparation of site specific management plan after completing participatory rural appraisal (PRA). In SLCFP management plans prepared under SLCFP comprise of reforestation, home garden development, micro finance micro enterprise development, gender equality, minor infrastructure development and socio economic factors of the site.

The site section criteria is another important factor that determines the success of the community forestry programs; Willingness of people to participate in community forestry activities, existence of dependency, existence of other resources and accessibility were considered when selecting a site. Success of community forest managements vary with the strength of the local arrangements for compliance monitoring the implementation of the community governance processes with accountability (Dangal, 2014)

The officers who involved in community forestry should gain a broad knowledge on community forestry order to guide the programs and achieve successful outcomes. The local and foreign trainings which were given to officers of Forest Department vitally contributed to the successes of the project

Summary

The government of Sri Lanka has lunched various community forestry programs to minimize the impacts of forest depletion on the livelihood of local communities and the natural

environment. Moreover, forestry sector master plan The forestry sector master plan introduced in 1995 provides particular emphasis to build partnership and empowering rural communities to manage and protect forest resources and also to involve communities in forestry development activities and benefit sharing. The recent participatory forestry projects, especially Sri Lanka Community Forestry Program have many components to attract community participation and consequently it affects the overall out comes to strengthen the livelihood contribution of forests. The preparation of site specific Forest management plans including reforestation, home garden development micro finance, micro enterprise development, gender equality minor infrastructure such as access roads minor irrigation tanks and other socio economic benefits is considered as the main component to attract peoples participation. In addition, micro enterprise facilitation introduced by community forestry projects, appropriate site selection criteria and performance of CBOs particularly SLNRMP project and SLCFP program are encouraged people to engaged in the community forestry activities. Establishment of Famers woodlot and intercropping cash crops and vegetables in fist three years are generally popular component of most of projects and community earn considerable of amount of money. Incentives granted for other livelihood activities supported particularly unemployed youth and women of the communities. Systematic and transparent involvement of CBOs, women and youth empowerment and microenterprise facilitation also contribute to the success of the increased participation. As a result the community forestry concept is widely recognized and accepted by government agencies, communities, NGOs as well as donor agencies .

However Forest Department with limited financial, human and other resources and lack of community support has recognized as the major courses for poor performance of these community forestry programs. Therefore, it is essential to empower staff in relation to improved extension capacities and increase the role of community in managing forests.

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Promotion and Development of Community Participation in Forest Conservation Area Project

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Abstracts: Natural resources are important for ecology and climate change. Reducing deforestation forest degradation and reduce the use of forest resources. It will maintain the balance of the world. The fact the most of Thailand's population has been living in agriculture for a long time has been linked to the forest. In the past, the use of the forest was for livelihood only, but nowadays, access to or use is more than just for subsistence. As a result, current natural resources of the country can not rehabilitation the needs of the human population. As such, if not solve problem, it will have an impact on the ecosystem's abundance in the forest area in the future. Therefore, the agencies responsible for natural resources, such as the National Park, Wildlife and Plant Conservation Department, have activities to promote and develop community participation in conservation forest area in the conservation and management of natural resources. In the context of the area and the ability to operate the community for people to live together in a sustainable. The people in the community will be the collaborators in protecting and preserving forest areas, and National Park, Wildlife and Plant Conservation Department will be sponsors in the form of grants and academic information. To strengthen the community. Establish a network to conserve and restore the forest. And enhance the quality of life for the people living in forest conservation areas, especially in the watershed forest. Project has been operating since 2006 up to now it has already been done52 provinces cover a total of 1,534 villages within the forest conservation zone and communities living around the forest conserve. In the fiscal year 2017 work with 236 villages, each village will receive 50,000 baht per year for a period of not more than 4 years. There are 6 main activities that have been successful in activities such as Khao Lak village, Trang Province. It has made a project to produce drinking water community, buy a boat for the rafting, ,forest patrol, nursery plants. And once the forest is preserved, the community has income from collecting wild plants.about 1,398,860 baht per year. When it comes to income, the villagers have a getting better life and sustainable ecosystem management

Introduction

In the present world, environmental conditions are being destroyed by the needs of the human population. The increase is ongoing. Most forests are in tropical countries. If these countries would reduce deforestation forest degradation and reduce the use of forest resources. It means

of reducing greenhouse gas emissions from forest conservation sustainable forest management and increasing carbon sequestration in the forest. There will be an incentive to maintain and manage the tropical forest forever. Because of the actions involving people and land use of forestry. It takes time to raise awareness and mutual understanding. First, it will have an impact on the ecological abundance of the forest area in the future. But conservation and the well-being of people around the forest must coexist without the need for one party to lose or to suffer. It is a win-win solution to reduce dependency on forests. And promote and develop community participation in conservation forest. Therefore, the agencies responsible for forest resources, such as the National Park, Wildlife and Plant Conservation Department, have activities to promote and develop the community participation in conservation forest areas in a manner that provides subsidies to the community. In the area or around the forest conservation. To conserve and manage natural resources in the context of the area and the ability to operate the community itself. There are field agencies in the field of water conservation and management, as well as technical coordinators and facilitators as appropriate.

Background of the Project

The Department of National Parks, Wildlife and Plant Conservation, whose mission is to conserve and rehabilitation forest, wildlife and plant resources in conservation forest areas by protecting existing conserve areas. Degraded forest restoration is back to full with the promotion strategy. Encourage and cultivate a sense of community and be involved in local resource management. To balance the ecology and environment. As well as biodiversity for a watershed. Wildlife habitat, food sources, recreation and ecotourism of the people .It response to Her Majesty's approval managing people and forests together without the people thought. This is a forest area. This is home. But feel the same forest and to maintain treasure as a treasure of their own. People live with the forest integrated management by public articipation and reduce the conflicts in the utilization of resources, soil, water and forests, so the project has promoted and developed community participation in conservation forest since 2006.

Objective

1. To promote the strength of community organizations in the area of conservation forest to have the capacity to protect natural resources in the forest conservation area to be abundant and sustainable development.

2. To increase the efficiency of conservation of forest areas, the community has contributed to the abundance of local forest ecosystems and contribute to the well-being of the community.

3. To enhance and develop participation in the management of natural resources of the community and coordinate in the watershed network with the public sector in the forest conservation area.

Operations

The promotion and development of community participation in conservation forest consists of the following steps.

Step 1: Field agency for watershed conservation and management.

1.1 Perform public relations and establish a ready-to-live village in a responsible area that has never participated in or participated in less than 4 times.

1.2 In the fiscal year, the total number of 236 villages.

Step 2: The Conservation Area Management Office appointed the executive committee to promote and develop the community participation in the forest conservation area. (Executive Committee)

Step 3: The people in the target villages have a meeting to listen to the clarification on the operation and purpose from the field agency staff. For those who are interested in signing a member of the board and set up a board of directors of the village from the members to serve as a coordinator conduct a brainstorming session to represent the disbursement. It is the core of the activity include a report on the performance and evaluation upon completion.

Step 4: The Executive Committee considers the project's community monitoring and approval. To enable the community to carry out activities in a timely manner and pay the community subsidy to carry out activities in accordance with the approved project.

Step 5: When the proposed project of the community has been approved, the village council must open a bank account in the name of "promoted and developed community participation village" and withdraw money to carry out the project activities. Achieve the set objectives. The field agency is responsible for advising and providing academic information.

Step 6:pExecutive Committee shall proceed or set up a progress monitoring committee. Accelerate the work of the field agency and the activities of the target village periodically. Relate to the project activities, community projects. As well as counseling solve problems promptly. Accelerate and monitor the reporting to be accurate, complete and timely.

Step 7: Reporting Performance

7.1: progress reporting

Prepare a report on the progress of the overall implementation according to the Progress report on the Promotion and Development of Community Participation in the Forest Conservation Area.

7.2:Reporting on Mission Completion

1) The Village Committee of the village when the activities of the community project plan have been completed. The field agency must notify the Village Committee of the village to prepare a report on its performance according to the community performance report.

2) The field agency when the planned activities are completed

2.1) Prepare a performance report of the performance appraisal unit to present problem solving problems. And suggestions according to the report of the performance of the field agency. Include a complete report of the corrected community performance report.

2.2) Fill in the information of the board and the members of the village council and wish to apply as a proxy to the board of directors and members to verify the completeness and accuracy of the information.

3) Prepare a summary report of the performance of the Promotion and Development of Community Participation in the Forest Conservation Area. as a whole. Accelerate the work and reporting of community and field agencies. It also presents obstacles and suggestions. In the work process related to the board of directors.

Key Elements Relating

The implementation of support for the project has Promoted and Developed Community Participation in Conservation Forest Area by each village will receive a grant of 50,000 baht per year for a period of not more than 4 years, and receive academic knowledge. To promote the strength of local communities to be able to protect natural resources and the environment. Provide abundant local forest ecosystems that support the well-being of the community. There are 6 main activities:

1. Forest watershed activities
2. Forest fire control activities
3. Watershed ecosystem restoration activities
4. Folk stage activities for the conservation of natural resources and the environment.
5. Ecological land use activities
6. Activities that support the conservation of natural resources and the environment.

Each of the main activities are detailed in Table 1.

Table 1 The unit of operations activity

No	Activities / projects	Unit of Measure	remark
1	**Forest watershed activities**		
1.1	Patrol caring for community forest areas / watershed forests / conservation forests.	Rai	Number of forest area
1.2	Forest ordination (conserve the big tree)	Times	number of activities
1.3	Define the area of the community forest conservation.	Rai	Conservation Forest Area
1.4	Define the boundary between the forest and the farming area.	kilometer	
1.5	Marking the boundaries of the forest.	label	
2	**Forest Fire Control Activities**		
2.1	Make a fire line	kilometer	
2.2	Build a pavilion, forest patrols	Unit	
2.3	Make / improve patrol	kilometer	

2.4	Supply forest fire fighting equipment.	Set	
2.5	Patrol forest fire prevention	Rai	area of care
3	**Upstream ecosystem restoration activities**		
3.1	Reforestation in community forest / conservation forest / Watershed forest	Rai	area planted
3.2	Planting native forest, herbs, community food.	Rai	area planted
3.3	The care of two side trees / canal / buffer zone / around the village	kilometer	
3.4	Grow Vetiver grass	seeding	
3.5	Construction of permanent watershed check dam	Unit	
3.6	Construction of semi-permanent watershed check dam	Unit	
3.7	Construction of mixed watershed check dam	Unit	
3.8	Maintenance and maintenance of planted forests.	Rai	Number of nurturing areas
3.9	Nurture, preserve, forest, herbs, herbs, food, community	Rai	
3.10	To build a nursery village.	Unit	Specify the species and number
3.11	Nursery	seeding	
4	**Folk Stage Activities For the conservation of natural resources and the environment.**		
4.1	Operational meetings Community / village regulations		
4.2	Organize the community stage of the community in the watershed area network.		
5	**Ecotourism Land Use Activities**		
	Adjustable terraced land		
6	**Activities that support the conservation of natural resources and the environment**.		
6.1	Mount the mountain water system.		
6.2	Repair mountain plumbing system		
6.3	Build water storage		
6.4	Make a publicity label.		Identify the course / study topic.
6.5	Organize training / study tour of natural resources	person (At training / study)	-Area survey - Attach survey results
6.6	Explore biodiversity in upstream forest		
6.7	Improve nature trails, landscapes and scenic spots.	The place	specified media used
6.8	Public relations through various media.	Times	identify occupations that promote
6.9	Career Promotion Program for Forest Fire Prevention / Conservation	Project / people	

Lessons Leart

This is to create good morale for all community members and staff involved. To engage in creative activities and to achieve the results. Can be good model for other communities. It also promotes the network of community participation. "Outstanding Village Contest", which has been operating since 2012, has been successful. There is a prototype community such as Ban Khao Lak, Moo 7, Nam Phut Sub-district, Trang Province. There are ecotourism activities in the community. By dividing income from tourism to continue. Forest conservation activities

Today, it is clear that the benefits of community-based development and community-based activities in the conservation forest have helped to restore the forest back to abundance. Water conservation and rehabilitation by the cooperation of community members, activity It has sparked community members to take part in the conservation and restoration of local forest resources. Joint decision to carry out various activities. The local community has strengthened and has the potential to jointly preserve and restore the watershed forest. Reducing forest degradation to expand shared areas, defining community rules for sustainable forest management and utilization, etc. are all by-products of watershed forest conservation. Encourage the community to live in harmony with the forest.

For the village to participate in the enter contest. Must have qualifications

1. A village that has participated in the project.

2. There is effective conservation and restoration of forest resources. See clear and acceptable results.

3. Continuous operation of the project budget or the initiative of the project.

4. Can exemplify the conservation and restoration of forest resources. The winners of the first will receive a plaque of honor from the National Park, Wildlife and Plant Conservation Department with a cash of 30,000 baht. Four runner prize will receive a plaque of honor from National Park, Wildlife and Plant Conservation Department with a cash of 15,000 baht. Four consolation prize receive a plaque of honor by the National Park, Wildlife and Plant Conservation Department with a cash of 10,000 Baht.

An example of a village that is well-selected for the award ceremony. Ban Khao Lak 7, Nam Phut Sub-district, Trang Province. There are ecotourism activities in the community. By dividing income from tourism to continue. Forest conservation activities The model of village project is shown in report form.

Report on the performance of the project of the village of the past selected the best.

1. Village name / location of Khaolak house, Moo 7, Nam Phut, Amphoe Mueang, Trang

Coordinates N 0581721 UTM 0853396 Datum WGS 84

2. Information for consideration

Part 1: Basic Information of the Community

1. Project Name Khao Lak House

2. Activities that have been conducted.

1st year

- Watershed ecosystem restoration activities 1 kilometer buffer zone forest plantation, 2 integrated check dams

- Watershed forest protection activities patrolling forest conservation 10 times a week.

- Village and community events in the watershed for the conservation of natural resources and environment

- Activities that support the conservation of natural resources and the environment. Promote a publicity of 5 labels to develop a water source.

Year 2 (no subsidy)

- Ecotourism rafting

- 1.12 hectare of community forest conversion.

3. Size of area or distance or size of the Khao Lak Basin Project, size 3,220 hectare

4. Issues in conservation and restoration of forest resources in the community. The community is urgently needed to take action. In order of importance

4.1. Problem

- Occupy the rubber plantation area

- Illegally cut Chen Xiang tree (Aromatherapy)

- The care of canal used in the village water supply system.

- Heavy rain in the rainy season.

4.2. Action

- Organize community and community activities for the conservation of natural resources and the environment. To develop knowledge

- Patrol caring for the forest by community involvement.

- forest ordination (conserve the big tree)

- Support natural resource conservation activities. Make a publicity label. Development of water resources building a ecotourism

- Restoration of the upstream ecosystem Create a dam planting buffer zone forest

- Roles of community committees (focus on continuity of community work)

    - Organize local people and community meetings.
    - Define the basic law by community acceptance.
    - Campaign to organize forest surveillance

- Introduce forest replanting.
- Explore the check dam building area.

Part 2: Participation Membership Information

1. 97 % of meetings with members attending a quorum.

2. 84 % of members participating in the project.

3. 97% of members present at the meeting to determine. Community Rules for Forest Resource Conservation

4. 0.3 % of members violating community rules for forest resource conservation.

Part 3: Project information on ecological conservation and restoration

1. Rehabilitation of ecosystems watershed
   - Forest Bumper Reforestation Activities
   - Two check dam construction activities
2. Forest watershed activities
   - Patrolling forest protection forest conservation.
   - Forest ordination (conserve the big tree)
3. Organizing activities for villagers to conserve natural resources and environment.
   - Meetings, community / village regulations
   - Organize the community of the community in the watershed.
4. Activities that support the conservation of natural resources and the environment.
   - Make a publicity label
   - Water resources development
   - Ecotourism
   - Provide knowledge on the conservation of natural resources for youth and control the utilization of forest resources for sustainable development. (Focus on common regulation in the community)

     1) Do not compromise scavenging. Destroy the forest strictly

     2) No one person is allowed. Remove the orchid from the forest community.

     3) When cutting trees, replanting forests must be replaced.

     4) In the case of build a house, notify the village council. But the person requesting never to be punished forest. Do not interfere with drugs. Do not gamble

     5) Everyone in the community must help each other and take care of the forest when they meet someone suspected of any wrongdoing of the forest. If the case is finally settled, the village will award 10,000 baht to the case.

6) People in communities with gardens in the canal area are prohibited from using insecticides strictly.

7) Everyone must be involved in forest conservation activities.

Part 5: Information on the establishment of the village network for forest conservation and restoration.

- From the operation of forest maintenance Channel 11 Department of Public Relations to filming. "Water from above to below" and broadcast live broadcast nationwide.

- Channel 3: Lamai Thailand's MLA Tournament (Channel 4)

- Channel 5 has been filming. "Thai people do not discourage" at the forest watershed Khao Lak.

Part 6: Information on Creative Initiatives.

1. Guidelines or methods that the community has used as a tool for conservation and restoration of watershed forests.

1) Take care of plant a buffer zone of the village of Moo 7, Nam Phu, Trang Province

2) Planting trees on the anniversary of His Majesty the King

3) Communities join forest ordinations for conserve existing forests.

4) Sustainable ecotourism

5) Extended source of medicinal plants.

2. Future community action plans after the subsidy from the project.

1) Offer the project to other government agencies for a budget

2) Watershed conservation group, together with communities and clubs in the area, help to preserve the forests of the watershed forest.

3) Income from ecotourism activities (rafting) which is deducted from income to fund the activities of natural resources and environment conservation in the community.

- Knowledge transfer process conservation and rehabilitation of forest resources for community members and children in the community.

  - Establish youth forest protection training camp.
  - Introduce knowledge of forest planting, and check dam
  - Set up a volunteer team to repair and maintain watershed forest.
  - Organize a forum for the exchange of ideas on the conservation of diversity.

The community in the project has activities to Promote and Development Community Participation in the Forest Conservation Area Project, which can help restore the forest back to conservation and rehabilitation of water resources .Forest collection can earn income for the villagers in the communities in the village as shown in Table 2.

Table 2 **Income from forest collection.**

Scientific name	Number of people seeking (people)	Income (Baht / year))	Average income (Baht / person / year)
Parkia speciosa	30	536,000	17,867
Parkia timoriana	22	144,550	6,570
Archidendron bubalinum	30	51,480	1,775
Bamboo Shoot	27	70,700	2,619
Koompassia malaccensis	19	425,000	22,389
Mushroom sp.	28	68,400	2,443
Diplazium esculentum	25	15,580	623
Baccaurea parviflora	25	14,700	588
Bouea macrophylla	24	35,120	1,463
Salacca wallichiana	26	36,610	1,408
Bouea oppositifolia	1	360	360
Baccaurea motleyana	1	350	350
Total		1,398,850	

The Way Forward

In the process to continue to perform for the Promotion and Development of Community Participation in the Forest Conservation Area.That is a payment for ecosystem services (PES) is a form or method that encourages cooperation in the management of ecosystems and natural resources in a participatory manner. By the principle that. "Users or beneficiaries of ecosystem services." It will reward the benefits given in various ways to the doers.To maintain sustainable ecosystem services or sustainable ecosystem services. By the ecosystem administrator. Should live a better life by paying compensation.

"LEAF project" is a mechanism for sustainable management of natural resources by providing economic incentives by allocating compensation or rewards to maintainers of natural resources.Ensure the sustainability of the resource base and the benefits that humans will gain from the ecosystem. By compensation or compensation scheme. It may be in the form of monetary and non-monetary compensation, such as tax or fee reductions.Security of land holdings and the exchange or transfer of technology and knowledge. And integrated basins on the base of the community by applying the value compensation mechanism.

Those involved in the ecosystem are

1. The role of conservation of natural resources and ecology.
2. Those who take advantage of natural resources and ecosystems.
3. Those affected by ecological change and environmental quality. Because of the deteriorating ecosystem. It will make people less profitable and will result in higher social costs.
4. The price of ecosystem services.

In addition, ecosystem service compensation is the principle of a financial sharing mechanism of activities undertaken in forested areas. This is a possible alternative or tool to support REDD + activities. "Reducing Emissions from Deforestation and Forest Degradation in

Developing Countries (REDD) in Developing countries (+) " Or activities related to the management of forest areas of the country. This will be motivated by paying for forest conservation and management activities to reduce greenhouse gas emissions and forest carbon sequestration. This means that any individual or group of people who have implemented and maintained forests and managed sustainable forests to help increase carbon sequestration in the wild. Include care to prevent deforestation or forest degradation will be paid for the operation. The returns are varied depending on the sharing system. Benefits will be developed such as ecosystem service payments. The local community forest land owner and buffer zone community to maintain and increase carbon sequestration in forest areas. Or pay to compensate for the opportunity cost caused by landowners' need to prevent deforestation and forest degradation from land use changes associated with their business activities amount of payment. The return depends on the amount of carbon that the area can sustain or the amount of greenhouse gases in the area including loss of forest cover in the area. In addition, one of the main components of to do this, it is to encourage the use of funds from ecosystem services for conservation and sustainable ecosystem management.

Summary

Promotion and Development of Community Participation in Forest Conservation Area Project help restore the forest return to abundant. Water conservation and rehabilitation by the cooperation of community members, activity It has sparked community members to take part in the conservation and restoration of local forest resources. Joint decision to carry out various activities. The local community has strengthened and has the potential to jointly preserve and restore the watershed forest. Reducing forest degradation to expand shared areas, defining community rules for sustainable forest management and utilization, etc. are all by-products of watershed forest conservation. Encourage the community to live in harmony with the forest. Each village will receive 50,000 baht per year for a period of not more than 4 years. Project has been operating since 2006 up to now has already been done 52 provinces cover a total of 1,534 villages in the forest conservation area and communities living around the forest reserve. And to create morale for the community, the community and the people involved to engage in creative activities and to achieve the results can be good model for other communities. It also promotes the network of community participation. "Outstanding Village Contest", which has been operating since 2012, has been successful. There is a prototype community.

Ban Don Chiang Mai 8, Sop Pong, Mae Taeng District, Chiang Mai Province, has planted trees to grow and distribute to other communities. Make a return to the community.

Ban Khao Lak 7 m., Nam Phut, Muang Trang has ecotourism activities in the community. By dividing income from tourism to continue. Forest conservation activities

Non Nuoc House, 4 Phaholyothin Road, Petchaboon, Phetchabun. The community has restored the forested area and in the past, the forest was the concession to complete the forest. 2,750 rai. Bo, Muang Nan community has restored 4,000 acres of forest to restore it. Perfect forest

The next step will be the Payment for Ecosystem Services (PES), as it will provide incentives by paying for forest conservation and management activities. Reduce greenhouse gas emissions and carbon sequestration in forest areas. This means that any individual or group of people who have implemented and maintained forests and managed sustainable forests to help increase carbon sequestration in the forest. Include care to prevent deforestation or forest degradation will be paid for the operation. The returns are varied depending on the sharing system. Reimbursement of landfill opportunities the opportunity afforded by landowners to prevent deforestation and forest degradation from land use change to do this, it is to encourage the use of funds from ecosystem services for conservation and sustainable ecosystem management. Finally, livelihood of community around the forest is better well-being.

Using Choice Experiments to Estimate Non-Use Values: Case Studies of the Wild Asian Elephant and the Dugong in Thailand

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Abstract: The aim of this study was to determine the non-use value of the wild Asian elephant and the dugong, in Thailand by applying a choice experiment framework. The survey was administered to 300 adult residents of Bangkok in five pre-selected districts. Although this study could not estimate the 'non-users' willingness to pay for the conservation of wild elephants in Thailand, the willingness to pay for conserving dugongs was elicited. The overall average willingness to pay for the most preferred choice of dugong conservation scheme (slow down the dugong population decline; re-create required habitats; and provide buoy systems) was almost 4,390 THB annually per person. The dugong improvement most valued by the general public related to the implementation of a buoy system. The respondents were not willing to pay for increasing local fishers' knowledge of dugong conservation. People's attitudes toward the state of the nation's environment and wildlife, especially the wild elephant and the dugong, were obtained during the experimental survey. Most of the respondents considered that the quality of the environment in Thailand had become worse. The loss and destruction of habitats, illegal poaching for tusks, and habitat fragmentation as a result of road construction were found to be serious threats to wild elephants. Therefore, increasing penalties for violations of existing laws and expanding protected areas of elephant habitats should take priority. The perceived threats to dugongs, especially inshore fishing, accidental capture, as well as the loss and degradation of dugong habitat, were shown to be serious concerns. The prohibition of trawling in near-shore areas and increasing penalties for violators of the related laws were regarded as the main priorities. The key implications for dugong conservation policies in Thailand were to provide illuminated buoy systems for indicating dugong habitats so that inappropriate fishing activities and high-speed boating are prohibited, to re-creating habitats and to mitigating the dugong population decline. Increasing penalties for elephant poaching and expanding protected areas of elephant habitats were also recommended.

Keywords: Choice experiment, willingness to pay, Wild Asian Elephant, Dugong

1 Introduction

The Asian elephant (Elephas maximus) is one of the world's critically endangered species of large mammal (IUCN, 2012). The elephants are now confined to forests but Thailand has lost virtually all of the lowland forests in the heart of the country due to agriculture and settlement. The decline of elephants in Thailand parallels that of its forests, which decreased from 80% to 24% cover between 1930 and 1990. According to IUCN (2012), the wild elephant population in Thailand is small and fragmented. There are approximately 3,100 to 3,800 wild elephants estimated to occur in protected areas such as the National Parks and Wildlife Sanctuaries in Thailand (Forest Research Center 2012). These reserve areas are not large enough and are too isolated to allow the elephant population to recover. Due to human use of the land surrounding the reserve areas, it is difficult to create linkages between reserves without increasing conflicts between humans and elephants. Moreover, elephants also tend to forage outside the forests reserve and destroy human crops, creating human-elephant conflict which results in the killing of elephants. There have been attempts to find long-term solutions to these problems and provide elephants with their basic requirements as well as improving elephant habitat.

Similarly, the dugong (Dugong dugon) is an endangered species of marine mammal listed as vulnerable to extinction on a global scale. In Thailand, the dugong is one of the fifteen designated animal species legally protected under the Thai Fisheries Act since 1947 and the Wild Animal Reservation and Protection Act of BE 2535 (1992) (Hines 2002). Historically, dugongs were found along the Gulf of Thailand and the Andaman Sea coast. Today, there are five central populations along the Andaman Sea coast, including Ranong, Phuket, Krabi, Trang, and Satun provinces. The loss of habitat resulting from shrimp farms was a serious problem affecting the dugong population in the Gulf of Thailand, whereas on the Andaman Sea coast dugongs are vulnerable as a result of habitat destruction due to fishing practices such as push netting. Also, tin mining in the provinces of Phuket, Phang-Nga and Krabi, along with sediments from industrial developments, has generated adverse impacts on seagrass communities in these regions. Additionally, increases in tourism will likely affect dugong populations. The dugong has a low reproductive rate and the rate of change in population depends on the survival of adult dugongs (Hines 2002; Marsh 2008). Therefore, reducing the adult mortality rate is one of the critical issues in the conservation of the dugong.

Since these two species and their habitats are now recognized as being vulnerable, it is important to determine how willing people are to pay to prevent extinction. Significantly, the costs of wildlife protection measures have to be compared with the total benefit for the existence of the species, ideally in monetary terms. As there is a missing market in the real world for natural assets, the non-use value of wildlife resources cannot be directly measured in monetary terms so wildlife may be neglected in the decision-making process. While there is still limited information available about the monetary benefits of wildlife species to Thai society there is also a need to focus on information-based policies, which should be transparent in preparation and delivery.

The aim of this research is to determine the non-use value of two endangered species, the wild Asian elephant and the dugong in Thailand. The non-use values of the changes in the ecological and social conditions of the species and their habitats are estimated with a recently developed stated preference valuation technique, namely the choice experiment method. These research findings could raise an important argument over the fundamental nature of wildlife values and design policies for their preservation in Thailand. The results will offer useful information for decision makers to consider wildlife resources in the decision-making process. Also, this has a wide potential application in both terrestrial and coastal areas management.

1.1 Values of Environmental Goods and Natural Resources

Although the environment and natural resources are valuable to society, they are non-market goods that are unlikely to be valued effectively by an actual market. Hardarson and Hardarson (2000) also state that environmental assets are public goods that can be used by everyone with no rivalry in consumption and are non-exclusive so that it is impossible to exclude anyone from consuming them. Whilst a free market is used to allocate scarce resources for the greatest social welfare, it does irreparable damage to the environment such as externalities because it does not reflect the true costs of goods and services. For example, when a private firm produces any goods or services it has costs to pay for labour, raw materials, machinery, and energy, which are called the private costs of the firm. In contrast an external cost, which represents a true cost to society, is not usually taken into account by the firm. These externalities have resulted in market failure, referring to "the failure of actual market to display the efficiency of resource allocation which ideal markets can be demonstrated to achieve" (Keat 1997: 32). As a result, environmental problems such as excessive pollution or degradation have always occurred.

From an economic point of view, the monetary term resulting from environmental valuation plays an important role in the protection of the environment (Markandya and Richardson 1997). For instance, the cap-and-trade policies, which are implemented to charge firms for the pollution-causing substances they emit into the environment, can ensure that total air pollution and water pollution will be reduced (Field and Field 2009). Environmental valuation also helps to design effective policies to bring about the improvement of environmental quality. Monetary terms are important information to add to policy formulation by weighting the true costs and benefits of an environmental policy or regulation. If decision-makers need to evaluate the appropriateness of some proposed action, they have to indentify both the gains and the losses from that action. If the gains exceed the losses, then it seems natural to support the action. On the other hand, if the costs exceed the benefits, the action is not desirable (Tietenberg and Lewis 2009). This principle is called cost benefit analysis, which was first used in the U.S. in the early twentieth century to evaluate water development projects (Field and Field 2009). Through this approach, policies or projects are evaluated in terms of the environmental benefits they would produce, and these are compared with the costs that are required. Furthermore, economic valuation can allow benefits associated with environmental preservation to be directly compared with the economic value of other resource use options.

Tisdell (2005) also notes that economic valuation can be of value in determining whether to conserve or utilise living resources such as wildlife and natural areas. Additionally, environmental valuation has a role to play in raising people's awareness of environmental conservation by showing the importance of the environment and natural resources. For example, the value of wildlife can be used as the evidence for limiting or banning trade in an endangered species (Christie et al. 2004).

It is believed that the central role of values is to govern human actions. People are likely to think and act on the basis of their views, which are determined by their values (McAllister 1980). In order to value an environmental asset, it is important to understand that the total economic value of an environmental good includes use values and non-use values. **Use value** refers to actual use, planned use or possible use of the good. For example, wildlife can provide direct use values such as meat, fur, feathers, and medicinal products that have market prices. Wildlife species also generate non-market direct use values as they provide for enjoying a wildlife-watching trip and stimulate wildlife tourism (Tisdell 2005). Another example is a national park that can have use values both resulting from people visiting a national park presently and in the future. A future visit is called **option value**, which becomes a form of use value. Option value is the value for keeping the option available for future use.

Non-use value, on the other hand, relates to the value resulting from the existence of some good. Non-use value is also classified into three main types, namely existence value, altruistic value, and bequest value. **Existence value** is the value of the good that exists without actual or planned use. It also refers to feeling good when knowing that the resource still exists without directly benefitting from the consumption. **Altruistic value** is the value that the good should be available to others in the current generation. **A bequest value** is the value of knowing that the good is available for the next and future generations (Pearce et al. 2006). It usually occurs when knowing that the resource or a species is available for future generations. Tisdell (2005) mentions that the existence value of a species is the amount individuals are willing to pay to know that a species exists, independently of any use of it, while the bequest value is the amount they are willing to pay to ensure the preservation of a species for future generations.

1.2 Environmental Valuation Approaches

Field and Field (2009: 45) state that "…the value of a good to somebody is what that person is willing to pay for it." For example, some people are willing to pay lots of money to visit Yellowstone National Park while others are not. Some people put a high value on preserving the habitat of endangered species; others do not. Once the benefits and costs of environmental consumption are usually nonmarket in nature, a series of nonmarket valuation techniques are used to estimate these types of the outcome. The methods for measuring these economic values are revealed preference and stated preference approaches which measure the utility or economic value increased or decreased to individuals from environmental changes.

The revealed preference method uses tangible market transactions to assess preferences regarding the environment, such as house prices, and relies on observed behaviour (Tisdell 2005). In other words, this approach infers people's willingness to pay to obtain a specified

good by observing behaviours in regular market places. The Hedonic Price Method and Travel Cost Method belong to this category.

The stated preference approach relies on the stated preferences or stated values by individuals (Tisdell 2005). In theory the major advantage of stated preference methods over revealed preference methods is that they are capable of valuing both use and non-use values (Hanley and Spash 1993; Tunstall and Coker 1996). Unlike revealed-preference methods, the stated preference methods access values directly through survey methods, rather than observing actual behaviours on marketplaces. It is also stated that although the use of stated preference methods for environmental valuation has been debatable, there is evidence indicating that the hypothetical responses in these surveys provide useful evidence regarding value (United States Environmental Protection Agency 2009). There are two methods that are widely used under the stated preference approaches. These include contingent valuation and choice modelling. In theory, the former method would be used to estimate the total change in an environmental good, while the later is capable of valuing environmental changes that are multidimensional (Pearce et al. 2006).

1) The Contingent Valuation (CV) is an attempt to measure how much society would be willing to pay for environmental goods by asking hypothetical questions about consumers' marginal rates of substitution between money and the environmental benefit. By the use of CV methods the respondents are asked directly to state their willingness to pay for changes in provision of non-market good or the willingness to accept compensation for the destruction of the environmental good. In early applications of contingent valuation methods, respondents were asked open-ended questions such as "What is the most you would be willing to pay for…?" (Alberini and Longo 2006: 7). This kind of question was difficult to answer and resulted in many missing values for willingness to pay.

2) Choice Modelling (CM) provides the value of various attributes and trade-offs. It is based on questioning individuals about what they would choose under hypothetical situations. By asking individuals to rank or score the options presented, or to choose their most preferred from those options, the contingent valuation methods may reduce some of the response difficulties found in contingent valuation studies as respondents get an easier way to express their preference for an environmental good. Choice modelling exercises consist of four main types including choice experiments, contingent ranking, contingent rating, and paired comparisons. In a choice experiment individuals are asked to choose between two or more alternatives. In a contingent ranking respondents are asked to rank and score a series of alternatives for an environmental good. In a contingent rating, respondents are asked to score alternative scenarios on a scale of 1-10. Lately, in a paired comparison exercise individuals are questioned to score pairs of scenarios on similar scale (Pearce et al. 2006).

1.3 Choice Experiments

The choice experiment technique is one of the choice modelling approaches, which creates a hypothetical market situation and elicits individuals' preferences for the attributes by asking them to make a choice between certain alternatives. In other words, the choice experiment

tries to mimic an existing market for a product, which is described by a set of attributes. The product can range from transport modes, health treatments, and ecological and environmental goods. The choice experiment is consistent with the Lancasterian microeconomic approach, assuming that individuals obtain utility or well-being from a good based on the characteristics or attributes of the good, rather than directly from the good per se (Campbell et al. 2008). For example, some people may derive much more enjoyment from a fishing trip if it is on a relatively pristine river with few other fishers around, while others may prefer fishing on a lake with other fishers present (Wallmo 2003). Thus, choice experiments try to give people enough choices to cover the full spectrum of opportunities that are available by mixing and matching all of the different options so that people will have a wide variety of choices between which they can be choose. Knowing which choice people make from a bundle of options researchers can observe the sources of trade-off they are willing to make. They may substitute one of these characteristics from another so that the marginal rate of substitution between these characteristics can be inferred. Because it consists of a cost as one of these characteristics of the good or product, a marginal rate of substitution between these characteristics and money will be estimated. It also presents the price that people are willing to pay to obtain more of each attribute that describes the products. This is the way to estimate the value that people hold for improvement in a good's attributes or the amount of money to avoid an adverse attribute in a product that they do not appreciate (Adamowicz et al. 1998).

2 Methods

This study used a choice experiment (CE) survey designed to elicit the non-users' willingness to pay (WTP) for the hypothetical wild elephant conservation and dugong conservation schemes in Thailand. A stratified random sample was adopted as a sampling method to reflect the geographic distribution of the adult population, and the approximate gender and age profile within Bangkok. The population of interest was the adult (18 year old and over) residents in Bangkok, the capital city of Thailand. Five of the 5 districts of Bangkok were randomly selected as the survey sites. These included Chatuchak, Bang Khae, Pathum Wan, Dusit and Bang Kapi districts. A three-section questionnaire or interview script was designed. The first section consisted of attitudinal questions related to respondents' perceived changes in the environment and their perceived threats to wild elephant and dugong populations in Thailand, including the perception of required management to conserve these two species. The second section involved the choice experiment divided into two parts, the wild elephant and the dugong parts. In each part, the respondent was faced with eight choice sets. Typically, respondents were asked to choose their most preferred scenario from the choice set. The last section gathered demographic data for statistical analysis of the survey responses. A final sample of 300 face-to-face interviews was conducted in several sites such as parks, universities and shopping malls located in five districts of Bangkok. The average length of an interview was approximately 30 to 45 minutes.

2.1 Attitudinal Questions

Firstly, respondents were asked a series of attitudinal questions using ranking scales. Respondents were first asked about the extent to which they felt the quality of each environmental component in Thailand has changed during their lifetime. Then, respondents were asked to rank in order of priority, the 1st, 2nd, and 3rd most important threats to wild elephants in Thailand and the most urgent measures needed. As a follow up respondents were also asked to rank the most important threats to dugongs and the most important measures needed to preserve the dugong population in the country. Then, the importance was calculated by assigning points to the rank for each item, with the highest ranked item received the highest number of points. For each respondent, a first place rank was assigned the maximum number of point (three points), second place was assigned two points (maximum-1), and third place was assigned one point. (Maximum-2). The higher added points, the more important the item. A simple example of the analysis is shown in Table 2.1 (WISCO Survey Power, undated).

Table 2.1 An example of the analysis of attitudinal questions using ranking scales

Threat	Respondent A	Respondent B	Respondent C	Importance	Rank
Habitat loss	1= 3 points			3 points=33%	3
Road construction		2 = 2 points		2 points=22%	4
Illegal poaching		1= 3 points	2 = 2 points	5 points=56%	2
Human-elephant conflicts	2 = 2 points	3 = 1 point	1= 3 points	6 points=67%	1
Tourism	3 = 1 point		3 = 1 point	2 points=22%	4

Source: Adapted from WISCO Survey Power (undated)

2.2 The Choice Experiment

This research used a choice experiment survey to extract the respondents' WTP for various attributes of the hypothetical wild elephant conservation and dugong conservation schemes. The choice experiment survey was carried out through three main stages. The first stage was to identify attributes. All relevant attributes in the choice experiments of each species evaluation were identified using evidence from literature reviews and consultations with experts or conservationists in the wild elephant and the dugong fields. After assigning attributes, the levels for each attribute were specified. These included the present situation and outcome changes in one or two levels. The four selected attributes and their levels associated with the wild elephant conservation scheme were identified: Elephant Population, Elephant Habitat, Wildlife Corridor and Human-elephant Conflict Resolution (Table 2.2). Firstly, the Elephant Population attribute was split into three levels: Continued Decline, the wild elephant population is declining continuously; Slow down the Decline, the decline of the population is slowed down but the population may still become locally and nationally extinct; and

Recovery, the population has recovered and local extinction would be removed. The second attribute was Elephant Habitats, including three levels: Habitat Degradation, Habitat Restoration, and Habitat Re-creation. The third attribute was Wildlife Corridor divided into: No wildlife corridor and Properly Implemented Wildlife Corridors. The fourth attribute included in the CE is the Human-Elephant Conflict Resolution, which was assigned with two levels: Simple Measures, using traditional methods such as physical barriers, crop guarding, noise, fire and Advanced Measures such as compensation schemes and elephant translocation, which is the removal of the elephant to an area where there will be reduced contact with people and their crops. The cost attribute was assigned as Yearly Payment, which was the amount that individuals personally would have to pay yearly for 10 years to implement the 10-year period scheme. The payment levels used were 100 Baht, 200 Baht, 500 Baht, and 1,000 Baht, where one-Pound Sterling equals approximately 50 Baht.

Table 2.2 Attributes and levels used in the choice experiments for wild elephant conservation

Attribute	Level Description	
1. Elephant Population	Continued Decline	No action (continued decline in the wild elephant population)
	Slow down the Decline	Slow down or halt the rate of the decline in the wild elephant population (may still become locally and nationally extinct)
	Recovery	Stop decline and ensure recovery of the elephant population (local extinction would be removed)
2. Elephant Habitat	Degradation	Elephant habitats will continue to be degraded and lost
	Restoration	Habitat restoration (better management of existing habitats)
	Re-creation	Habitat re-creation (creating new habitat areas)
3. Wildlife Corridor	No Wildlife Corridor	Wildlife corridor is not implemented.
	Properly implemented Wildlife Corridor	Wildlife corridors are properly implemented and allow elephant the ability to migrate between core areas of biological significance increase gene flow and reduce rate of inbreeding, thereby improving species fitness and survival.
4. Human-Elephant Conflict Resolution	Simple Measures	Traditional methods (e.g. simple fences, noise, fire, crop guarding)
	Advanced Measures	Elephant translocation, compensation schemes
5. Yearly Payment (Baht)	0, 100, 200, 500, 1,000	Added to each individual for obtaining an effective programme for 10 years

Similarly, four key attributes and their levels associated with the dugong management scheme were chosen. These included Dugong Population, Dugong Habitat, Education about Dugong, and Buoy System. The cost attribute, Yearly Payment, was also added to each individual for obtaining an effective programme (see Table 2.3).

Table 2.3 Attributes and attribute levels used in the choice experiments for dugong valuation

Attribute	Level description	
1. Dugong Population	Continued Decline	No action (continued decline in the dugong population)
	Slow down the Decline	Slow down or halt the decline in the dugong population (may still become locally and nationally extinct)
	Recovery	Stop decline and ensure recovery of the dugong population (local extinction would be removed)
2. Dugong Habitat (Seagrass Beds)	Degradation	No action (dugong habitats will continue to be degraded and lost)
	Restoration	Habitat restoration (better management of existing habitats)
	Re-creation	Habitat re-creation (creating new habitat areas)
3. Education about Dugong (the number of local fishers who are educated and informed about dugong conservation)	Some Fishers	Some of the local fishers are educated and informed about dugong conservation
	A Lot of Fishers	A lot of the local fishers are educated and informed about dugong conservation
4. Buoy System	No	Buoys are not provided
	Yes	Buoys are provided in seagrass areas, dugong habitats so that fisher know the area where harmful fishing gears and high speed boats are prohibited
5. Yearly Payment (Baht)	0, 100, 200, 500, 1000	Added to each household for using an effective programme for 10 years

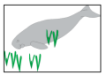
The next stage involved combining the levels of the attributes into different scenarios by using a statistical design theory. The choice experimental design is developed using an efficient Bayesian design to combine the levels of the attributes into a number of alternative scenarios to be offered to respondents. For the wild elephant conservation programme, the attributes and attribute levels presented in Table 1 result in 22 ×32 ×5 (i.e., 180) possible hypothetical scenarios. As this number is large and it is impossible to include all scenarios in the questionnaire, a Bayesian design is used to reduce the number of scenario combinations. The profiles of choice tasks were generated using the experimental design software, Ngene. Each choice set consisted of two possible outcomes – labeled as 'Option A' and 'Option B'. Each option described the conservation status of the wild elephant after implementation of the specific hypothetical conservation scheme. An example of a translated choice set for the elephant is shown in Figure 2.1. Likewise, in the dugong evaluation, respondents are shown alternative variants of the dugong conservation schemes, which are described by a set of attributes, differing in terms of attributes and levels, and including the price or cost of each alternative choice. An example of a translated choice task for the dugong is presented in Table 2.2.

The final step, a pilot test of the survey instrument, was carried out to improve the survey. The interviewer conducted 45 pilot interviews with Thai people. This pilot test helped to generate the final version of the survey, choice experiment part. To obtain answers for the CE

questions in Section B, about half of the respondents faced the wild elephant choice experiment part followed by the dugong choice experiment part, while the other half started with the dugong part followed by the wild elephant tasks. In this section, each respondent answered eight choice tasks, resulting in 8×300 (i.e., 2400) observations for the wild elephant model estimation and eight choice tasks, resulting in 8×300 (i.e., 2400) observations for the dugong model estimation.

	Option A	Option B
Elephant Population	Slow down the Decline	Continued Decline
Elephant Habitat	Restoration	Restoration
Wildlife Corridor	No	Yes
Human-Elephant Conflict Resolution	Simple measures 	Simple measures 
Yearly Payment (Added cost to your household each year for 10 years)	500 Baht/year	100 Baht/year
Which of the two options do you prefer?	[ ]	[ ]

Figure 2.1 Example of a choice set for wild elephant preservation

	Option A	**Option B**
Dugong Population	Continued decline	Recovery
Dugong Habitat	 Re-creation	 Degradation
Education about Dugong (the number of local fishers educated about dugong conservation)	A Lot of Fishers	A Lot of Fishers
Buoy system (buoys are provided to present dugong habitat where harmful fishing gears and high speed boat are prohibited)	 Yes	 Yes

Yearly Payment (Added cost to your house hold each year for 10 years)	200 Baht/year	100 Baht/year
Which of the two options do you prefer?	[ ]	[ ]

Figure 2.2 Example of a choice set for dugong preservation

3 The Choice Experiment Econometric Models and Estimating

In the choice experiment approach, the Random Utility Theory (RUT) and Lancaster's characteristics theory of value form the basis for model estimation. The RUT assumes that an individual will choose the alternative, which provides the greatest level of utility, and the respondent's utility (U) for an environmental good consists of two features: a systematic or known component (V) and a random component (ε). The utility that individual n receives from a given alternative j can be expressed as

$$Unj = Vnj + \varepsilon nj \quad (1)$$

where Unj is the unobservable utility that individual n associates with an alternative j, Vnj is the quantifiable, known portion of utility, εnj and is the random, unobservable effects associated with an alternative j for individual n.

The Lancaster's characteristics theory of value postulated the utility an individual derives from a good comes from the characteristics of that good (Campbell et al. 2008). Thus, the known portion of utility is a function of the attributes or characteristics of the different alternatives in the choice set and characteristics of the individuals (Alberini and Longo, 2006). The systematic component of utility Vnj can be expressed as

$$Vnj = \beta Xnj \quad (2)$$

where β is a vector of parameters to be estimated through the maximum likelihood method.

Conditional Logic Models

As mentioned earlier, the CE was designed with the assumption that a random utility of an individual n choosing choice j (unj) consists of a measureable part (Vnj) and a random part (εnj) as in the equation (1). The observed utility (Vnj) is a function of all attributes of the choice j and of the individual n, and the common specification of this function is linear in parameters as in the equation (2).

In this study an individual n faces a decision among a known set of conservation alternatives, J, where j represents a specific alternative under consideration from the full set of alternative J. The utility of the nth individual for alternative j can be specified as:

$$Unj = \beta' Xnj + \varepsilon nj \quad (3)$$

where Xnj is a vector of the observed variables relating to the chosen alternative and β is a vector of the variables' parameters, and εnj is a random errors component.

As an individual will choose the alternative j which yields the greatest level of utility, the probability of choosing alternative j is equal to the probability that the utility of alternative j is greater than the utility associated with alternative k after evaluation each and every alternative.

$$\Pr\{j \text{ is selected}\} = \Pr\{ unj > unk \quad = \forall j \neq k\} \tag{4}$$

In a CE model the random part is assumed to be independently and identically distributed (IID). The probability of a chosen choice j from a choice set consisting of m is,

$$\Pr\{j \text{ is selected}\} = \frac{\exp(\beta' j \, Xnj)}{\sum_{m=1}^{J} \exp(\beta' m \, Xnm)} \tag{5}$$

The CL assumes the independence of irrelevant alternatives (IIA) property, which states that the relative probabilities of two options being chosen are unaffected by introduction or removal of other alternatives.

3.2 Welfare Estimation

The maximal WTP for option j, is defined as the payment that makes an individual indifferent between the choice j and status quo choice k.

$$V(Xj, Cj^*, Sn\} = V(Xk, Ck,=0, Sn) \tag{6}$$

Cj refers to the cost of choice j. Xj and Xk are attributes related to choice j and k, respectively. Sn is a vector of socio-economic or demographic factors of individual n. Thus, a marginal WTP (MWTP) value of a change within a single attribute m can be represented as a ratio of coefficients as follows,

$$MWTPm = - \beta m / \beta c \tag{7}$$

where βm is the coefficient of attribute m and βc is the coefficient of the monetary attribute. This part-worth formula provides effectively the marginal rate of substitution between cost change and the attribute in question (Bennett and Blamey, 2001).

Finally, a relative difference of willingness to pay (Δ WTP) associated with all changes in implementing the conservation programme between two choice profiles is,

$$\Delta WTPjk = -[(\sum \beta m \, (Xmj / Xmk))/\beta c] \tag{8}$$

(Δ WT) quantified the variation in scheme outcomes in money terms as represented by two different choices which is used to elicit preferences for different scenarios relevant for management option.

4 Results and Discussion

The purpose of this study was to estimate the non-use values of the wild Asian elephant and the dugong in Thailand using a stated preference valuation technique, a choice experiment method. The data presented were collected from a choice experiment survey of a sample of 300 adult residents in five districts, Chatuchak, Bang Khae, Pathum Wan, Dusit and Bang

Kapi in Bangkok, Thailand. The characteristics of respondents are presented in Sections 4.1 and Section 4.2 reports the results of responses to the attitudinal questions. The main result of the choice experiment of wild elephant conservation is summarised in Section 4.3. The outcome of the discrete choice experiment, in which the non-use values of dugongs in Thailand are estimated, is shown in Section 4.4. Section 4.5 tests whether the marginal willingness to pay (MWTP) results from the use of questionnaire Version B, in which the part of dugong questions are in the first sequence and the MWTP results from Version A show the difference. The final section of the chapter provides the discussion of the findings.

4.1 Profile Respondent

A total of 300 useable face-to-face interviews were obtained. The characteristics of respondents can be seen in Table 4.1. It shows that over half of the respondents (54 percent) were female. After adjusting the weights, the sample geographic mirrored population demographics. A significant proportion of respondents were between the ages of 25-34. The age of the respondents ranged from 18 to 72 years, with a mean being 32 years. Moreover, forty-eight percent of respondents were single, while 45 percent were married. In addition, almost half of participants (45 percent) held bachelor degrees, while a quarter (23 percent) had completed secondary school level. The occupations of respondents were employees, self-employed and civil servants (35.3, 25 and 20.7% respectively). An additional 50 participants (a further 16 percent) were students. Approximately two third of the respondents had 4 to 6 members in their household. The total number of members per household ranged from 1 to 8. The majority of respondents had a low level income, between 5,000 and 10,000 Thai Baht/month (100-200 Pound). The reported household income level was median with 22.7 percent of respondents reporting between 20,000-25,000 Thai Baht/month. The average household income was 20,085 Thai Baht per household per month, or 241,020 Thai Baht per year.

Table 4.1 Characteristics of respondents

Data	Overall Frequency	Percent Total
Gender		
Male	138	46.0
Female	162	54.0
Age (Min = 18,Max = 72, Average = 34)		
18-24	60	20.0
25-34	122	40.7
35-44	59	19.7
45-54	41	13.7
55-64	11	3.7
65 or over	5	1.7
Prefer not to answer	2	0.7
Marital status		
Single	144	48.0
Married	135	45.0
Others	21	7.0
Education		
Primary school	41	13.7
Secondary school	69	23.0
College	27	9.0

University	135	45.0
Postgraduate degree	26	8.7
Prefer to not answer	2	0.7
Occupation		
Civil servant	62	20.7
Self-employed	75	25.0
Employee	106	35.3
Student	50	16.7
Retirement	3	1.0
Others	4	1.3
Household Size (Min = 1, Max=8, Average =4.2)		
1-3	78	26.0
4-6	205	68.3
7 or over	6	2.0
Prefer not to answer	11	3.7
Own Income (THB/month), Average = 12,273		
0-5,000	38	12.7
5,001-10,000	99	33.0
10,001-15,000	84	28.0
15,001-20,000	41	13.7
20,001-25,000	14	4.7
25,001-50,000	16	5.3
50,001 or over	7	2.3
Prefer not to answer	1	0.3
Household Income (THB/month), Average = 20,085		
0-5,000	18	6.0
5,001-10,000	37	12.3
10,001-15,000	38	12.7
15,001-20,000	48	16.0
20,001-25,000	68	22.7
25,001-50,000	53	17.7
50,001 or over	28	9.3
Prefer not to answer	10	3.3

4.1.2 Environmental Membership

As shown in Table 4.2 the majority of respondents were not members of environmental groups (87.7%).

Table 4.2 Environmental memberships of respondents

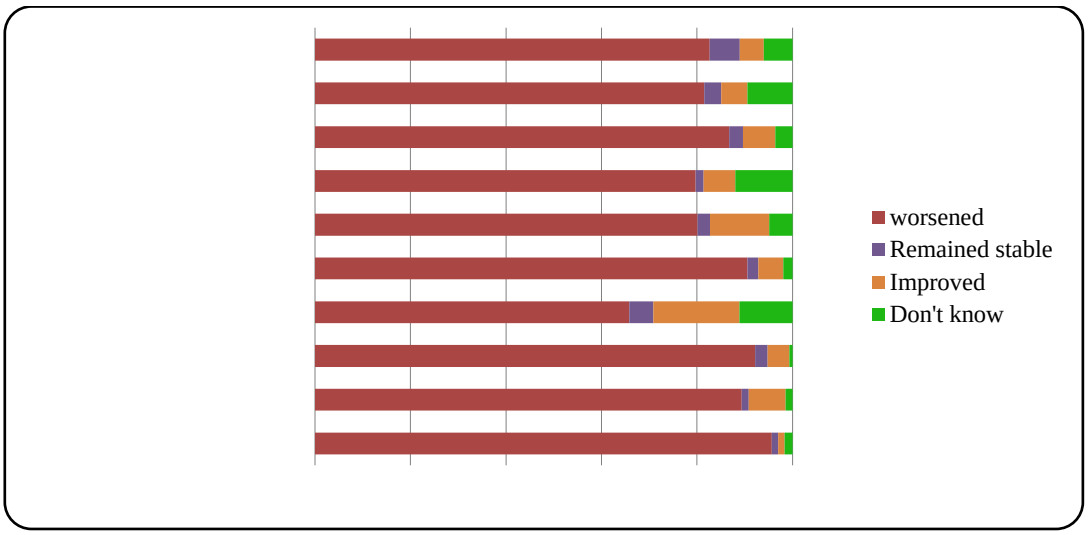
Membership of Environmental Groups	Overall Frequency	Percent Total
Yes	37	12.3
No	263	87.7

4.2 Results of the Attitudinal Questions

4.2.1 Perceived Changes in Environment Quality

When asked whether the quality of the environment in Thailand had improved, remained stable or worsened in their lifetime, on average, the overall majority of the respondents (85 percent) stated that it had worsened while seven percent felt it had improved. Only three percent thought it had remained stable, however, five percent stated they did not know. The area stated to have declined most was the forest areas, indicated by 95 percent of respondents. It should be noted that 82 percent and 94 percent considered that marine animal abundance

and terrestrial animal abundance had worsened, respectively. Figure 4.1 shows the overall picture of perceived changes in Thailand's environment.



Share of respondents

Figure 4.1 Perception of change in Thailand's environment

4.2.2 Perceived Threats to Wild Elephants

Participants were given various threats to wild elephants in the country and asked to rank the 1st, 2nd, and 3rd most important issues. The results are shown in Table 4.3. The most frequently cited reasons were habitat loss and degradation (62.9 percent), along with poaching for elephant tusks (57.3 percent). The issue related to tourism activities ranked low among respondents.

Table 4.3 Perceived threats to wild elephants

Rank	Perceived threats to wild elephants	Number respondents			Weight (Points)	Importance (%)
		1st most important	2nd most important	3rd most important		
1	Habitat loss and degradation	145	42	47	566	62.9
2	Illegal poaching for elephant tusks	91	91	61	516	57.3
3	Habitat fragmentation due to road construction	34	82	34	300	33.3
4	Human and elephant conflicts as a result of crop-raiding	20	44	68	216	24.0
5	Illegal poaching for elephant calves used in tourism	6	32	36	118	13.1
6	Pressure from tourism activities	4	9	48	78	8.7

4.2.3 Perception of Required Methods for Wild Elephant Conservation

As a follow up respondents were also questioned about their attitudes regarding the priority of required methods for preserving wild elephants in Thailand. They were asked to rank the top three urgent measures needed to preserve the wild elephant. The result from this question is presented in Table 4.4. The opinion of the respondents was a high priority to increase penalties for violators of existing laws and to expand protected areas in order to protect

elephant habitats, while elephant research and monitoring were considered to be the lowest priority.

Table 4.4 Perception of required methods to improve wild elephant population

Rank	Perceived measures	Number respondents			Weight (Points)	Importance (%)
		1st most important	2nd most important	3rd most important		
1	Increase penalties for violators of existing laws	87	87	43	478	53.1
2	Expand protected areas to protect wild elephant habitats	104	49	20	430	47.8
3	Create wildlife corridors	52	58	45	317	35.2
4	Reduce human-elephant conflicts by implementing crop-protection measures	21	38	55	194	21.6
5	Strengthen rangers with authority to investigate conservation related causes and suppress crimes involving forest resources	16	39	28	154	17.1
6	Educate people about wild elephant conservation, the problems involved and the related laws	16	15	43	121	13.4
7	Enhance local communities, national, regional and international cooperation efforts	4	9	48	78	8.7
8	Improve our understanding of elephant behavior and distributions through research and monitoring	0	5	15	25	2.8

4.2.4 Perceived Threats to Dugongs

Participants were also asked to rank the top three threats to dugongs in Thailand. As shown in Table 4.5, the most important threat perceived by the participants in Bangkok was onshore fishing, especially trawling in near-shore areas. The loss/degradation of dugong habitats was the second most important threat. On the other hand, coastal development was viewed as less dangerous than other issues.

Table 4.5 Perceived threats to dugongs

Rank	Perceived threats to dugongs	Number respondents			Weight (Points)	Importance (%)
		1st most important	2nd most important	3rd most important		
1	Inshore fishing pressure (e.g. trawling)	84	94	46	486	54.0
2	Accidental caught	77	45	52	373	41.4
3	Habitat loss and degradation as a result of water pollution	55	66	54	351	39.0
4	Vessel strikes	33	45	31	220	24.4
5	Hunting and use	46	19	15	191	21.2
6	Natural predators or diseases	2	18	59	101	11.2
7	Coastal development	3	13	32	67	7.4

4.2.5 Perception of Required Management for the Dugong

Respondents were asked the question: What would you do if you were the governor to preserve the dugong in Thailand? When ranking their priority from first, second, and third most important methods, the results, as seen in Table 4.6, can be linked to the key perceived threats to the dugong, i.e. inshore fishing, accidental catch, and the loss and degradation of dugong habitats. The result was that almost half of the respondents (45.4 percent) required the prohibition of trawling in the near-shore areas in particular where dugong habitats are prohibited. It was followed by increasing penalties for violators of the laws (36.7 percent), implementing buoy systems to present dugong habitats (33.0 percent), expanding marine protected areas (32.7 percent), and increasing local fishers and public awareness on the dugong (14.2 percent) respectively. Conducting dugong research and monitoring ranks last.

Table 4.6 Perception of required management to improve dugong population

Rank	Perceived measures	Number respondents			Weight (Points)	Importance (%)
		1st most important	2nd most important	3rd most important		
1	Prohibit trawling in areas where it can damage dugongs and seagrasses	95	46	32	409	45.4
2	Increase penalties for violators of existing laws	47	78	33	330	36.7
3	Implement buoy systems for presenting dugong habitats where the use of harmful fishing gears is prohibited and boating speed is limited	37	68	50	297	33.0
4	Expand marine protected areas to protect dugong habitats	67	29	35	294	32.7
5	Educate and create awareness among local fisher and general public about dugong conservation	39	48	63	276	30.7
6	Enhance local, national, regional and international cooperation efforts	8	23	58	128	14.2
7	Improve our understanding of dugong behaviour and distributions through research and monitoring	7	8	25	62	6.9

4.3 The Choice Experiment of Wild Elephant Conservation

To estimate the non-use value of the wild elephant population in Thailand, the Discrete Choice Experiment (DCE) was used. In the DCE, respondents were presented with a series of choice sets composed of different attributes associated with wild elephants and their management namely, Elephant Population, Elephant Habitat, Wildlife Corridor, and Human-elephant Conflict Resolution. They were asked to choose an option in each choice set. The discrete choice and multinomial logit models were estimated using NLOGIT 4.0 (LIMDEP 9.0) Software. Parameter estimates for the wild elephant conservation model can be found in Table 4.7.

Table 4.7 The Discrete Choice and Multinomial Logit Model of wild elephant conservation resulting from the analysis of LIMDEP software

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]
POP_SLOW	1.24299	.09247	13.442	.0000
POP_REV	-.55624	.11827	-4.703	.0000
HAB_REST	.80850	.06715	12.040	.0000
HAB_RECR	.45392	.10074	4.506	.0000
COR	1.04831	.08986	11.666	.0000
RES	.04527	.06524	.694	.4878
PRICE	.00086	.77853	11.100	.0000
Log-likelihood		-1999.315		
No. Observations		2400		

As can be seen in Table 4.7, although most of the attribute's coefficients are significant, the coefficient of the price is positive. It does not complete with standard assumption of economic theory. When the coefficient of the price (βc) and the coefficient of attribute m (βm) are positive, results in for MWTP for the following equation:

$$MWTPm = - \beta m / \beta c$$

as negative. Thus, the estimated model cannot be used to elicit the MWPT.

Although this study could not estimate a MWTP for the wild elephant population in Thailand, the non-use values of dugongs in Thailand are elicited.

4.4 The Choice Experiment of Dugong Conservation Programme

4.4.1 The Discrete Choice and Multinomial Logit Model of Dugong Conservation

The discrete choice and multinomial logit models were estimated using NLOGIT 4.0 (LIMDEP 9.0) Software. It was found that all attributes were significant in the dugong model and parameter estimates for the model are presented in Table 4.8.

Table 4.8 The Discrete Choice and Multinomial Logit Model of dugong conservation resulting from the analysis of LIMPEP

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]
POP_SLOW	1.47362	.12697	11.606	.0000
POP_REV	.97018	.16859	5.755	.0000
HAB_REST	2.26549	.15395	14.716	.0000
HAB_RECR	2.49445	.13012	19.197	.0000
EDU	-3.16431	.14653	-21.595	.0000
BUOY	4.66342	.22317	20.896	.0000
PRICE	-0.00196	.00019	-10.346	.0000
Log-likelihood		-1449.661		
No. Observations		2400		

4.4.2 Average WTP Estimates for the Attributes of Dugong Conservation

The choice experiment results were used to compute indirect WTP according to different levels of dugong population improvement. Presented in Table 4.9 are the average WTP estimates per person per year for improvements in each of the dugong attributes. These are the MWTP on average of moving from one level to an upper level. As can be seen from Table 4.9, the average WTP to enhance dugong populations from Continued Decline to Slow down the Decline was found to be nearly 750 Thai Baht (THB) per person per year. The value for an

improvement from the Slow down the Decline to Recovery was almost 500 THB. For the second attribute, the dugong habitats, the average WTP to the change of dugong habitats from Habitat Degradation to Habitat Restoration was 1,150 THB, and the average WTP for improving from Habitat Restoration to Habitat Re-creation was almost 1,270 THB. Whereas the respondents were unlikely to pay for educating local fishers about dugong conservation, the average WTP was negative 1,600 THB. Lastly, the average WTP for implementing buoy systems, which can be used to inform local fishers about the areas where harmful fishing gears and high speed boats are prohibited was the highest value of almost 2,370 THB. The overall average WTP to improve all of the mentioned attributes from the status quo to the most suitable dugong conservation scheme, which is that the dugong population improves from Continued Decline to Slow down the Decline, the habitat improves from Degradation to Re-Creation, some fishers are educated and buoy systems are provided, was 748.19+1266.48+2367.71 (i.e., 4,382.38) THB per person per year.

Table 4.9 Average WTP for dugong population improvement in Thailand per person per year

Improvement	WTP	Standard Error	b/St.Er.	P[|Z|>z]
Dugong Population: Slowdown the Decline	748.19	78.20135	9.567	.0000
Dugong Population: Recovery	492.58	78.50481	6.274	.0000
Dugong Habitats: Restoration	1150.24	91.47554	12.537	.0000
Dugong Habitats: Re-creation	1266.48	90.80566	13.947	.0000
Education: Lots of educated Fishers	-1606.59	109.86242	-14.624	.0000
Buoys: Exist	2367.71	140.66155	16.833	.0000

4.6 Discussion

A number of discussed issues can be drawn from the findings. Firstly, for the conservation of wild elephants in Thailand this study could not be used to estimate a MWTP of the respondents because the price coefficient had a positive value which did not meet standard assumptions of economic theory. A possible explanation could be that the elephant is known as a rare and familiar species. Elephant also has an important role to Thai people and their culture as the national sign animal (Melamid and Finemanf 2000). As a result, the respondents have chosen the option that has the highest in donate value. In other words they were unlikely to trade the monetary attribute against the other conservation attributes.

Secondly, although the dugong education has a significant negative coefficient, the dugong model performs as expected. The Dugong Population, Dugong Habitat, and Buoy Systems attributes had significant positive coefficients whereas the coefficient of price had significant negative value. This finding was supported by the choice experiment study of Adamowicz et al. (1998). They measured the passive use values relating to caribou preservation and reported that caribou population and wilderness area had significantly positive coefficients while the coefficient on the price had significantly negative value.

By focusing on the first attribute, the Dugong Population, the average WTP for Slow down the Decline of the dugong population was found to be higher than for the Recovery with 748 and 493 THB respectively. Thus, the people preferred to support a dugong conservation scheme that simply ensures dugong survival rather than recovering the dugong population.

The finding from this study directly contradicted the reported by Christies et al. (2004). They reported that the public preferred to value higher price for attaining an environmental scheme which promised full recovery of the population rather than simply slowing down the decline.

For the second attribute, the Dugong Habitat, the average WTP for Habitat Re-creation attribute was higher than Habitat Restoration attribute at 1,267 and 1,150 THB respectively. This finding was in accordance with the choice experiment study reported by Christies et al. (2004). They reported that the residents in Cambridgeshire were willing to pay a higher implicit price for habitat re-creation than for habitat restoration at £61.36 and £34.40 respectively.

Interestingly, the dugong improvement that was most valued by general public related to implementation of buoys, which amounted to approximately 2,368 THB/person/year. It possibly related to results from attitudinal questions. Inshore fishing, especially trawling in near-shore areas, and degradation of habitats were perceived as the main threats to the dugong in Thailand. These may be the reasons why the respondents were willing to place high value on an environmental scheme with its aim to reduce these risks, especially providing buoy systems.

However, the findings for the Dugong Education attribute were interesting since this attribute was significant in the model but the average WTP for increasing local fisher's knowledge related to the dugong was found to be negative (-1,607 THB). These results meant that the respondents were unwilling to pay for increasing local fishers' knowledge and awareness of dugong conservation. According to the results (see Table 4.5), there were three supported reasons. Firstly, respondents believed that inshore fishing is one of the most important threats to dugongs, and local fishers may be blamed as the dugong enemy. Secondly, the respondents considered increasing local fishers' knowledge and awareness of dugong were not sufficient for dugong conservation (see Table 4.6). In comparison, prohibiting trawling and increasing penalties of violators of existing laws were considered to be a priority. Thirdly, in accordance with Adamowicz et al. (1998), they reported that the respondents might distrust the administration over the ability of wildlife managers to carry out the conservation schemes aiming to increase local fishers' knowledge and awareness of dugong conservation.

For the overall willingness to pay, although people's opinion on the WTP for dugong conservation was less than 1 % of the average annual household incomes (241,020 THB), the overall average WTP for the most preferred dugong conservation scheme was about 4,390 THB per year. This value was as high as 2 % of the respondents' annual incomes.

Finally, the average WTP resulting from interviews by using questionnaire Version B of the first sequence and the WTP resulting from interviews by using questionnaire Version A of the last sequence are not significantly different. However, the respondents who were asked to answer the dugong choice questions in the last sequence tended to attach lower values to the dugong conservation scheme. A possible explanation was that respondents compared elephant and dugong based on their feelings. Consequently, they placed higher value on elephant than dugong. When they were asked to take part in the dugong choice experiment after answering

the elephant choice experiment, they have chosen the option that has the lowest in donate value.

5 Conclusion

The analysis of the experiments to assess respondent's preferences for conservation goals returned seven key findings. Of 300 useable face-to-face interview samples, the majority of respondents were female, between the ages of 25-34, single, held bachelor degrees, were employed, and had four to six members within their household. The average individual income and household income of the respondents were approximately 147,300 and 241,000 Thai Baht per year respectively. In addition most of the respondents considered that the quality of the environment in Thailand had become worse. The environmental issue relating to forested areas came out as the most important concern, because it had declined dramatically.

The majority of respondents also considered that the terrestrial animal and marine animal abundance had declined. Moreover, the loss and destruction of habitats, illegal poaching for tusks, and habitat fragmentation as a result of road construction were found to be the first, second and third greatest threats to wild elephants respectively. Whereas, human-elephant conflicts, illegal poaching for elephant calves, and pressure from tourism were considered to be of lower threats. Therefore, increasing penalties for violations of existing laws and expanding protected areas to elephant habitats were regarded as the main priorities, while elephant research and monitoring was considered to be the lowest priority.

For the dugong in Thailand, the most significant perceived threat by the participants in Bangkok was inshore fishing, especially trawling in near-shore areas. The loss and degradation of dugong habitats were ranked as the second most important threat, while coastal development was deemed to be less dangerous than other issues. Consequently, prohibiting trawling in dugong habitats and seagrass areas was agreed to be the top priority. Additionally, they supported increasing penalties for violations of existing laws, implementing buoys in order to indicate dugong habitats, expanding marine protected areas, and increasing the awareness of local fishers and public on the dugong. However, dugong research and monitoring was ranked as the least important issue.

This study could not estimate a MWTP of the respondents for the conservation of wild elephants in Thailand, as the coefficient of the price is positive which was not valid for the standard assumption of economic theory. The overall average WTP for the most preferable choice of the dugong conservation scheme would be to slow down the dugong population decline. The required habitats would need to be re-created, and buoy systems provided; the cost of this would require almost 4,390 THB annually per person. The dugong improvement most valued by the general public related to the implementation of a buoy system. The WTP for implementing buoys was almost 2,367 THB per person per year. The following were the dugong habitats attribute at the level of Habitat Re-creation (1,266 THB), and the dugong population attribute at the level of Slow down the Decline (about 748 THB). However, the respondents were not willing to pay for increasing local fishers' knowledge on dugong conservation.

The key policy implications of the choice experiment findings are that the public is willing to pay a sum of money for dugong protection policies. Thus, we are able to make clear recommendations with regard to which types of dugong conservation should be made a priority. It is concluded that the respondent's most preferred choice within the scheme was to provide buoy systems for highlighting dugong habitats so that inappropriate fishing activities and high-speed boating are prohibited, re-creating habitats and the mitigation of the dugong population decline. Moreover, the attitudinal question with regard to the perceived threats to dugongs and their management indicated that inshore fishing, accidental capture, as well as the loss and degradation of dugong habitat were serious concerns. Thus, the prohibition of trawling in near-shore areas and increasing penalties for violators of the related laws should take priority. Although the willingness to pay for conserving wild elephants could not be elicited from this study, the threats to wild elephants and conservation measures perceived by the respondents can provide useful information for policy makers. Even though the representative inhabitants of Bangkok were not likely to pay attention to wildlife research and monitoring, policy makers however should take the research and monitoring process into account. It should be noted that these recommendations were concluded from the Bangkok residents' point of view. Therefore, future works need to be done with other groups of people, especially with stakeholders in rural areas. Moreover, it is important to note that this choice experiment study only provided non-use values, which are only one part of the total economic value. In a cost-benefit analysis for environmental resources it is important to elicit the other types of the values such as the use and option values. Thus, further studies using other appropriate valuation techniques are needed. Furthermore, assessing whether the dugong conservation scheme offers value for money requires an inspection of the costs associated with it.

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Research on Management of Watershed Protection Forest based on the Muong Minority Ethnic Communities in Da Bac District, Hoa Binh Province, Vietnam

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Abstract: The research is to analyze and assess limitations of Muong communities in a given socio-economic situation and changing mechanism of benefit sharing of forest resources by using environmental services (FES), and propose some solutions to strengthening effectiveness of management and utilization of watershed protection forests.

The research result shows that in the context of climate change, payment for environmental services requires new approach in developing legal framework on community forest management. The implementation of payment for forest environmental service in watershed protection forest is a "pilot policy" which have actual values of indigenous knowledge, communities' customs related to forest management. Their adaptive benefit-sharing mechanism is compulsory requirements of safeguard in implementing principles on result-based payment and a transparent, equal, participatory and prior informed of benefit-sharing mechanism need to be examined to implement them at local community level.

Introduction

Currently, community forestry (CF) is a method of community-Based forest management, which is an adaptive practice of managing and utilizing forests at local level in Vietnam. This practice is considered as an effective method to manage, protect and develop forest. As of 2016, there are eight stakeholders, including Forest Management Board, State Forest Company, other economic organisations, army, households, communities, mass organisations and CPCs, who are directly involved in managing 14.377 Mha of forest1 in Vietnam. Of which, communities are involved in managing 1.1 Mha. According to, IUCN and RECOFTC (2011) stated that total of the forest area and forestland managed under community-based forest management is expected to rise to 4.4 million ha, accounting for 25% of total forest land in Vietnam.

The Muong communities are managing watershed protection forest in Hoa Binh and have also encountered a number of challenges originating from the restrictions of legal framework for community forestry. They have outstanding tradition and customary principles in managing natural forests. However, in order to build Hoa Binh hydroelectric plants, a number of villages of Muong, Tay, Thai and Dao ethnic groups had to move to from low land area to up

[1] Decision No. 1819/QD-BNN-TCLN dated 16/5/2017 of the MARD.

land area for resettlement. The resettlement movement is called "moving up resettlement". This places considerable pressure on forest resources and forest land because of the shortage of land and forest to cultivate food and cash crops and to extract forest products in the sake of community development. The underlying cause of such shortage is the sink of both forestland and agricultural land that are driven by building hydroelectricity plants. Facing big challenges in living in resettlement area, Muong ethnic communities have, however still maintained a good practice in managing watershed protection forest in this area for over 20 years after their resettlement. The multi-storey canopy structure and environmental function of forest have continuously been maintained so far. This may be the adaptive process of Muong communities in forest management and utilization within context of strict implementation of policies on managing and protecting watershed protection forest; incomplete tenure rights to forests and their remarkable dependence on forest.

The development of community forest is therefore, still face some limitations, such as the security of tenure right and the realization of right after forest and forestland allocation; shortage of support mechanism to incentivize local community to develop livelihood on their allocated forest land. The research on management of watershed protection forest based on the Muong minority ethnic communities was conducted in Hoa Binh province in order to analyze and assess limitations of Muong communities in a given socio-economic situation and changing mechanism of benefit sharing of forest resources by using environmental services (FES), and propose some solutions to strengthening effectiveness of management and utilization of watershed protection forests.

Thus, the study is conducted to answers research questions, as following:

1) What is the real situation of Muong communities' practice on forest managment and utilization?
2) Why do Muong communities retain their interest in forest managment under incompleted forest tenure rights oon watershed protection forest? What is the driving force behind their activities for community forest managment?
3) What are the difficulties and challenges faced by Muong communities in managing and protecting watershed protection forest?
4) What do the policy recommendations need to be enhanced in socio-economic conditions and natural resource conditions of Muong communities living in Hoa Binh watershed protection forest? And also to be applied at national level?

Objectives

To make a significant contribution to the amendment and enhancement of policies on management of watershed protection forest based on local communities in Vietnam in the sake of poverty alleviation and response to climate change.

Specific Objective:

- Assess the real situation of community forest management based on Muong minority group in Da Bac district, Hoa Binh province.
- Identify difficulties, opportunity, challenges and drivers affecting forest management and utilization of Muong communities
- Propose policy solutions to strengthen the capacity of community forest management practice, making a contribution to policy development and implementation on community forest management at national level.

Approaches and Methods of the Study

Logic frame (Figure 2) describes 3 steps of conducting the research which shows the close relation among subjects, contents and expected results. Specified as following:

Step 1: Collect secondary data and review of community forest management in specific scio-economic context: This step describes the major milestone in the development of CFM in Vietnam in order to have insight into the important role of CFM in the course of forest protection and management, poverty alleviation, and climate change adaptation. In addition, a review of major policies on CFM was conducted to identify the development trend and limitation of such policies. This also helps to strengthen capacity of local communities in implementation of their rights and responsibilities over watershed protection forest. Moreover, an analysis of role and development trend of community forest management in the context of high focus on climate change and sustainable poverty reduction of local communities. The results of this step will provide a clear picture on the development period, strengths and difficulties and challenges of CFM in the near future, thus clarifying measure and polices need to be taken facilitated to the development of CFM in Vietnam.

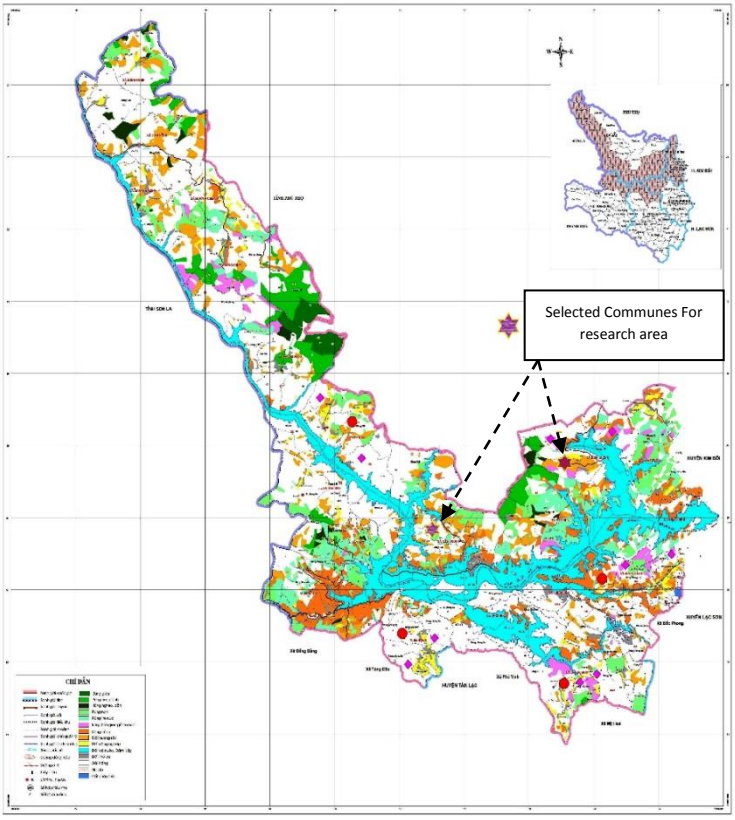


Figure 1: Sketch map of communes under watershed area

Step 2: Field study

Locations selected to conduct case study are two of 12 communes located in area of watershed protection forest in Da Bac district, Hoa Binh province. These communes are Doi and Ke village in Hien Luong commune and Co Xa and Mat village of Tien Phong commune. Their forests are characterized, as below:

- A large area of watershed protection forest with diverse forest types including plantations and natural forests.
- Informal allocated to Muong communities to manage under the forms of community forest management.
- Receiving payment for forest environmental services.

Step 3: consult experts and workshop

Several meetings to consult with expert and workshop to disseminate the research result were conducted. The most important result of research is the policy brief depriving from the review of research on CFM, policy review and assessment result of actual situation of CFM of Muong communities. Research used the workshop and expert consultants to receive useful feedback from multiple stakeholders, contributing to the completion of the research results.

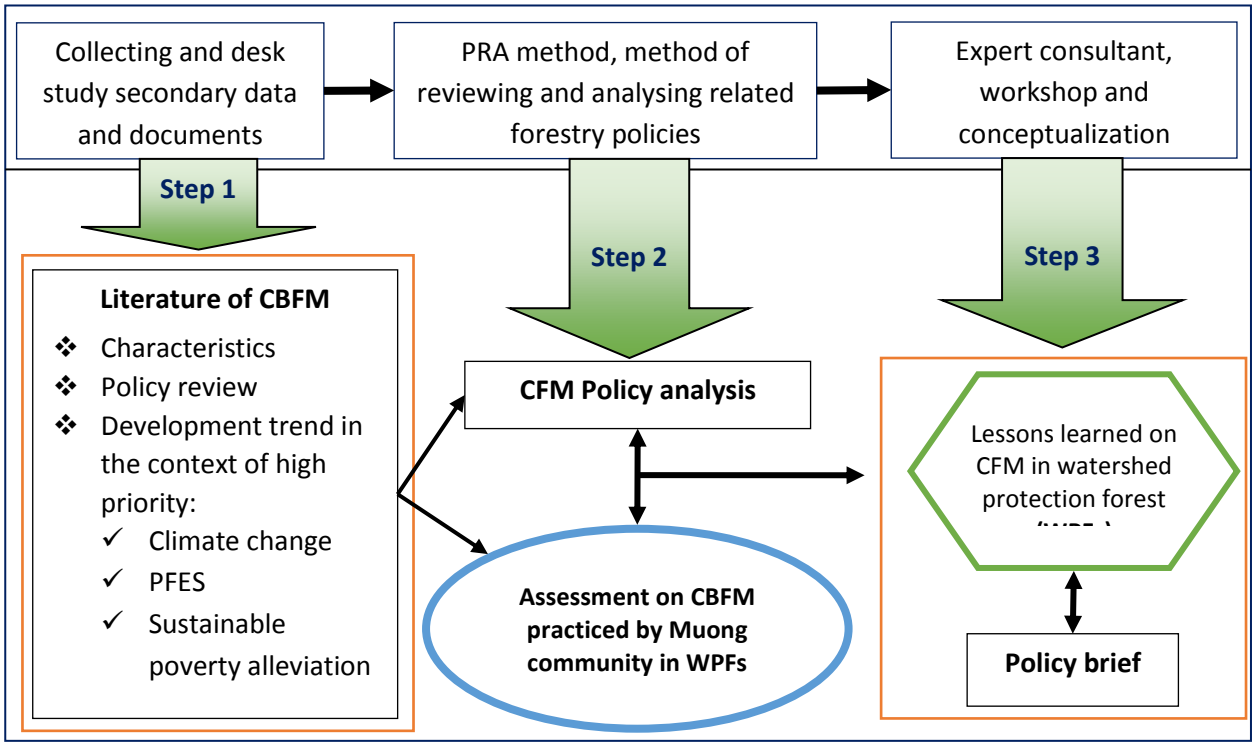
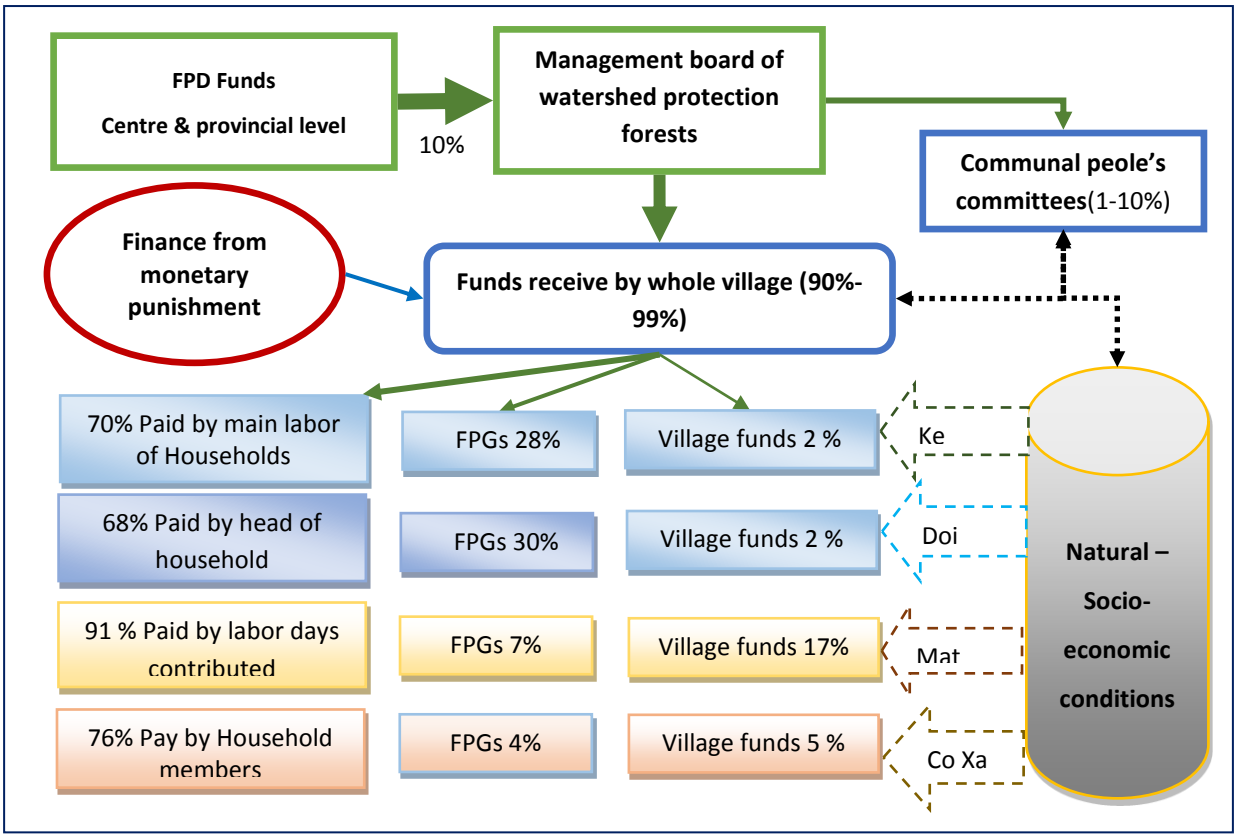


Figure 2: Research approaches

Research Results and Discussion

The research results show that The Muong community in the surveyed villages have effectively managed the allocated watershed protection forest while local authority has not formally devolved forest tenure right to them. However, Muong communities have successfully adapted traditional knowledge and rules on forest protection and management in

many previous decades to build and implement the newly established regulation on forest protection and development. This regulation is continuously implemented and revised to meet the demand for forest management and development in villages and in various periods. As a result, the number and severity of forest encroachment in the studied villages have remarkably reduced. In addition, the economic contribution of community forest management activities to household economy has been significantly improved when local communities have been received the payment for provision of forest environmental services (FES). They have made significant adjustment to benefit sharing mechanism in order to ensure that the village members of the village are equitably and fairly received the financial benefit reaping from their participation in forest protection and management. Sharing mechanisms of financial support received from PES are shown, as below.



The fact that financial source from provision FES in 4 studied village has made significant compensation for communities' effort to manage forest. It improved the way of forest management, benefit sharing mechanism and increase the forest areas being protected. Thus, core-values of the implementation of payment for environmental services is to facilitate the forest management conducted by local communities themselves so as to protect and develop forest in the participatory, transparent, equal and adaptive way.

The local authorities at communal level proved their role in support, facilitate and incentivize the development of a proper, adaptive and participatory benefit-sharing mechanism at each studied communities. The research result shows that:

- Strong customary rules and principles are well maintained and implemented

- Community coherence is strong due to the racial homogeneity and strong tradition
- High awareness of the importance of watershed protection forest for their crops under the community forest and their drinking water
- The new finance source from PFES provides a significant monetary incentive to manage forest
- Income from Forest non-related activities reducing pressure on forest
- Domestic demand of timber and fuelwood from natural forests were significant reduced.

The research result also pointed out some difficulties and challenges faced by local communities in managing watered protection forest.

- Muong communities have not been formally allocated forest or forest land, having no formal forest land use right certificate or forest allocation decision from the district People's Committees. Thus, the Muong communities have not been allocated unclear and temporary tenure right over their forest;
- The community also experiences insufficient legal aid to resolve conflict on forest encroachment, illegal logging and lack of management skill of CFM;
- Lack of financial supports and specificsupport mechanism or policy, especiallymechanism to strengthen capacity for implementing current policy on community forest management at community level; and
- Lack of opportunity to improve livelihood because the allocated natural watershed protection forest is often impoverished and degraded.

Base on the above findings, research make some recommendations:

- Allocating natural watershed protection forest to the qualified local village community is an important step to not only support local communities to practice their tenure right but also ensure their benefits from forest tenure.
- High priority should be given to the extension of forest area eligible for receive payment for environmental services and clear identification of forest tenure of communities who managing the forest areas that is received payment for environmental services is an appropriate solution to increase access to new financial sources. This will help improve livelihood of local communities. This also facilitate community to establish and practice a result-based benefit-sharing mechanism in so that the benefit is shared in a more transparent and equal way, especially in the context of wide implementation of policy on payment for forest environmental services in Vietnam nationwide and Vietnam’s plan to implement REDD+ after 2020.
- There should be a simplification of administrative process for extracting timber from community forest for subsistent usage in the way of integrating the principleof policy implementation and community custom of forest utilization.

- The effectiveness of community forest management is remarkably reliant on the management capacity of community, especially village forest management board, the leaders of each village. An effective mechanism to support and strengthen community capacity must start from the establishment and implement of plan for CF. Communal peoples committee must well prove their role in forest governance to support and incentivize local communities to upgrade and extend the participatory, adaptive and equal benefit-sharing mechanism.
- In the context of climate change, payment for environmental services requires new approach in developing legal framework on community forest management. The implementation of payment for forest environmental service in watershed protection forest is a "pilot model" which have actual values to implication of policies on payment for carbon-sequestration (REDD+). The role of indigenous knowledge, communities' customs related to forest management and their adaptive benefit-sharing mechanism is compulsory requirements of safeguard in implementation of REDD. Principles on result-based payment and a transparent, equal, participatory and prior informed benefit-sharing mechanism need to be examined to implement them at community level.

Policy Recommendations

1) Strong policies and regulations are key factors to ensure: roles of community forestry in responding climate change, poverty alleviation and equal benefit sharing of PFES; and social inclusiveness, as well.
2) Current LFPD should be amended to ensure community rights, not only rights to protect forest, but also rights to use and own added value of natural forest.
3) Develop new benefit sharing policys.
4) Current PFES policy needs to be improved to establish a better mechanism on payments for forest ecosystem services.

Lessons Learned

1) Strong customary rules and principles of forest management are well maintained and implemented by CF (Applying and maximizing roles of CF);
2) Lack of opportunity to improve livelihood due to the allocated natural watershed protection forest is often impoverished and degraded. Thus, community forestry needs to have more financial supports and strong policies and regulations to do forest protection and rehabilitation, FIRSTLY.
3) The new finance source from PFES provides a significant monetary incentive to protect and develop forest in responding climate change, poverty alleviation and equal benefit sharing of PFES; and social inclusiveness, as well;

The Way Forward

1) Not understand well comprehensive situation of community forestry. Because, watershed protection forests are still large area; having a lot of multiple stakeholders participated in, including local ethnic communities. But, there are very few researches and activities to make clear picture of this situation.
2) Need to have many supports/assistances (e.g. Further research/policy improvement/pilot of community forestry in the new context of initiative financial resources of PFES) for scaling up Community Forestry, which this process is going on.

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