SOUTH ASIA ASSOCIATION FOR REGIONAL COOPERATION

List of PARAMETERS to Assess Forest Contribution to Socioeconomic Development

Proceedings of
SAARC Expert Group Meeting
on
Forest Contribution to Socioeconomic Development
20-22 August 2013, held at Pokhara, Nepal

SAARC FORESTRY CENTRE
Taba, Thimphu, 2013

SFC Publication 2013

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FOREWORD

There is no doubt that forest is contributing to the socio-economic development particularly to livelihoods of the people, biological conservation, climate change mitigation etc. Countries and agencies have been continuously assessing the contribution of forests to socioeconomic development. However, the vast potential of contribution towards socioeconomic benefits/development is not fully assessed in the region taking into consideration of changing roles and responsibilities of people and their dependency on forests over times.

As the same time there are lot of changes in managing the forest because of globalization, some of the most important effects on forests and forestry in many countries in the region are the result of international and regional development. Heightened awareness of the values of forests has increased the importance of linking spatial levels and broadening understanding of issues and opportunities likely to affects forests and socioeconomic development. There are new challenges like ensuring good governance practices, equity of forest resource sharing etc. and opportunities like development of community based nature based ecotourism, payment for environmental services etc. to generate additional income to people which need to be discussed regionally and develop plans to address those new issues and explore new opportunities, and share amongst the Member States and others.

This Expert Group Meeting on the Assessment of contribution of Forest to Socioeconomic Development in the SAARC Member States was organized by Institute of Forestry (IOF), Government of Nepal and SAARC Forestry Centre, Thimphu from 20 -22 August 2013 at Pokhara, Nepal. Experts from Afghanistan, Bangladesh, Bhutan, Maldives, Nepal and Sri Lanka met for three days and came up with the list of PARAMETERS to assess the contribution of forest to socioeconomic development that could be used by the Member States. I am very impressed that the Experts from Member States have made efforts to prepare papers, and presentations which reflected considerable energy put in to share their experiences. I am sure the PARAMETERS developed and published in this book will be very useful to those who endeavor to carryout studies on contribution of forests to socioeconomic development. Furthermore, the PARAMETERS listed in this book also cover some environment and biological conservation aspects.

On behalf of SFC, I would like to thank officials from IOF and Forest Department, Government of Nepal for investing significant amounts of time and energy to plan and organize this successful meeting. I am impressed and would like to thank the PFM Specialist for coordinating efficiently with IOF, Forest Department, Government of Nepal and with the participants from SAARC Member States, which resulted in the successful conclusion of the meeting.

We hope that the PARAMETERS listed in this book will be well received and used by Member States.

Sangay Wangchuk, PhD
Director
South Asia Association for Regional Cooperation (SAARC) Forestry Centre

I. LIST OF PARAMETERS TO ASSESS FOREST CONTRIBUTION TO SOCIOECONOMIC DEVELOPMENT

The Expert Group Members from SAARC Member States have developed a potential list of PARAMETERS, which could be used for assessment of forest contribution to socioeconomic development.

Parameters	Indicators	Measurement Tools / Instruments
Forest Contribution to Social, Cultural, Knowledge and Technology		
Creating an enabling environment - Governance	Existing laws and regulations	Public audit
	Compliance	Compliance audit
	Transparency	Ombudsmanship; Public Watchdogs
	Accountability	Public accounting system
Networks	Identified stakeholders	Stakeholder analysis
	Communication	Stakeholder meeting frequency; Mode of communication
	Federations	Frequency of meetings and declarations made with federations
Institutional development	Community empowerment	Level of authority for independent decision making
	Record keeping	Existing record keeping system
	Rules and regulations	Procedures and by-laws / Guidelines
	M&E mechanism	M&E system; M&E reports
	Knowledge Management and Sharing	KM and KS tools
Social Inclusion	Participation of Ethnic and Marginalized groups	Proportionate representation; Involvement in decision making; Records of stakeholder meetings

Gender equality	Gender representation at decision making	Records of meetings; Types and number of decisions incorporating Women's voice
	Women representation in the committee	Number of women holding key positions; Gender audit
	Social acceptance of Women committee members by community	Gender audit
Equity	Access to resources	Distribution and types of internal and external benefits; Appraisals
Human capital development	Access to basic requirements - food security, health, education, water, skill development...etc	Vulnerability and poverty assessment; Country census
Traditional	Use of medicinal and aromatic plants	Assistive studies on use of forest species for traditional uses
Forest Contribution to Financial and Economic Resources		
Income from: *-Wood products* *-Non-wood products* *-Community nursery (seedlings, flowers…etc.)*	-Amount deposited in government treasury -Amount deposited in community account -Amount/value received by the individual households	-Volumn/Weight/Number
Ecosystem Services *-Payment for Ecosystem Services*	Amount deposited in government treasury -Amount deposited in community account -Amount/value received by the individual households	Number/Area
Conservation Services *-Fines, Penalties (forest products and wildlife related)* *-REDD and REDD+(Carbon trust fund)*	Amount deposited in government treasury -Amount deposited in community account -Amount/value received by the individual households	Amount/Area
Ecotourism *-Community based ecotourism* *-Generate income*	Amount deposited in government treasury -Amount deposited in community account	Number /Amount

through organizing festivals	-Amount/value received by the individual households	
Bio-prospecting (Emerging concept which, if carefully undertaken, may give opportunity for substantial benefits to the community)	Amount deposited in government treasury -Amount deposited in community account -Amount/value received by the individual households	Number/Amount
Contribution of Forest to Physical and Infrastructure Development		
Rural road/trail construction	Length and Number	Quantitative
Sanitation activities (like toilet)	Length and Number	Quantitative
Investment in School/education/library building etc.	Number	Quantitative
Community building/Temples/Cultural Centre etc.	Number	Quantitative
Hospital/basic health Unit	Number	Quantitative
Local Water Supply/Irrigation	Number and Area	Quantitative
Drinking Water supply	Number and Area	Quantitative
Micro-hydropower Generation	Number	Quantitative
Development of Aquaculture	Number and Weight	Quantitative
Micro-enterprise development	Number	Quantitative
Establishment of common local market sheds	Number	Quantitative
Forest fencing	Length	Quantitative

Sale proceed from community nursery	Income	Quantitative
Forest Contribution to Environment and Ecology		
Biodiversity Conservation	Safety Net, reduce of life and property	Trend analysis
	Direct food- food, nuts, vegetables	Assessing monetary value
	NTFP – Medicinal plants, fuel wood, fodder, timber, leaf litter, bedding materials, compost, bamboo etc	Assessing monetary value
	Number of visitors to Eco tourist	Assessing monetary value
	Carbon Stock	Inventory
Protection from Natural Disaster	Rate of loss of Life and Property	Survey
	Amount of soil loss from certain areas	Survey
Reclamation of Land	Land Mass increased	Survey
	Settlement	
	Agriculture, more forest products, fish farming, salt production	
	Decreasing soil erosion	
	Conservation of Water	
Biosphere Reserve	Eco-tourism	
	Protection of Biodiversity	
	Increase in income to communities	
	Improved environment	

	Increase or improve aesthetic value	
Payment for Ecological Services	Generate financial resources	
	Quality and Quantity of water increases	
	Protection of Forests	
	Soil Conservation	
Eco-Tourism	Income Generation	
	Employment	
	Protection of Forests	
	Bio-diversity Conservation	

II. INTRODUCTORY SESSION

Welcome Speech by Dr. Rajan Pokharel, Regional Director of Forests, Pokhara, Nepal

Mr. Chairperson, the Dean, Institute of Forestry, Pokhara
Dr. Ganesh Raj Joshi, Chief Guest, The Secretary, Ministry of Forests and Soil Conservation, Government of Nepal
Dr. Sangay Wangchuk, Director, SAARC Forestry Centre, Bhutan
Respected Professors, Institute of Forestry
Distinguished Delegates and Participants
Ladies and Gentlemen

It gives me an immense pleasure to welcome you all this morning to this important meeting organized by Ministry of Forests and Soil Conservation (MFSC), the Institute of Forestry (IOF) and South Asia Association for Regional Cooperation (SAARC) Forestry Centre. We have gathered here to meet our goal (UNCED agenda 21 in 1992) as well as to express our friendship and strengthen our relationship in the region along with the Excellency in forestry.

The United Nations Conference on Environment and Development (UNCED) in 1992 agenda 21 recognized that poverty was a global problem and forest has a major role to play in its eradication both for ecological stability and for the general welfare of the masses. The vast contribution towards socioeconomic benefits/development is not fully assessed in the region taking into considerations of people's role, responsibilities and dependency on forest resources. The three days meeting in Pokhara, Nepal will bring together Experts and Professionals of SAARC Member States who have dealt on forest and its contribution to socioeconomic to expedite an understanding to achieve the goals of UNCED. I hope that this meeting will further develop an action plan to strengthen the participatory forestry in the region as well as address new challenges in livelihoods and governance and explore opportunities for the benefits of this region.

At the moment, we are in Pokhara. Its bewitching beauty has been the subject of many visitors. Its pristine air, spectacular backdrop of snowy peaks, serene lakes and surrounding greenery make it " the jewel in the Himalaya", a place of remarkable natural beauty. With the magnificent Annapurna range forming the backdrop and the serenity of three major lakes – Phewa, Rupa and Begnas- Pokhara is the ultimate destination for peace. The mesmerizing Machhapuchhre also called Mt. Fishtail dominates the scenery because of its proximity to the valley and can be seen from anywhere in Pokhara.

I do hope your stay over Pokhara will be very pleasant and will create a platform for future research on the theme to be useful for vulnerable and marginalized people in the region.

Thank you, Thank you very much.

Keynote Address by the Chief Guest - Dr. Ganesh Raj Joshi, Secretary, Ministry of Forests and Soil Conservation (MoFSC), Government of Nepal.

Respected Chair and Dean Institute of Forestry
Director SAARC Forestry Center
Regional Director, Ministry of Forests and Soil Conservation
Distinguished Delegates, Experts and Professionals from IOF and MOFSC
Ladies and Gentleman
Good Morning and Namaste.

I feel honored to be here with you this morning and address this forestry expert group meeting of SAARC countries jointly organized by MOFSC, SAARC Forestry Center and IOF. We all know forest is an important resource in SAARC Member States as it covers around 82 million hectares. Large groups of the people in the region heavily depend on natural resources for their daily livelihood that further contribute local and national economy to a visible extent. However, contribution of such resources is not adequately reflected in the national accounting system. Only the direct and physical products are being considered for the contribution purpose. Moreover, despite of being abundant forest resources, the region is prone to poverty. Poverty is being perceived as a global problem and forest resource can play significant role for mitigating ecological problems along with the general welfare of masses. Community based forest management is gaining momentum among the SAARC Member States.

The contribution of forests and other natural resources to the national economy is not properly assessed as large part of services provided by them are outside the market regime which can not be easily monetized. The economic decisions based on such partial information may not be rational and lead to the underestimation of the role of the sector. The contribution of forest sector in Nepal is not consistent as it varies from 4 to 15% to AGDP, mainly because of not having a standard methodology.

With this dilemma, the United Nations System of Integrated Environmental and Economic Accounting has suggested for maintaining satellite accounts for natural resources. Even if the green accounting is not fully integrated with the rest of national accounts, these satellite accounts will help to evaluate the contribution aiming at conservation of natural resources in the interest of future production of goods and services for human well-being. There is a need of having standard methodology in estimating contribution of the forestry sector of Nepal to the national GDP.

In Nepal, the local communities were conventionally involved in the protection and utilization of forest resources. In spite of massive involvement of local people in forest management, forest sector is changing with change in governance structures often influenced by social movements demanding decentralization, democratization and recognition of rights, ownership and tenure.

Forests and people have mutual impacts on each other in terms of employment, production and ecological integrity. There has been significant achievement regarding the mutual existence of forest and human being. However, there are still challenges like good governance practices, equity in benefit sharing, exploring opportunities of community based forestry enterprises, payment for environmental services that ensure equitable income to the local people. These issues are to be discussed at regional level which may shape future course of action to address current issues and explore new opportunities.

Community based forest enterprises development, although a recent phenomenon, are emerging in this region not only with substantial revenue generation but also creating employment even in the rural settings. However, it still remains a daunting task for stakeholders in replicating and up scaling successes unless we can create conducive environment both at policy and implementation level. This sort of meeting will be quite fruitful in devising policies and strategies for sustainable forest based enterprises development in this region for ecological integrity and poverty reduction.

I have a firm belief that meetings of this kind will definitely help Member States towards a collective learning and mutual sharing of experiences. The output in the form of an action plan based on the recommendations of the expert group meeting will certainly help conservation and sustainable utilization of forest resources for socioeconomic development of this region.

Please, allow me to express my best wishes for the success of this meeting. I also wish your a stay very pleasant and memorable in this beautiful lake city of Pokhara.
Thank you.

Inaugural Speech by Prof Chiranjibi Prasad Upadhyaya, Dean, Institute of Forestry (IOF), Government of Nepal, Pokhara, Nepal

First of all, I would like to welcome all the participants of SAARC Expert Group Meeting in the beautiful city of Pokhara. We, on behalf of Institute of Forestry are much delighted to host this meeting, which we believe will be an important milestone in evaluating the existing parameters to access socioeconomic contribution of forest and revise them to suit the contemporary needs.

As we all know, the evolution of participatory forestry has given a new dimension to the management of forest and natural resources, whereby local indigenous knowledge and techniques are employed to manage forest resources.

We in Nepal are recognized as a pioneer of Participatory Forestry Management that started since the late 70s and received a veritable degree of success. In this aspect, our forest resources and its management styles have evolved differently as compared to those in the First World countries. This is why; along with the success of participatory forestry, we need to be equally prepared for a scientific basis of their management. This in turn, requires a careful effort to access the parameter or indicators of this scientific evaluation.

Even though the United Nations Conference on Environment and Development (UNCED) in 1992 (Agenda 21) recognized poverty as a global problem and identified the role of forest in eradicating both ecological stability and maintaining general welfare of the masses, the ways to recognize the role of forest in doing so still remains vague.

So we believe, this meetings will bridge a gap in making accessible a framework that can be readily employed in SAARC countries and internalize the positive aspects of each unique system in our nations.

I would like to take this time to share some of the achievement of Institute of Forestry with you. Over the years, Institute of Forestry has established itself as a leading institute in Forest Science producing trained manpower and high quality data on Forest-People interaction.

IOF proudly announces recent advances in forest product valuation and income accounting at the household level. Data from our 4 research sites (Mustang, Gorkha, Kaski and Chitwan) in Nepal in a time series panel household analysis of over 800 households since 2006 adopting the CIFOR's Poverty Environment Network standard methodology and by establishing 240 permanent forest sample plots to correlate the forest product extraction and household consumption with scientific forest growth data. The research results from the IOF has started to emerge in key international scientific journals (displayed in the seminar venue at the Hotel Waterfront Resort, Pokhara).

One of our faculties, Dr. Santosh Rayamajhi et al. (2012) has taken great strides in estimating forest income accounting for 22% of total net income for lower Mustang. Similarly, another researcher from IOF Dr. Bir Bahadur Khanal et al. (2013) has estimated forest income accounts for 16% of total net income for Gorkha.

In this light, we are happy to collaborate with the experts from SAARC Member States in evaluating our position in the map of world forestry and devise ways to scientifically strengthen and promote the burgeoning need for scientific assessment of the role of forest in socio-economic aspect of society at large.
Thank you.

Vote of Thanks By Dr. Santosh Rayamajhi, Institute of Forestry, Pokhara, Nepal

The Chairman, Dean of IOF
The Chief Guest, Honorable Secretary of MOFSC
The Guest of Honor, Director of SAARC Forestry Centre, Bhutan
The Delegates, Professors and Facilitators, and invited Guests

I am very pleased to see the beginning of SAARC's initiative towards strengthening forestry and forest management in the region.

I am confident that this workshop/seminar will be a milestone in paving a path towards the green accounting of forests benefit in the overall socio-economic development of our nations and making it possible to reflect in the national GDP.

I believe that with our joint efforts in the coming three days deliberation, we could achieve what we have gathered here for.

First of all, I wish to extend hearty thanks to Dr. Sangay Wangchuk for his great enthusiasm in establishing a network within the SAARC countries and selecting the IOF and Pokhara for this historic event. His constant visits and interaction with the IOF has been a source of inspiration for us to pursue socio-economic research. We are grateful to his influencing and convincing presentation and critical thinking delivered to this ceremony and giving a clear road map to the seminar. He has certainly inspired us to be scientific and maintain scientific integrity. We are also thankful for his team members especially Mr. K. J. Temphel without whose contribution the meeting would've been difficult if not impossible. Mr. Karma deserves a special mention too, whose valued contribution as finance officer is much appreciated.

I am grateful to Dr. Ganesh Raj Joshi, Secretary of Forests and Soil Conservation for your valuable time to grace this inauguration ceremony with the importance it deserves. His keynote speech has inspired us to take ahead the gaps and challenges in making the participatory forestry accountable in the national GDP.

I am especially thankful to the Regional Director of the Western Regional Forestry Directorate Dr. Rajan Pokharel for his inspiring welcome speech and support in organizing the SAARC Expert Group Meeting. I am thankful to the team of the Regional Forestry Directorate officials especially Mr. Kedar Poudel for his keen interest and support in organizing and facilitating the field work program in Kaski District.

I thank all the delegates from the six SAARC Member States (Afghanistan, Bangladesh, Bhutan, Maldives, Nepal, Sri Lanka) for sparing their valuable time to participate in this event. I hope your journey was enjoyable and I wish you a very pleasant stay. Today it reminds me of my good old days 25 years back in the Indian Forest College, Dehradun where I was together with one of the Delegates from Bhutan Dr. Dhan B. Dhital, I am honored to see you sir in this august gathering.

I also thank the District Forest Officer of Tanahu and Kaski District Forest Officials for their valuable time in supporting us for organizing the field visit programs for the participants and for their time today.

I would like to thank the team of Institute of Forestry for their gracious presence in this event especially the Campus Chief, Assistant Deans, senior faculty members especially Prof Dr. Ridish Pokharel, Dr. Bir Bahadur Khanal and Dr. Krishna Tiwari, as well all other colleagues.

Thanks to our Research Assistant Ms. Karuna Poudel for her active contribution in preparation of this event. Most importantly, I would like to thank our Communication Officer from the IOF/ComForM project Ms. Bhushita Vasistha for her tireless support and vigor in organizing this seminar and facilitating some part of it.

Overall, I would like to thank the Dean IOF, Professor Chiranjibi Prasad Upadhyaya for his constant guidance and the vision to hold this important regional event here in Pokhara facilitated by the IOF with its cadre of experienced researchers. With his coordination with the SAARC Forestry Centre we wish to see this partnership flourish. Thank you sir for your inspiring speech.

Last but not the least; I thank Hotel Waterfront Resort for making our stay so hospitable and the working environment so comfortable.

I am confident that we will have a memorable experience at Pokhara.

Thank you again.

III. PAPERS

FOREST CONTRIBUTION TO SOCIOECONOMIC DEVELOPMENT IN AFGHANISTAN - Mr. Sayeed Aminullah Fakhri, Afghanistan

Head of the Forest Protection
Forest Development Directorate
Ministry of Agriculture, Irrigation and Livestock
Kabul, Afghanistan

Executive Summary

Afghanistan has wide range ecosystems including glacier, high alpine vegetation, mountain coniferous and mixed forest, and open dry woodland with Juniper, Pistachio, almond, semi desert scrub, sand stony desert, rivers, lake and wetlands.

The more closed types of mixed and coniferous forests occur mainly in the east, along the border with Pakistan, where precipitation tends to be more regular and abundant. Areas of open woodland of Pistachio, Almond, and Juniper remain mainly on the northern slopes of the Hindu Kush and west of the country.

In the north plains and the southwest arid zones, tree growth is mainly limited to narrow strips of riparian woodland and scrubby vegetation, dominated by poplar, willow, tamarisk and Haloxylon, that occurs in the often relatively narrow transition zone between open water and adjacent desert or semi- desert.

Forests provide important sources of fruit, fodder, fuel wood and timber for construction and industry as well as critical wildlife habitat. They also promote riverbank stability.

Afghanistan is essentially agrarian country; agriculture; herding, horticulture and forests make the main source of lively hood for around 79% of population.

Key words: *Forests, source of food, critical, wildlife habitat, riverbank stability, and population.*

1. Background/Rational:

Afghanistan's total land area approaches (65.2) million ha (National Geographic Society 1995). About 63% is mountainous, about 3.3 million ha (5%) of the total land area is irrigated and regularly cropped, while 4.5 million ha (7%) is rain-fed and is cropped opportunistically, depending on precipitation. An additional 45% is under permanent pastures, 2-3% under forest covers.

Historically, forest cover in Afghanistan was more extensive than its current state. Under the influence of the Indian Ocean monsoons, deciduous and evergreen forests once covered large areas of the eastern part of the country. Open woodland of pistachio and *Cercis griffithii*, almonds and juniper occupied much of the north and centre of the country leading to the Amu

Darya where riparian tugai woodland, dominated by poplar, willow and *tamarix*, framed much of the country's northern border providing river bank stability and reducing the impact of flooding.

More recently, FAO reports of the 1970's estimated that roughly 1 million hectares of closed canopy oak forest and 2 million hectares of coniferous, largely pine and cedar forest, amounting to approximately 3.5- 4.5% of the total land surface existed. Such figures lie in stark contrast to current assessments. Estimates now indicate that only 2.1% of the country remains forested. Between 1990 and 2000, Afghanistan lost an average of 29,400 hectares of forest per year. This amounted to an average annual deforestation rate of 2.3% with the years between 2000 and 2005 experiencing a rate of deforestation increasing to 2.9% per annum currently. As stated in the NPP - National Water and Natural Resources Development Program, in total, between 1990 and 2005, Afghanistan lost approximately 34% of its forest cover, equating to 442,000 hectares. These trends have created a situation where in which only a highly degraded Pistachio woodland belt of the north, covering approximately 45,000 hectares and the highly threatened Eastern forest complex covering approximately 1.3 million hectares remain. (Figures from NPP 1: National Water and Natural Resources Development Program)

Around 79 % of Afghan people live in the rural area and rely on Natural resource for their livelihood. Forest is the important and key element of renewable natural resource that has a vital role for environmental stability, protection of soil, water, improvement of agriculture, livestock, source of energy and construction material, as a consequence play a great role in socio-economic development in the country.

Addressing forestry depletion and degradation and sustainable management is therefore a national priority.

In this Paper it is considered to highlight the significant role of forests for socio economic development in term of direct and indirect impact and the potential that is exist for the future economic development through forest protection, restoration and development and as well as opportunities to be supported and problem that are needed to be address.

2. Forest contribution in Socio Economy:

Recognition of the three distinct contributions that forest product can make to socio-economic development - the creation of employment, the generation of economic surpluses and the provision of inputs to other sectors of the economy - will lead national decision-makers to have a greater appreciation of the role that forestry and forest industries can play in meeting other national goals.

There are major direct and indirect economic benefits to be derived from the sustainable use and conservation of Afghanistan's forests.

2. 1 Direct Impact:

Non-timber wood production.

Pine nut from *Pinus gerardiana* that is a best dry nut fruit, the price is USD 20 per kg in the local market and is one of the export item to the foreign countries and income generation for local and national economy, annual income from export of this fruit is about USD **621,944**, the total export of 50.066 **MT** in 2012 to Iran, India, Pakistan and Canada .The problem with this product is non standard of harvesting, process and packages.

Pistachio nut that is the key economically important species for national and international market from (*Pistacia Vera*). Afghan Pistachio nuts are widely regarded as the best in the world; they have a low water demand and grow in the wild across a wide band of 11 Northern Province of Afghanistan, most intensively in Badghis and Samangan Provinces. This is the main source of income generation for local people and national economy. The statistic from 2012 shows the amount from export of this fruit to the foreign country is USD 15,439,803. The big problem with this fruit is premature harvesting, process, package and illegal cutting for firewood.

Afghanistan's organically grown pistachio nut and Pin nut are highly valued in Asian markets and therefore attract higher prices. Pistachio and Pine nuts exports from Afghanistan currently vary from between 5 and 14 per cent of agricultural exports valued at USD 20 million in 2009. There is huge potential to reinvigorate Afghanistan's forests to increase the contribution for forest product to the social-economic development, particularly as the world price for both nuts has been increasing in recent years.

Medicinal plants like Cumin, Hing (*Asoefitedia*), *licorice*, gums and other edibles like Morel mushrooms have great roll in socioeconomic developments, which are distributed in Pistachio and Pine nuts forests area. The amount received from export of these items in 2012 was USD 53,723,006.

Walnut and nut from almond forest is the best dry fruit for national and international market and is the income generation resource for local and national economy, the total value from export of walnut in 2012 was USD 15,13,836 and from almond was USD 24,960,455.

Furthermore Non-Timber Forest Products (NTFP) in Afghanistan make a significant contribution to the country's GDP – and again sustainably managed harvesting and trade in this sector would enhance its value further. Details export figure is provided in table 1.

Table 1. Export of Forest products from 2009 till 2012

No	Nuts name	Kg	Cost in USD	Export to foreign countries	Year
1	Almond	21040119	**77,914,859**	Iraq, Pakistan, Saudi Arabia, India, Turkish, Canada, Germany, Iran, London.	2009
2	Walnut	2501463	**12,825,408**	Iran, Iraq, Pakistan, Saudi Arabia, India, Turkish, London.	2009
3	Pistachio	1969416	**19,902,303**	India and Pakistan.	2009
4	Walnut	3379429	**12,713,001**	India, Iran, Iraq, London, Turkish, Saudi Arabia, Pakistan	2009
5	Almond	1772280	**17,804,071**	India, Pakistan, London, America, Norway, Sweden.	2010
6	Pine nut	46103	**376,812**	Canada, Norway, India, Saudi Arabia, Dubai, London and Pakistan.	2010
7	Dry fruit	35821000	**87,630,000**	Tajikistan, Russia, India, Pakistan, Iran, Saudi Arabia, Germany Kazakhstan and other countries.	2010
8	Pistachio	915321	**14,224,590**	Canada, America, India and Pakistan.	2010
9	Almond	3276852	**22,686,350**	Australia, Germany, Dubai, London, India, Iraq, Iran, Pakistan.	2011
10	Walnut	383115	**1,513,836**	Canada, Turkish, Dubai, India, Iraq, Pakistan and Iran.	2011
11	Pistachio	1066903	**15,439,803**	India, Iran, Iraq and Pakistan.	2011
12	Pine nut	50066	**621,944**	London, Canada, India, Iran and Pakistan.	2011
13	Walnut	383115	**1,513,836**	Australia, Germany, Emirate, Britannia, Turkey, Pakistan, Canada and Iraq.	2012
14	Almond	3276852	**24,960,455**	Australia, Germany, Emirate, Britannia, Turkey, Pakistan, and Iraq	2012
15	Pistachio	1066903	**15,439,803**	Iran, India, Pakistan and Iraq	2012
16	Pine nut	50066	**6,21,944**	Iran, India, Pakistan and Canada	2012
17	Medicine Plants	13424830	**53,723,006**	Australia, Germany, Emirate, Britannia, Turkey, Pakistan, Canada and Iraq	2012
18	Timber	176656	**45,798,189**	Tajikistan, China, Iran, Kazakhstan, Malaysia, Russia and Pakistan.	2012

Wood production:

Timber from *Cedrus diodara, Pinus wallichiana, Pisea spp* and *Abies spp* that provide the best quality of industrial wood for national and international markets, this is also the best income generation for local and national economy, the price per ft^3 is USD 45 to 423 in the local market and USD 600 to 800 in Pakistan market. Timber itself is worth millions of dollars in export value, and a sustainably managed and controlled timber sector (through plantation and forest certification for example) would add considerable value to the worth of the existing standing timber resource. An amount of USD 45,798,189 was generated through export of Timber.

In the North plains and the southwest arid zones, tree growth is mainly limited to narrow strips of riparian woodland and scrubby vegetation, dominated by poplar, willow haloxylon and tamarisk, that occurs in the often relatively narrow transition zone between open water and adjacent desert or semi- desert. These forests provide important sources of fuel wood and timber for construction. They also promote riverbank stability and sand dune fixation.

Employment:

The fruit and timber forests are the important source of employment for local people (no statistic). It is worth of mention that natural forest does not need big Silviculture investment; just they need proper management to be protected from diseases, insects and illegal cutting. In the context of forest enterprises, still there is no interest from investor due to security problems and instability all around the country.

The degradation of forest resource base, therefore, directly and severely impacts the livelihood of the majority of the Afghan population as well as the country's economic development as a whole. Particularly affected are the poor and most vulnerable, such as households headed by females or with physically disabled members, landless households or these farming on only small-rain-fed plots.

2.2 Indirect impacts.

Providing key regulatory functions to watersheds, conservation of soil and water, reduction in wind & water erosion, ecological & food security, flood and drought control, balanced agriculture, better nutrient cycling, climate change and results in a more consistent flow of water in streams and rivers throughout the year and therefore into irrigation systems - thereby contributing to higher agricultural productivity.

Attaining growth in the rural economy is fundamental to Afghanistan's continued development and underpins, to varying degrees, its ability to meet its Millennium Development Goals (MDGs) set by the United Nations in 2005, to be achieved by 2015.

3. Result:

Forest is the fundamental element for natural resources protection and socio-economic development. Forest provides direct benefits to livelihood and income generation source for **53%** of the population (14.33 million People). An estimated of (**8,630,000**) population are benefited from direct and indirect impact of Pistachio, Juniper and Almond forest in the northeast, north and northwest of Afghanistan according to the provincial report. Direct interview with local people reveals that each family collect around 70 to 200 Kg of Pistachio per year in the north zone, an estimated of (**5,701,900**) population are benefited from direct and indirect impact of conifer and Oak forest in the central, east and southeast of Afghanistan and each family collect around 20 Kg to 700 kg Pin nut per year. 85% of the country population depends on forests for fuel wood.

4. Description of Ministry programmes for Socio-Economic development:

In order to comprehensively address the identified issues in an integrated fashion and to achieve the objectives, Ministry of Agriculture, Irrigation and Livestock has prepared the National Agriculture Development Framework and consists of four programmes to move towards a Sector-wise approach.

- ✓ Natural Resource Management.
- ✓ Agriculture Production and Productivity.
- ✓ Economic Regeneration.
- ✓ Programme Support and Change Management.

The four programmes are inter-related and build upon each other, sustainable and efficient management of the natural resources are the base for foundation of increasing agricultural production and productivity, which is also the basis for ensuring food security and enabling economic regeneration to take place.

4.1 Program activities:

Due to more than 3 decades of war and instability from 1977 - 2002 all human resource administrative and economic infrastructures had been destroyed. Since 2002 Forest department has started again from zero to create a technical capacity in 34 provinces of the country and to establish the forests provincial offices, restore nurseries and reorganize the local community for reforestation activities.

4.2 Objectives:

Communities and institutions throughout Afghanistan establish and maintain forests and define regimes of utilization, which achieve a balance between maximization of production and productivity in effective maintenance and enhancement of forest resource bases.

This objective leads to a set of activities and results that will enable communities and government institutions at provincial, district and central levels to establish systems of governance and management.

Since that time the following activities and projects have been implemented under the Natural Resource Management Program by forestry department and its national and international partners. 500 forestry associations have been identified in 22 provinces and are being trained on forest restoration and watershed management practices.

As per the law and policy, facilitated discussions between (5000) community members all over the country and local stakeholders on user rights for forest resources. Surveillance system on the exploitation and trade of forest products: Pistachio harvesting by-law, and technical harvesting guideline were prepared, workshops were conducted for provincial and district level staff to arrange the harvesting and trade of forests products.

Inventory of plant and animal species present in Afghanistan & resource assessment of selected species (e.g. endangered species or species with commercial value) was completed at

provincial and national levels by wildlife operative committee of Afghanistan and officially announce every year.

Since 2003 nearly 15 million trees were planted in public spaces, such as parks, schools, roadsides, in Governmental lands and private lands, forestry department, municipalities, and private nurseries were established in 34 provinces of the country.

Techniques to enhance conservation of forests and reduce erosion introduced to 5000 community members, 100 district and 200 provincial staff which is including:
- tree plantation
- alternative fuel sources (361fast growing woodlots)

The technical skills of around 10,000 people from Communities in forestry and watershed management are strengthened by forestry department in 34 provinces of the country. 5,000 Communities members, 70 district and 150 provincial staff trained on sustainable harvesting of forests products. School awareness & education (film and photos show, paintings by school students and giving presentations about importance of forests at schools in 5 provinces). Workshops and trainings of relevant government staff, 360 forestry association and near 100 people of elders and related organizations. Members at central, provincial and district level on the importance of sustainable forests management held.

- ✓ Media campaign, using posters, leaflets, TV and radio spots are prepared to aware people on plantation and forests conservation.
- ✓ 83,000 hectares of Pistachio, Pine nuts and other forests have been taken under protection and reforestation activities.
- ✓ 5000 hectares had been directly seeded and planted in 22 province of the country.
- ✓ 200 home nurseries for women have been established for forest restoration at the 22 provinces of the country.
- ✓ 55 small-scale income resource generations project have been established for 55 forestry associations for forest protection purpose.
- ✓ 34 big government nurseries were established in 34 provinces with a capacity to produce 3-4 million saplings per year for greenery purpose.
- ✓ 2 forest fire combating Centre have been established in 2 eastern provinces for fire control.
- ✓ 5 degraded green belts in 5 priorities point have been restored by forestry department in Kabul province.

4.3 Challenges:

- ➢ More than 3 decades of civil war and lack of security in provinces affected forestry development program. The major challenges are:
- ➢ Rapid growth of Population
- ➢ Lack of professional staff, most of technical staff left the country during 3 decades of war and still going on.
- ➢ Drought is generally still an atypical shorter-term seasonal phenomenon that affects negatively on reforestation activities and socioeconomic development and it has affected about 75 percent of land in the north, west and south of the country.

- Premature and non technically harvesting of Pistachio nut.
- Illegal logging and smuggling of timber from forest, around 80 to 90 % of national benefit goes to the smuggler and the rest remain for local communities.
- Cutting of forests for subsistence.
- Lack of alternate energy for fuel.
- Converting forestland to rain fed cultivation and settlement.
- Equity of forest resource sharing.
- Forest disease.
- Forest fire is most often due to international military activities
- Climate change can only exacerbate the situation further-with possible catastrophic repercussions; heightened food insecurity and water scarcity, especially in the most arid areas of Afghanistan, leading to a range of humanitarian crises, including population displacement and conflict.
- Soil erosion is also a serious problem due to the loss of protective vegetation cover.
- Inadequate up-to-date data available, irregular data generation by the national statistical body, and inadequate capacity for data collection and Processing.
- Weak inter-sectoral coordination.
- No visibility of the real contribution of forestry.

4.4 Opportunities

- Existing of forest Policy and strategy.
- Existing of forestry law.
- Existing of forests management plan.
- Supports of International counterparts like (FAO,UNEP, AKDN)
- Existing of International donors.
- Investment of Government in this sector.
- Cooperation of local people in forest protection and rehabilitation
- Interests of country residence for greenery.
- Cooperation of line ministries and municipality for greenery and plantation.

4.5 Way forward:

Based on National Priority program (NPP) and National Agriculture Development Framework (NADF), addressing natural resource (forestry) depletion and degradation is a national priority, without which all-future efforts in development and peace building will definitely be compromised.

The forest department prepared the National Forest Management Plan based on its policy and strategy. The National Plan for Forestry Management fits under the Biodiversity and Land Management sub- component of the Environment Conservation and Management (EC&M) component of the National Water & Natural Resource Development National Priority Programme.

The NFMP takes forestry in its broadest sense; incorporating the management of healthy and degraded forest, open woodland, wooded riparian zones, and plantations in the forestland (degrade) and on- farm trees. On that basis, the NFMP sets out a path for the implementation of

a nationwide Community Based Forest Management approach, which promotes a socially acceptable and improved management structures, decentralize government authority and integrated resource management. The NFMP supports this process through the establishment of a structure for strengthening governance mechanisms and the identification of critical information requirements.

The Biodiversity and Land Management sub-component of the EC &M addresses three main thematic areas; Forests, Rangelands and Protected areas with the goal of ensuring the sustainable management of environmental resources in order to promote economic development and sustainable rural livelihoods for the agro-pastoral communities of Afghanistan'[1]. In addition, the NFMP aligns itself closely with the second sub component, Energy for Rural Development Afghanistan (ERDA), which addresses issues of rural energy.

5. The main steps to be put for future

At the moment the first priority in Afghanistan is to stop illegal forest cutting and smuggling of timber, to achieve this objective. First and foremost, it needs to promote local livelihood through income generation resource and provide alternative fuel energy for local communities to reduce pressure from forests. Secondly implement forest law on violent to prevent timber smuggling, in this context the security organization has the main responsibility and regional cooperation is needed to stop timber smuggling.

To initiate participatory approach for forest protection and restoration. This concept is new in Afghanistan and needed for experienced country's cooperation.

It is possible to double all forest products through good governance, supporting provincial technical staff, community organizing for reforestation and forest protection.

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CONTRIBUTION OF FORESTS IN SOCIO-ECONOMIC DEVELOPMENT IN BANGLADESH - Haradhan Banik[1] and Sunil Kumar Kundu[2], Bangladesh

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Executive Summary

Bangladesh is a densely populated country in the world with an area of 14,750 square kilometer, situated in the north-eastern part of South Asia. Total population of the country is 142.3 million with an average of 964 people per km^2. The forest area of the country is 2.60 million ha (17.62% of the country area) and per capita forest is 0.02 ha, which is said to be one of the lowest in the world. The annual deforestation rate is 3.3%. Only 10.84% of forestland belongs to Forest Department. The country is endowed with hill forests (Evergreen and Semi-evergreen), plain land Sal forests (Deciduous), tidal mangrove forests, and village forests. These forests are not evenly distributed throughout the country. There are no natural forests in 28 out of 64 districts. Forests play a significant role in the socio-economic development of the people in the country. It protect lives and properties of coastal area from devastating cyclone and tidal surges, reduce poverty, create employment opportunity, reduce soil erosion, harbor of biodiversity and address the threats of climate change. Social forestry practices started since 1979 in the country. It showed outstanding achievement in socio-economic development and poverty reduction throughout the country. To-date 201,240,563 ha woodlot, 10,498 ha agro-forestry and 58,091 km strip-plantation were established. A total of 500,000 beneficiaries were involved in this process. Among them 20% were female participants. A total of BDT 2,066,862,489 has been distributed among 105,240 participants as part of their benefit sharing. Level of income of social forestry participants has increased significantly after joining the social forestry program. Since 1960, Forest Department implemented coastal afforestation program on the coastal embankment and in newly accreted coastal char and offshore islands, along the 710 km coastline. To-date man-made mangrove forests cover more than 212,335 ha of char and islands represent a coastal greenbelt and protecting life and properties of people from cyclone and tidal surges. The local participants improved their socio-economic conditions under the community based adaptation program. The world largest mangrove forest 'Sundarbans' is a good source of livelihood of about 500,000 people and it also act as a shelterbelt of the South-western part of Bangladesh. It has gained a momentum towards conserving biodiversity and improving socio-economic conditions of the participant through alternative income generation activities. Common challenges in the forestry sector of Bangladesh are population pressure, encroachment of forest land, fuel shortage, and threats of climate change. At the same time ample opportunities prevails in forestry sectors: available of huge amount of marginal and newly accreted coastal lands where participatory forestry practice could be implemented and thereby plenty scope of socio-economic development of the country visa vis climate change mitigation and adaptation opportunities.

Keywords: *Bangladesh, Co-management, Climate Change, Socio-economic, Social Forestry*

1. Background and Rationale

Forests of Bangladesh play a vital role for the livelihoods of communities providing them with fuel for cooking, timber and pulp for construction and industrial purposes, non-timber product including fibers, fruits, nuts, honey as well as various compounding materials for gums, incenses, latex, oils, resins, shellacs, and tannins. It is estimated that at least 400,000 people are associated with the trade of forest products. Non-timber forest products (NTFP) contribute to supporting the economic activities of at least 600,000 people (Choudhury and Hossain 2011). Moreover, forests provide valuable ecosystem services: they maintain local climate, influence global fluxes of O_2 and CO_2, protect top soil and husband important nutrients; and prevent soil erosion. Forests also harbor tremendous biological diversity of flora and fauna including unique species, such as the Royal Bengal Tiger.

In the past deforestation occurred in forests area in an alarming rate. It is estimated that Bangladesh's forest cover has been declining by 2.1 percent annually in the last three decades alone. Today, forest cover is estimated to be around 2.56 million hectares (m ha) (17.8% of total land area) (Kahn et al, 2004). Loss of forests led to soil erosion, landslides, and loss of water and biodiversity. Present forest area of Bangladesh is shown in Table 1 (Banik and Mohiuddin (2013).

Table 1. Forest area in Bangladesh

Type	Area (Thousand ha)	Percentage
Hill Forest	1377	9.33
Sal Forest	120	0.81
Mangrove Forest	610	4.13
Mangrove Plantation	200	1.36
Fresh water Forest	023	0.16
Village Forest	270	1.83
Total :	2600	17.62

The first forest policy was formulated in the British India in 1894 mainly aiming at commercialization of forest use for revenue maximization and expansion of agricultural land. In sixties, forest policy was revised mainly with focus towards industrial support. Following Bangladesh's independence in 1971, the Government of Bangladesh (GOB) adopted the first National Forest Policy in 1979. The main objective was to provide greater protection to forests, and placing more emphasis on conservation, whilst developing its rural and industrial economics. In 1994, the Bangladesh Forest Department (BFD) introduced a new policy that represents a marked shift in the approach to forest management. The main stated objectives of this policy are to contribute to sustainable development and poverty alleviation through

people's participation in forest protection and management and support for forestry development from a border sector of society.

From last two decades there has been a gradual shift in the forest management approach adopted by BFD i.e., from its traditional custodian role to a more participatory approach. Accordingly the provision of people's participation in protecting the natural forest and afforesting the degraded and encroached forestland with benefit sharing mechanism has been developed and people's participation has been ensured. Social Forestry (SF) was included in the Forest (Amendment) Act 2000 and the SF Rules were approved in 2004 (amended in 2010 and 2011). The Asian Development Bank (ADB) funded Community Forestry Project implemented in the seven northern districts from 1981 to 1987 paved the foundation of participatory forestry in Bangladesh. Following this several other participatory forestry projects have been implemented in the country. SF has brought significant change and success in forest management, with notable success in poverty reduction, income and employment generation and other benefits to rural poor. The introduction of Tree Farming Fund (TFF) in SF program has ensured sustainability of the program.

In the past, the management prescription of the Protected Area (PA) and production forestry was used to overlap. Only recently (since 1997) attempts are being made to prepare separate management plans for the PAs. During 1997 for the first time, separate management plans were prepared for each of the Protected Areas under the control of the FD. In Bangladesh, Management of Aquatic Ecosystem through Community Husbandry (MACH) (1998-2005) and forest Co-management project (Co-management of Tropical Forest Resources in Bangladesh), titled 'Nishorgo Supported Project' (NSP) (2004-2009) were implemented through Co-management approach. Subsequently the Integrated Protected Area Co-management (IPAC) (2009-2013) project has been implemented in 26 forest PAs, Wet land and ECA (Ecologically Critical Areas). The main objective was to conserve biodiversity through collaborative management with active participation of local community. Co-management organizations have been formed for the better management of the PAs.

The GOB prepared a "Forestry Master Plan" for the period 1995-2015. The plan provides a framework for optimizing the forestry sector's contribution to stabilizing environmental conditions and assisting economic and social development. A new plan would need to focus on sustainable participatory forest ecosystem management considering climate change risk with impacts on forest ecosystems and their services, community participation and co-management of forests. Management plan for each forest Division could be useful for scientific management of the forests in the country.

The Forest Department has the mandate for management of protected areas (PAs). The Bangladesh Wildlife (Preservation) (Amendment) Act, 1974, recognizes three categories of PAs, viz. National Parks, Wildlife Sanctuaries and Game Reserves. For the conservation and development of bio-diversity and natural environment as well as for eco-tourism, education and research, 28 protected areas have been established so far, covering an area of 261,891.51 ha (Fig 1).

Figure 1. Showing the Protected Areas of Bangladesh

A few Socio-economic studies have been carried out to quantify the economic and social benefits in the forestry sector of Bangladesh so far (Khan et al 2004; Mia 2009; Choudhury and Banik 2011; Paul and Chowdhury 2011; Kibria et al 2013). The present paper elucidates the state of forests of Bangladesh, present and past forestry activities, and some socio-economic data. Challenges and opportunities in the development of socio-economic conditions in forestry sector of Bangladesh are also discussed.

2. Program activities

2.1. Social Forestry

Social Forestry programs have been initiated in 1979 with a view to meet the requirement of forest products for the local population and to rejuvenate the degraded ecological and climate conditions through proper conservation of soil and water towards improvement of the socio-economic conditions of the local people.

Social Forestry / Community Forestry or Participatory Forestry in Bangladesh has been evolving during the last three decades as a component of an integrated approach to forestry and rural development. The Bangladesh Forest Department and some non-government organizations (NGO) have adopted SF as one of the components of poverty alleviation strategy (Jashimuddin 2004). Community Forestry has become an alternative and acceptable program to the rural people, especially for the landless and small farmers. The basic principle is the integration of local people in afforestation activity with multiple objectives of ecological, economic and social benefits (Ahmed and Aktaruzzaman 2010). It has generated huge amount of resources and income of the poor people above the subsistence level and proved that community forestry can play a significant role in rural poverty alleviation (Jashimuddin 2004).

Khan and Begum (1997) showed that participatory forestry in Bangladesh has succeeded in reducing the historical mistrust and conflict between forestry officials and local farmers. Locals are involved in tree plantation activities while the encroachers of unauthorized occupants have been transformed into usufruct right holder in designated forests areas through participatory benefit sharing agreements (BFD, 2005). Participatory in the resettlement project increased household income, employment opportunities, and financial and non-land assets. It was found that the participatory management regime could achieve forest sustainability and improve the standard of living of the settlers. Hence the program is an efficient management option towards the sustainability of forests resources in Bangladesh.

The concept of social forestry was welcomed to address an ever-increasing demand for timber, fuelwood, fodder and cash income in rural communities. In its 3rd five year plan (1985-1990) and National Forestry Policy 1994. Bangladesh Government proclaimed the importance of the NGO sector in forestry development in all available lands, emphasizing women's involvement. Massive financial and technical assistance flowed from international donors such as UNDP, ADB, FAO, World Bank for Social Forestry implementation (Chowdhury 2004). Despite some criticism about the effectiveness of these programs and poor policy implementation, there has been measureable success on the ground. The historical development of community forestry is shown in the Table 2 (Jashimuddin and Inoue 2012). The present benefit sharing mechanism of SF is also stated in the Table 3 (Banik and Mohiuddin 2013).

Rural Development Program: A unique SF program named as Rural Development Program under Food for Afforestation Program has been implemented by the FD in collaboration with the World Food Program (WFP) from 1988-89 to increase forest and forest resources. In this program 48.47 thousands km strip plantation were raised and 17.3 thousands ha of natural Sal forests were maintained, and simultaneously about 40 million of working days were created for 484,700 families.

Village Afforestation: Village Afforestation Program started in 1973-74 and is a very successful program of Forest Department. In this program homesteads of 1380 and 4103 villages were afforested in Forestry Extension Project and Community Forestry Project, respectively. All benefits from trees were considered for the owners. Under Coastal Greenbelt Project 8.58 million seedlings were planted in homestead in 10 coastal districts.

Table 2. Historical development of community forestry programs in Bangladesh

Programs	Period
1.Taungya system	1871
2. Forestry Extension Service phase 1	1962-63
3. Betagi-Pomra Community Forestry Project	1979-1980
4. Jhumia Rehabilitation Program in CHT phase 1	1979-1989
5. Development of Forestry Extension Service phase 11	1980-1985
6. Community Forestry Project	1982-1987
7. Afforestation and Nursery Development Project	1987-1995
8. Jhumia Rehabilitation program in CHT phase 11	1990-1995

9. Participatory Social Afforestation	1991-1998
10. Forest Resources Management Project	1992-2001
11. Extended Social Forestry Project	1995-1997
12. Coastal Greenbelt Project	1995-2000
13. Forestry Sector Project	1997-2004
14. Sundarbans Biodiversity Conservation Project	1999-2006
15. Nishorgo Support Project	1999-2008
16. Char Development and Settlement Project-111(2nd Phase)	2005-2010
17. Reed-land Integrated Social Forestry Project	2005-2010
18. Afforestation in the Denuded Hill Areas of Chittagong North Forest Division (2nd Phase)	2008-2012
19. Biodiversity Conservation and Poverty Alleviation Through Afforestation in the Greater Rajshahi and Kushtia Districts.	2008-2012
20. Participatory Social and Extension Forestry in CHT	2008-2012
21. Community Based Adaptation to Climate Change through Coastal Afforestation.	2009-2012
22. Revegetation of Madhupur Forests Through Rehabilitation of Forest Depended Local and Ethnic Communities	2010-2010
23. Poverty Alleviation through Social Forestry	2010-2013

Table 3: Benefit sharing arrangement in SF

Type of production system	Benefit sharing (%)				
	FD	Participant	TFF	Land Owner	Union Parisad
Agroforestry	45	45	10	-	-
Woodlot	45	45	10	-	-
Strip Plantation	10	55	10	20	5
Sal Forests	65	15	10	-	-
Foreshore plantation	25	45	10	20	-
Natural Forest and old plantation except Sal forests	50	40	10	-	-
SF in FD owned land inherited by local people in forest land	25	75	-	-	-
SF in the government, semi-government or autonomous organization land involving local people	10	75	-	15	-

Private Nursery Establishment: This program was taken for generating self employment and simultaneously for uninterrupted supply of tree seedlings for afforestation. Under this program FD established 100 permanent nurseries and 15,000 private nurseries throughout the country.

Institution Planting: This program was for greening different offices, mosque, temple, and cemetery etc. It has been reported that 8.146, 1.302 and 3.98 million seedlings were planted under Thana Banayan and Nursery Development Project, Extended Social Forestry Project and Greenbelt Project, respectively in different institutions which created a good chunk of forests throughout the country. A total of 15.6 million seedlings were planted in different programs.

Social Forestry Training: Social Forestry Training was implemented throughout the country towards creating awareness about the importance of trees and forests and to generate self employment. A total of 0.3 million local people, village leaders, students, youths were trained.

Participatory Protected Area and Sal coppice management: To stop deforestation and degradation of National Parks and Wildlife Sanctuaries, Sal copies improvement participatory approach was initiated by the FD. About 4.34 million ha of protected areas and 4 million ha of degraded Sal forests were brought under community participatory approach.

2.2. Jhumia Rehabilitation:

The Un-classed State Forests (USF) of Chittagong Hill Tracts (CHT) region are in critical condition due to loss of top soils from the area caused by the repeated shifting cultivation by the local landless inhabitants of the districts as their age old traditional practices. This leads to unabated erosions of soils from the USF areas resulting silting up the tributaries at an accelerated rate, leads to floods in the plain and causing threat to reduce the lifespan of the alone hydro-electric project of the country located at Kaptai, Chittagong Hill Tracts. About 80,000 families practice shifting cultivation (Banik 2003). The Forest Department initiated Jhumia Rehabilitation Program in 1979-80 and rehabilitated 4,617 families (Table 4).

Table 4. The number of Jhumia families rehabilitated in CHT

Name of the Project		No. of families
1.	Afforestation and Settlement in the USF 1979-80 to 1989-90	314
2.	Integrated Afforestation and Jhumia Rehabilitation in the USF (1984-85 to 1989-90)	1730
3.	Development of Pulpwood Plantation in the USF (1984-85 to 1989-90)	140
4.	Afforestation in the USF (1st Phase) (1980-81 to 1989-90)	485
5.	Dev. of the Pulpwood Plantation in the USF (2nd) (1980-81 to 1986-87)	560
6.	Afforestation and Settlement in the USF (2nd Phase) 1990-91 to 1994-95	415
7.	Rehabilitation Jhumia Families around the Security Camps	939
8.	Afforestation and Rehabilitation of Jhumia Families (3rd) 1995-96 to 2001-02)	34
Total:		4617

2.3. Co-management

Alternative livelihood development of forest dependent communities: People living in and around forests are poor and traditionally rely on collection of forest resources such as fuelwood, bamboo, medicinal plants, foods and some other minor forest products for their subsistence. Due to increased scarcity of such materials, many of them are now involved in

illegal taping of forest resources. To prevent the trend of destruction of the natural forest and protected areas FD has undertaken the Nishorgo Support Project. This is a participatory program of conserving the biodiversity resources of protected areas through technical and financial support of USAID since 2003. Initially 5 protected areas were included in the project. Two committees were formed at the local level namely co-management council and co-management committee involving local communities, government and non-government officials. Under this project Village Conservation Forum (VCF), Peoples Forum and Community Petrol Groups (CPG) were formed to strengthen the conservation process. Co-management Council is a higher body headed by Upazila Nirbahi Officer (UNO) and it has mainly advisory and supervisory function and co-management committee for day to day work. After successful completion of Nishorgo Support Project an Integrated Protected Area Co-management Project (IPAC) was undertaken in 19 protected areas. Recently another co-management project has been launched titled 'Climate Resilient and Environmental Livelihood' (CREL) project.

2.4. Coastal Afforestation

Coastal forests are situated in the southern part of Bangladesh. The coastal zone covers 32% of the total area and 28% of the total population of the country situated on the north of Bay of Bengal and southern part of Bangladesh. It encompasses the exclusive economic zone in the Bay of Bengal and the land of 148 upazilas of 19 coastal districts.

The coastal zone is rich in natural and socio-economic resources. Some of them are agricultural land, livestock, fisheries, forestry, waterways, salt production, seaport, sites of archeological importance and tourism. The coastal zone contains many ecosystems such as mangrove, marine, estuary, islands, coral and sandy beeches'. It is a treasure of wetland resources and biodiversity.

The coastal forests of Bangladesh cover 11% land area of coastal zone. The coastal forests not only save the life and resources from natural districts but also play important role in socio-economic development of the coastal people (Banik 2011). The extent of coastal forests includes natural mangroves, fore-shore and embankment plantation is shown in Table 6.

Table 6. Extent of coastal forests of Bangladesh

Type of Forests	Area (Ha/Km)
Mangrove (Sundarbans)	601,700
Mangrove Plantation	200,000
Fore-shore Plantation	1,475
Embankment Plantation	1,000

In 1977, the government handed over 1,230,000 acres of newly formed char lands to FD for the execution of coastal afforestation program. Since 1960, the Bangladesh Forest Department (BFD) has implemented programs of coastal afforestation by planting mangroves on the coastal embankments, newly accreted coastal char lands and offshore islands along the 710 Km

of coastline. Till to-date (2013) man-made mangrove forests cover more than 212,335 ha of lands and represent a green-belt along the coastline (Table-7).

Table 7. Coastal afforestation projects implemented by the FD

Name of Project/ Schemes Coastal Afforestation	Area (ha)	Year
1. Trial Coastal Afforestation in Project (TCAP)	4581.78	1963-66 to 1973-74
2. Coastal Afforestation Project (CAP)	30981.77	1974-75 to 1979-80
3. Mangrove Afforestation Project (MAP)	40414.57	1980-81 to 1984-85
4. Second Forestry Project (SFP)	38844.13	1985-86 to 1991-92
5. Forest Resources Management Project (FRMP)	33568.00	1992-93 to 2001-02
6. Coastal Char Land Afforestation Project (CCLAP)	7205.24	2005-05 to 2009-10
7. Afforestation in the Coastal Areas to Mitigate Adverse Effects of Climate Change	12335.00	2010-11 to 2012-13
8. Revenue and other schemes	44404.51	up to 2012
Total	212,335.00	up to 2013

Community based adaptation to climate change through coastal afforestation

Bangladesh is highly vulnerable to the impacts of climate change. Communities in the coastal region are more vulnerable. National Adaptation Plan of Action (NAPA) has been developed in 2005 to address the situation. The Intergovernmental Panel on Climate Change (IPCC) estimates that 35 million people in these areas will be adversely affected by a predicted 45 cm rise in sea level by 2050. About 1,000 km² of cultivated coastal land and aquaculture farms are likely to become salt marsh due to increased salinity. Thus, food security and livelihood options may decrease significantly.

Since 2010, Bangladesh has been implementing a community based adaptation approach to combat the adverse effect of climate change through afforestation at four sites of coastal districts. One of the innovative interventions is the Forest, Fish and Fruit model (FFF) - an agroforestry system. It generates a range of products and services over the short, medium and long terms and, in doing so, offers diversified livelihood options and increased security (Alam 2012). The main objectives of the 'FFF' model are to provide protection to coastal people from tidal surges, cyclones and high tides. The model provides timber, fruit, vegetable and fish. The FFF model consists of a combination of protective and productive vegetation, mounds and ditches, and a pond to support a fish nursery - all of which create multiple sources of income and mitigate the effects of climate extremes (Figure 2)

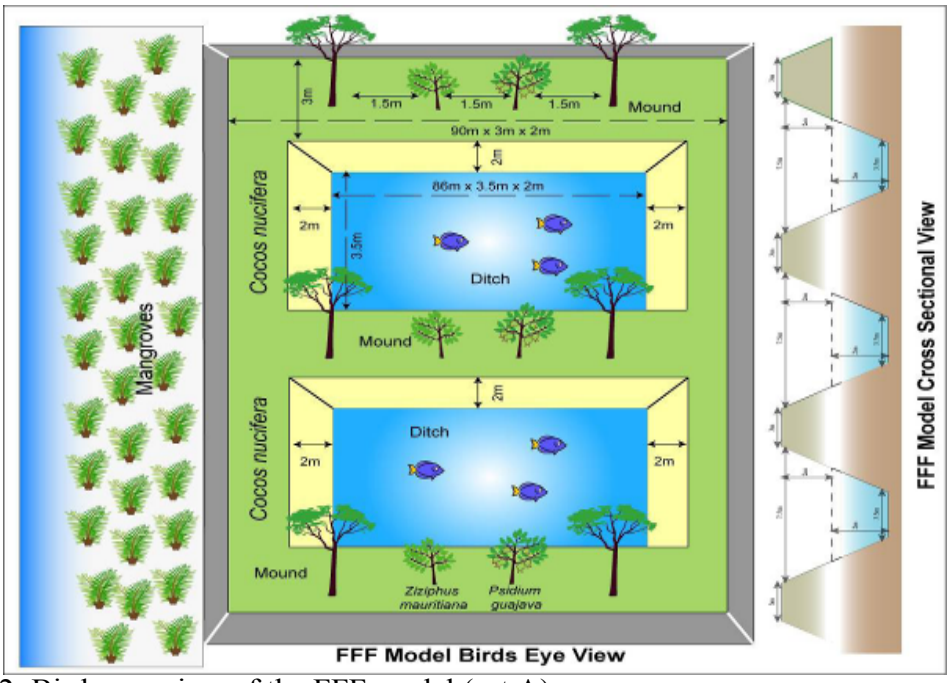

Figure 2: Birds eye view of the FFF model (set A)

2.5. Present on-going programs

At least twenty projects have been implemented in last five years and spent Taka 2549.919 million in the overall development of forestry sector of Bangladesh. Furthermore, twelve forestry projects have been approved by the GOB for implementation in the current fiscal year (Table 8).

Table 8. Forestry projects in Annual Development Program (2013-14) (Lac BDT)

	Name of the project and duration	Total cost	GOB Fund	Foreign Fund
1	Afforestation project on Bamboo, Cane and Murta (2nd phase) (2009-2014)	1910.00	1910.00	-
2	Poverty alleviation through Social Forestry Project (2010-2013)	10968.00	10968.00	-
3	Bangabandhu Safari Park, Gazipur (2010-2014)	21989.00	21989.00	-
4	Sheikh Russel Aviary and Eco-park, Rangunia, Chittagong (2010-2015)	3445.00	3445.00	-
5	Sundarbans Environmental and Livelihood Security Project (2010-2014)	13620.00	3562.00	10058.00
6	Strengthening Regional Co-operation for Wildlife Protection Project (2011-2016)	27620.00	2125.00	25495.00
7	Biodiversity conservation and development of eco-tourism in Bangladesh (2011-2014)	4805.00	4805.00	-
8	Restoration and conservation of biodiversity in the denuded hills of Sitakunda, Mirsarai, Banshkhali, Inani forest area, Sal forest of Barind Dhamurhat and Singra (2011-2014)	1339.00	230.00	1109.00

9	Development and extension of Bangabandhu Sheikh Mujib Safari Park, Cox's Bazar (2012-2015).	1895.00	1895.00	-
10	Bangladesh Climate Resilient Participatory Afforestation and Reforestation Project (2013-2016)	28350.00	810.00	27540.00
11	Community based Adaptation to Climate Change through Coastal Afforestation in Bangladesh (2009-2013)	3977.00	683.00	3294.00
12	Char Development and Settlement Project-4 Forest Department Part (2011-2016)	3184.00	162.00	3022.00
	Total	123102.00	52584.00	70518.00

3. Results and impacts

The contribution of the forestry sector to the national economy is very important. The contributions are in the form of timber, electric poles, cross arms, anchor logs, railway sleepers, fuelwood and employment. The current Gross Domestic Product (GDP) growth rate is 6.18% (BBS 2013). The GDP growth is declining (Figure 4). Contribution of forestry sector to GDP is 2.8% (CIA 2013) (Figure 5). Around 2% of the labor forces are employed in the forestry sector (GoB 2004), which provides employment of about 0.8 million workdays annually (FAO 2005). The livelihoods of people depend directly on the natural resource base (Nishat et al. 2005). In addition forests provide valuable ecosystem services. It maintains local climate and strongly influence global fluxes of oxygen and carbon dioxide; protect topsoil; and act as a stabilizing force for top soil to prevent erosion in hilly areas. Forests also harbor tremendous biological diversity of flora and fauna.

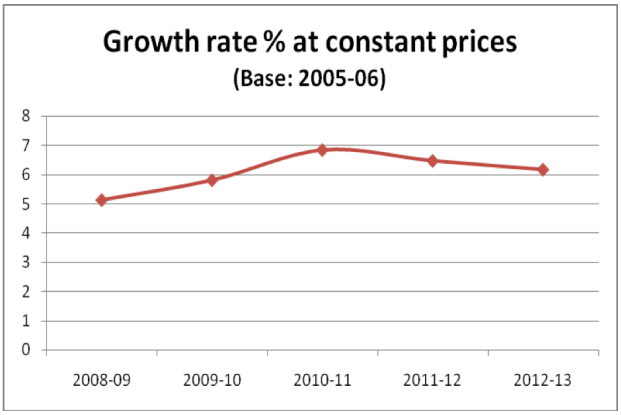

Figure 3. GDP growth rate of the country

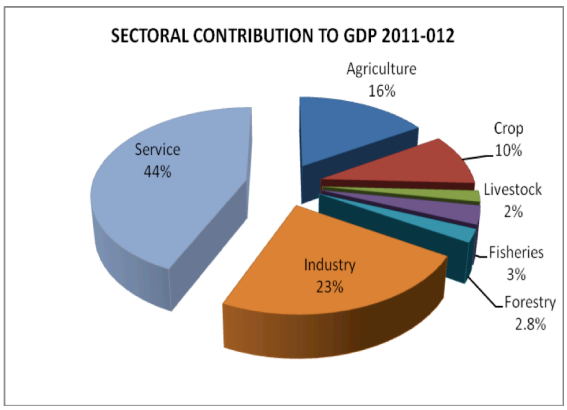

Figure 4. Sectoral contribution to GDP

Social Forestry: The Social Forestry program aimed at ensuring active participation of the local people in implementation of SF schemes and has brought significant changes in forest management in the country. About 335,000 poor people are now participating in the on-going SF programs. Data provided by the BFD (2013) reveals that Tk 2,066.86 million has been distributed among 102,800 participants as part of their benefit sharing (Table 9). These results

demonstrate that the SF production systems played a significant role in the development of socio-economic conditions of the rural people.

Table-9. Output from the SF production system in Bangladesh (1999 – 2013)

Description	Amount (Bangladesh - Taka)
Timber (Cft)	15,616,085
Fuelwood (Cft)	17,348,103
Number of Poles	4,526,721
Total Sale (BDT)	4,581,107,982
Share of Participants (BDT)	2,066,862,489
Number of Beneficiaries	105,240
Tree Farming Fund (BDT)	451,904,657
Government Revenue (BDT)	1,903,621,959
Area of Plantation Felled (Strip plantation) (Km)	10,536
Area of Plantation Felled (Woodlot Agroforestry) (Km)	21,880

Chowdhury (2004) reported that the income level of participants increased after joining the SF programs of FD in coastal area at Betaga and in central Sal forest area at Zathila, respectively (Table 10 and 11). The study of Muhammed and Koike (2007) showed that participatory forestry is profitable from the investment point of view (Table 12). The study reveals that participants are happy with the additional financial gain from forestry related activities. The report also explained that forest based additional income played an important role in socio-economic development of the poor folk of the society.

Table10. Income of participants from Betaga before and after joining the project.

S.L	Yearly Income Level (In US$)	Betaga (Before joining the SF project) %	Betaga (At present) %
1.	Up to170	4	0
2.	171-335	11	0
3.	336-500	8	12
4.	501-665	19	15
5.	666-Above	58	73
	Total N= 52	N= 26	N=26

Table 11. Income of the participants at Zathila before and after joining the project

S.L	Yearly Income level (Invs1)	Zathila (Before joining the SF project) %	Zathila (At present) %
1.	Upto - 170	19	0
2.	171-335	8	15
3.	336-500	42	4
4.	501-665	4	31

5.	666-Above	4	50
	Total N= 52	N=26	N=26

Table 12. Participatory forestry as an investment

Plantation category	Area km/ha	NPV US$	NPV Per km or ha	BCR
Strip plantation	5.7	44.786	7,857	**2.78**
Agroforestry	15	63,337	4222	2.48
Woodlot	15	65257	4350	2.36

NPV= Net Present Value, BCR= Benefit Cost Ratio

A qualitative analysis (Figure 6) of the participatory SF activities in Dhaka Forest Division showed the enhancement of the socio-economic conditions (Improved house conditions, Children education, Environmental awareness etc.) in the grass root people by Muhammed and Koike (2007).

Socio-economic indicators	Scale of Performances									
	1	2	3	4	5	6	7	8	9	10
Improved house condition										
Education to the children										
Improved medication										
New land purchase/ lease										
New income sources										
Improved fooding										
Drinking safe water										
Small Bank savings										
Awareness on malnutrition										
Environmental awareness										
Community decision making										
Improved social acceptance										

Figure 5. Qualitative assessment of participatory role in socio-economic development in Dhaka Forest Division, Dhaka.

A baseline survey was conducted at the homesteads and neighboring Sal forests at Omar Unio and Dhamoirhat Union of Dhamoirrhat Upazila, Naogoan Districts of Bangladesh to assess the forest resources, household's economic status and their dependence on forest resources and agriculture products, and gender role in agroforestry practices (Jasimuddin 2010). The study found the following results:

Family income

Analysis of the family income of the respondent households showed that average family income in the study area was Tk 35289 /year of which higher amount of income (40%) came from agricultural crops and vegetables followed by labor or forest resources collection (38%) and business (13%) (Table 13). However, average family income was found much higher in Maiser (Tk 54171 /year) which is mainly due to their involved in business compared to other villages. The households of Altadighi were found to earn most of the family income from agriculture (88%) and the households of Bakharpur were found to earn most of their income from labor or collection of forest resource (89%) (Table 13).

Table 13: Distribution of households' family income (Taka/year) in the study area (Note: FRC= Forest resource collection) (values in the parentheses denote percentage of total income)

Village name	Crops and vegetables	Timber and fruits	Labor/ FRC	Business	Others	Total income
Bakharpur (n=8)	2213 (6)	-	34050 (89)	-	1875 (5)	38138 (100)
Shekhaipur (n=10)	7126 (24)	-	14000 (48)	3500 (12)	4750 (16)	29376 (100)
Choto molla para (n=6)	6700 (25)	-	18667 (70)	1167 (4)	-	26533 (100)
Jatmammu dpur (n=6)	12400 (39)	967 (3)	12500 (39)	-	6000 (19)	31867 (100)
Altadighi (n=13)	29662 (88)	423 (1)	1538 (5)	923 (3)	992 (3)	33538 (100)
Maisar (n=7)	17329 (32)	371 (1)	7143 (13)	24000 (44)	5329 (10)	54171 (100)
Total (n=50)	14209 (40)	278 (1)	13388 (38)	4440 (13)	2974 (8)	35289 (100)

Income from tree and agricultural products

The respondents in the study area were asked to know the cost and benefit from plant products grown by them annually. The respondent households earned some money from fruits and selling of timber and also grew crops and vegetables for their own use and to get some extra income in their homesteads and agricultural lands. It was found that on average each family earned a total net benefit of Tk 5774 / year from forests and agricultural products including

fruits (Tk 118 /year), timber (Tk 440 /year), vegetables (Tk 5172 /year) and spices (Tk 44 /year) (Table 14).

Table 14: distribution of respondent households by income from plant products (Taka/year/household) grown by them (Note: Ct= Cost; Bt= Benefit; NB= Net benefit).

Village Name	Fruit			Timber			Vegetable			Spice			Total NB
	Cr	Bt	NB	Cr	Bt	NB	Cr	Bt	NB	Cr	Bt	NB	
Bakharpur (n=8)	-	-	-	-	-	-	2025	3988	1963	-	-	-	1963
Shekhaipur (n=10)	-	200	200	-	-	-	1222	3368	2146	150	200	50	2396
Choto Molla Para (n=6)	-	-	-	-	-	-	517	883	367	-	-	-	367
Jatmammudpur (n=6)	33	167	133	167	1000	833	42	100	58	-	-	-	1025
Altadighi (n=13)	-	38	38	77	385	308	13277	25423	12146	146	200	54	12546
Maisar (n=7)	57	429	371	286	2143	1857	12286	21000	8714	143	286	143	11086
Total (n=50)	12	130	118	80	520	40	5807	10980	5172	88	132	44	5774

Collection of forest resources

The respondent households were asked to know the type of forest resources they usually collect from the neighboring forests. It is observed that respondent households usually collect fallen leaves from the forest floor and sometimes dead trees, branches or twigs. All of the respondent households (100%) in the study area were found to collect fuel wood (dead trees, branches, fallen twigs and leaves) traveling a distance of 0.6 kilometers. They usually spent about 3.1 hours a day on average in collecting forest resources (Table 15).

Table 15: Distribution of respondent households by the collection of forest resources (Note: HH%= Percentage households responded).

Village Name	Fuel wood/leaves		Distance	Time spend/day
	HH%	Amount (Maund)	(km)	(hours)
Bakharpur (n=8)	100	105	0.6	2.4
Shekhaipur (n=10)	100	151	0.5	5.8
Choto Molla Para (n=6)	100	12	0.5	2.5
Jatmammudpur (n=6)	100	82	1.2	2.7
Altadighi (n=13)	100	115	0.4	2.4
Maisar (n=7)	100	149	0.4	2.4
Total (n=50)	100	121	0.6	3.1

Distribution of labour in homestead agro-forestry activities

The household survey also tried to identify the labor involvement in homestead agro-forestry activities especially on women involvement. The study showed the different agro-forestry activities in the homesteads with the labor involvement based on gender. It was found that both male (73%) and female (27%) member(s) of the households performed most of the activities of

agro-forestry (Table 16). However in Bakharpur (male 54% and female 41%) and Jatmammudpur (male 56% and female 44%) most of the works were performed more or less equally by both male and female members of the family (Table 16).

Table 16: Distribution of labour (%) in homestead agro-forestry activities (Note: M= Male; F= Female; BP= Bakharpur; SP= Shekharpur; CMP= Choto molla para; JP= Jatmammudpur; AD= Altadighi; Mai= Maisar).

Activities	Sex	Village Name						
		BP (n= 8)	SP (n= 10)	CMP (n= 6)	JP (n= 6)	AD (n=6)	Mai (n=7)	Total (n=50)
Planning	M	54	80	75	50	77	86	70
	F	46	20	25	50	23	14	30
Choice of species	M	54	80	75	50	73	86	70
	F	46	20	25	50	27	14	30
Seedling collection	M	54	80	75	55	73	86	70
	F	46	20	25	45	27	14	30
Propagation	M	54	80	75	50	73	86	70
	F	46	20	25	50	27	14	30
Planting	M	54	80	75	50	73	86	70
	F	46	20	25	50	27	14	30
Nursing	M	54	80	75	50	73	86	70
	F	46	20	25	50	27	14	30
Fertilizer application	M	54	80	75	50	73	86	70
	F	46	20	25	50	27	14	30
Weeding	M	54	80	75	50	73	86	70
	F	46	20	25	50	27	14	30
Harvesting	M	54	78	75	51	73	86	69
	F	46	22	25	49	27	14	31
Trees	M	54	80	75	55	73	86	70
	F	46	20	25	45	27	14	30
Fruits	M	54	80	75	50	73	86	70
	F	46	20	25	50	27	14	30
Vegetables	M	54	80	75	50	73	86	70
	F	46	20	25	50	27	14	30
Spices	M	54	75	75	50	73	86	69
	F	46	25	25	50	27	14	31
Medicinal plants	M	54	75	75	50	73	86	69
	F	46	25	25	50	27	14	31
Processing	M	54	80	75	50	73	86	70
	F	46	20	25	50	27	14	30
Selling	M	100	100	100	100	100	100	100
	F	-	-	-	-	-	-	-
Total	M	59	82	78	56	78	87	73
	F	41	18	22	44	24	13	27

Coastal Forest: It is evident that mangroves can mitigate or reduce risk of natural disasters such as cyclones and tidal surges. The forces of cyclone and surges retard when they are obstructed by the greenbelt of trees. As a result, the cyclone and surges become weak before hitting the localities resulting less damage. In 1970, 300,000 people in the Barisal coast, in 1990, 140,000 people in Noakhali and Chittagong coast and in 2007, 4,234 people were killed by cyclones, respectively. In 2007, 6 million people were displaced or made homeless by the 'SIDR' in the Barisal coast. It is shown that the loss of lives and properties are decreasing in the coastal area (Figure 6). The socio-economic conditions of the coastal people have been improved a lot due to less damage from natural calamities such as cyclones and tidal surges. This has been possible because of presence of coastal greenbelt and mangrove forests in these regions.

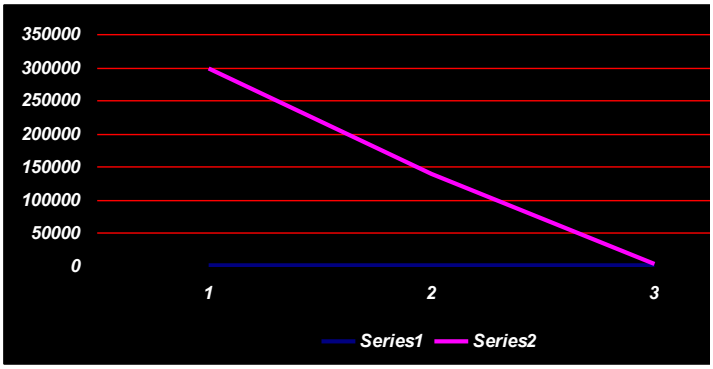

Figure 6. Number of people died in the coastal region due to Cyclones

Mangrove afforestation also plays an important role in reclaiming land in the Bay of Bengal by holding silt carried by river systems. A huge quantity of silts is carried annually through the river systems such as the Padma, the Meghna, the Jamuna and the Brahmaputra into the Bay of Bengal and creates chars in the estuaries. When new accretion starts, afforestation holds not only the soil particles but also accelerates the accretion of land above the tide level. Since last five decades about 200 square Kilometer area have been reclaimed from the Bay of Bengal through coastal afforestation in Bangladesh. From the reclaimed land Forest Department handed over 112,063 acres land to the Ministry of Land (Table 17) for distribution to the landless people in the coastal region for their socio-economic development.

Table 17. District wise area of coastal forests (reclaimed land) handed over to Ministry of Land

Name of District	Area of handed over (reclaimed land) Coastal forests (Acres)
Chittagong	9,834.47
Cox's Bazar	12,341.81
Noakhali	72,178.88
Laxmipur	3,000.00
Patuakhali	400.00
Bhola	14,308.64
Total	112,063.36

Community based adaptation: Beneficiaries earned income mainly from vegetables, fish and eggs. The data shows that Set 'B' earned more from fish than that of the Set 'A' (Figure 7)

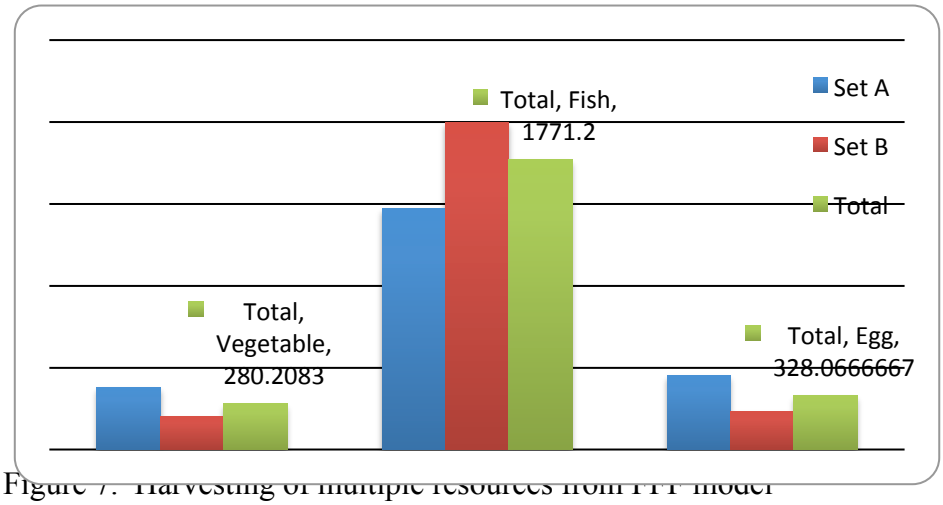

Figure 7: Harvesting of multiple resources from PFP model

Sundarbans: The Sundarbans- largest mangroves play an important role in the socio-economic development of the large number people living around it. In this region, the numbers of fishermen have increased over last five years, which indicates that dependence of people on Sundarbans has increased for their livelihood (Figure 8).

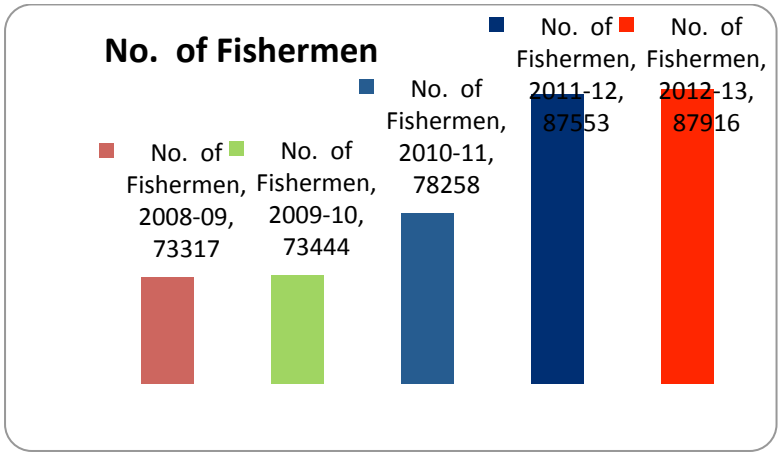

Figure 8: Number of fishermen in Sundarbans in East Forest Division.

Tourism: A large number of people around Sundarbans, Botanical gardens, Wildlife Sanctuaries (WS), Naional Parks (NP), Eco-parks throughout the country are associated with eco-tourism. Many of tourists from abroad and in country visit different forest areas (Table 18).

Table 18. Year-wise income from tourism in forests of Bangladesh.

Year	Number of tourists in different forests (million)	Revenue (BDT)
2011-12	6.22	44,317,983
2010-11	2.41	27,305,059
2009-10	2.20	23,092,246
2008-09	2.87	178,000,100
2007-08	3.01	13,951,267

A number of Non-timber forest products are collected both from mangrove and hill forests and play a significant role in socio-economic development of the country. Data shows a considerable amount of revenue earned from the NTFP (Table 19). Pulp wood and Bamboo are harvested from national forest (Table 20) and timbers are harvested from private Jote land of village forest (Table 21).

Table19. Local people collect NTFP from mangrove and hill forests through permit

No. of NTFP	Year				
	2007-08	2008-09	2009-10	2010-11	2011-12
Bamboo (No)	66993130	65739104	27771242	15411838	29222500
Nypa leaves (maund)	194263	1985420	687284	20739351	320016
Fish (maund)	572078	119624	147435	5040251	202042
Sun grass (maund)	27892	141849	34474	1914747	1216428
Honey (maund)	3773	3075	2763	25098	65731
Reeds (maund)	1693	2956	1025	-	-
Cane (Feet)	3235757	2410139	8157939	972213	342871
Phul Jharu (Bundle)	3244	784775	894	4801	900
Shell (maund)	1346	11	3	10249	1035768
Hogla pata (maund)	44981	47248	59362	888528	667600
Wax (maund)	946	770	153	5856	41875
Bola Firewood (maund)	406	1202	470	-	0.25
Crabs (maund)	40233	39671	15541	285453	1304904
Uluphul (Bundle)	9628493	13013650	112566615	6249919	9741191
Shrimp fry (No)	-	13567	434200	73200	-
Date palm (maund)				6383	6796

Table 20. Year wise pulp wood, Bamboo extraction from forests

NTFP	Year				
	2007-08	2008-09	2009-10	2010-11	2011-12
Bamboo for pulp (No)	452,2750	10,126,104	4,585,500	4,233,474	2,908,775
Bamboo Mohal (No)	14,551,240	2,101,944	17,328,463	13,994,741	4,414,574
Pulpwood	944,918	50,942	517,942	597,483	568,915

Table 21. Year wise timber supply from homestead forests through free permit

Year	Quantity of Timber (m^3)
2008-09	31,006
2009-10	61,191
2010-11	80,111
2011-12	124,827

Forests for Food Security

To link between forests and food security is one of the most indirect and hard-to-prove causal pathways. These linkages could be more direct and more easily grounded in empirical research. Like elsewhere in the world, foods from forests and other tree systems in Bangladesh constitute an important component of household's food supply. In many villages and small towns, the contribution of forests and trees to food supply is essential for food security, as they provide a number of important dietary elements that the normal agricultural product does not provide adequately. In many areas, dietary deficiencies and the monotony of the usual diet are reduced or avoided through this hidden harvest. The majority of rural households in the country, and a large proportion of urban households, depend on plant and animal products of forests to meet some part of their nutritional, cooking and health needs. Equally important, forests provide an essential source of cash income to purchase food, especially during poor harvests.

Forests and Livelihoods

Estimating incomes generated from the harvest of non-timber forest products (NTFPs) in forest environments is a challenging undertaking under the best of conditions. People living in forest environments, practicing fishing, collecting NTFPs and shifting cultivation heavily draw forest products not only for subsistence but also for cash income. In Bangladesh forest related subsistence includes shifting cultivation, rice farming, collection of NTFPs, home gardening and livestock rearing. People extract wood, fuelwood, bamboo, cane, leaves and grasses from forests to meet their household's needs and for sale as additional income to support and supplement their livelihoods. Earning cash by selling home-garden products in Bangladesh contributes 14.8% to total average monthly income. Population pressure, poverty and unemployment of the population around the forest areas in the country terrifically increase the rate of depletion of forests resources.

In order to combat the situation only recently FD has initiated to implement the co-management strategies of forest conservation with active and coordinated involvement of all stakeholders. Under the Integrated Protected Area Co-management (IPAC) project with the assistance from USAID, support has been provided to ensure that local communities become self sufficient in their roles of co-management, and are able to sustain the economic and other benefits of co-management, including increases in local incomes and increased security of food and livelihoods of people living in and around the protected areas. Alternative income generation interventions directly benefit local community members and reduce their dependency on targeted protected areas.

5. Challenges and Opportunities in the Forestry Sector

5.1 Challenges

There is an enormous gap between demand and supply of wood and bamboo in Bangladesh. The total forest in the country is insufficient not only to meet the growing demand of our people but also to maintain a balanced ecosystem. The forest land is constantly being utilized for homestead, urbanization, agricultural expansions and aqua-culture. The forest area and the tree composition are not evenly distributed throughout the country. In addition, the natural forest, the plantation and the village groves are being disturbed and encroached by human population.

The major challenges in the forestry sector are enumerated below:

Low productivity: The yield of forest of Bangladesh is one of the lowest in the world. Even within the country the yield of forests managed by Forest Department (2.0-2.5 m^3/ha/yr) is less than village forests (5.0 m^3/ha/yr). The productivity is low due to illegal felling, poor management practices, low initial survival, incompatible species composition, low soil efficiency, etc.

Flash flood and siltation of river basin: Denudation of forest land and upsetting the natural soil cause severe siltation of the river basin. Consequently, flash flood is a common phenomenon in the country.

Scarcity of bamboo and other NTFPs: Bamboo and other non-timber forest products (NTFP), viz, cane, patipata, etc., are immensely important to the villagers. Bamboo is heavily used by the villagers in construction of rural housing. It is also the only local source of long fiber in paper making in the Karnafuly Paper Mills.

Less importance on medicinal plants: Identification or development of right genotype

for important medicinal plants in the country is lacking.

U**neven distribution of forest**. The forest area and tree composition are not evenly distributed

throughout the country. The localized existence of forest is there due to climatic, topographic and demographic factors. The issues are therefore versatile to address with uneven distribution of forest.

Loss of biodiversity: Bangladesh is blessed with about 5,000 plant species with 15% tree, 35% shrub and woody climbers, and 50 % herb species. In term of number there are 750 – 800 tree species in the country. The major wildlife species includes 125 mammals, 750 birds, 500 fishes, 125 reptiles and 9 amphibians. At present 27 plants, 40 mammals, 41 birds, 54 fishes, 58 reptiles and 8 amphibians are extinct, threatened and/or vulnerable. Biodiversity depletion in the country is due to over exploitation, poor management and habitat destruction of natural resources, and poor law and order situation, frequent natural calamities, pollution etc.

Scarcity of industrial raw material: Because of higher demand, naturally there is scarcity of

industrial raw material, making the industries to run under capacity. Development of proper physical and chemical methods, replacement of the conventional raw material, etc., can lessen the crisis of industrial raw material significantly and at the same time reduce dependence on import of wood and the product as well.

Climate change: IPCC estimated that with a "Business as usual" scenario of greenhouse gases emissions, the world would be 3.3°C warmer by the end of 21st century. Apart from desertification, this unprecedented rise in temperature may create havoc with melting of polar ice and ice caps in the mountains, expansion of sea water as it heats up and consequent rise in sea water level. This is an alarming indication. In the Sundarbans, it is already exhibiting top dying of Sundri (*Herieteria fomes*). This may intensify further. Beside these, the climate change will alter the rainfall pattern. There may be some seasonal change with respect to summer, spring, winter, etc. Such change will affect the phenology of the trees. The flowering and fruiting seasons may change than what it is now. In such case the seed collection time may get changed. Consequently, the nursery and afforestation schedules will have to be reformulated. All these together, in future, are likely to bring many serious problems for the foresters and scientists in Bangladesh to address. **Climate change** is a very important recurrent issue. There is tremendous need for the country to under take appropriate measures to face the growing issues.

Poor technology transfer is more prevalent in the forestry sector. There are many innovative

researches in this sector. These are sometimes in use, but without giving any ownership to the research findings.

Based on the analyses above, the main problems of the forestry sector are summarized below:

- Low forest productivity.
- Flash flood and siltation of river basin
- Scarcity of bamboo and other NTFP
- Lack of importance on medicinal plants
- Uneven forest distribution
- Loss of biodiversity
- Inadequate availability, reliability, and quality of data
- Scarcity of industrial raw materials
- Climate change

• Poor technology transfer

Constraints

Forest meets the requirement of round wood, fuelwood, rural construction materials, industrial raw material, etc, and is the largest single sector to keep ecological balance of the country. In spite of this, forestry sector has not been given adequate priority over decades by the government. As a result, huge constraints have accumulated. Some of these are mentioned below:

a) Forestry activity in the country has increased many folds. The present **manpower of FD is too meager** to handle the need of FD itself. The foresters claim that the forestry activities are technical in nature. But their capacity to handle technical issues has declined sharply.

b) L**inkage between research and extension needs to improve**. The line Ministry should ensure FD and Bangladesh Forest Research Institute (BFRI) to work with mutual commitments for the development of the forestry sector.

c) **Forest land in the country** is only 17.62% that **is too meager to produce the output required**. Hence, every corner of land must be scientifically utilized to get maximum production. About 1.51 million ha of land is available for agroforestry. Over 0.71 million ha of USF land in the country, under the direct control of the civil administration (Deputy Commissioner), is getting degraded every day quite alarmingly.

d) The **monitoring and evaluation is very poor**. The monitoring systems in FD is to be improved to ventilate true societal achievements.

The above pen picture summaries the following, but not limited to, constraints in the forestry sector that need immediate attention of the government:

• Manpower of FD is too meager and need to build the capacity of manpower
• Approach of the foresters is colonial with policing behavior
• Linkage between research and extension is alarmingly poor
• Forest land in the country is too meager to produce the required output
• Monitoring and evaluation need to be improved
• FD suffers from inadequate funding.

5.2 Opportunities

• Production of forest resources will increase through intensive practice of social forestry
• Agroforestry offers a large potential to boosting our forest resources
• Doubling of yield is foreseen through using better quality seeds
• Scientific and planned cultivations of medicinal plants will greatly enrich the resources
• Scientific use of forest resource will cut down loss of the resources and conserve them
• Reorganization and reasonable financial allocation to FD will address many problems and constraints to minimize the demand-supply gap of forest resources

6. Way forward:

The forestland in Bangladesh is inadequate to maintain a balanced ecosystem. The yield of forest resources in the country is much low in the global perspective. There is already a wide demand-supply gap of the resources. In addition, the climate will be more hostile. In view of these circumstances, the following recommendations are made to enhance our forest resources by alleviating the problems and constraints:

- Every piece of forest land, including the USF, must come under forest cover.
- Unutilized homesteads, marginal strip land, tea garden surplus land and other unproductive small private land should be used for exhaustive agroforestry.
- Social forestry concept, with the participation of the public in general, should widely replace the traditional forestry perception. Vast area of newly accreted coastal land could be brought under forest cover.
- Present infrastructure of FD is inadequate to meet the challenges of the future. FD therefore needs rational strengthening and reorganization.
- Rigorous research back up is needed for intensive afforestation and scientific management of forest resources.
- It should be mandatory for BFRI to promote participatory research program development, participatory research execution and participatory innovation development with the involvement of the relevant stakeholders.
- Strict monitoring and evaluation (M&E) must be done in FD against preset measurable indicators.
- Adequate fund should be allocated to FD.

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ASSESSMENT OF CONTRIBUTION OF FORESTS FOR SOCIO-ECONOMIC DEVELOPMENT IN BHUTAN - Dr. Dhan B. Dhital, Bhutan

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Executive Summary

Forest is an enormous storehouse for various kinds of products and services. People living in rural areas have been heavily depending on products like timber and also non-wood forest products from the time immemorial. Scientific utilization of non-wood forest products, for economic benefits, had not gain any momentum because of lack of knowledge and scope for marketing. National Government also gave high priority to management of forest focusing on timber management because it was one of the main revenue in the country. However this trend is changing very fast because non wood forest products has started contributing enormously for the socio-economic development of people especially those living in rural areas of the country.

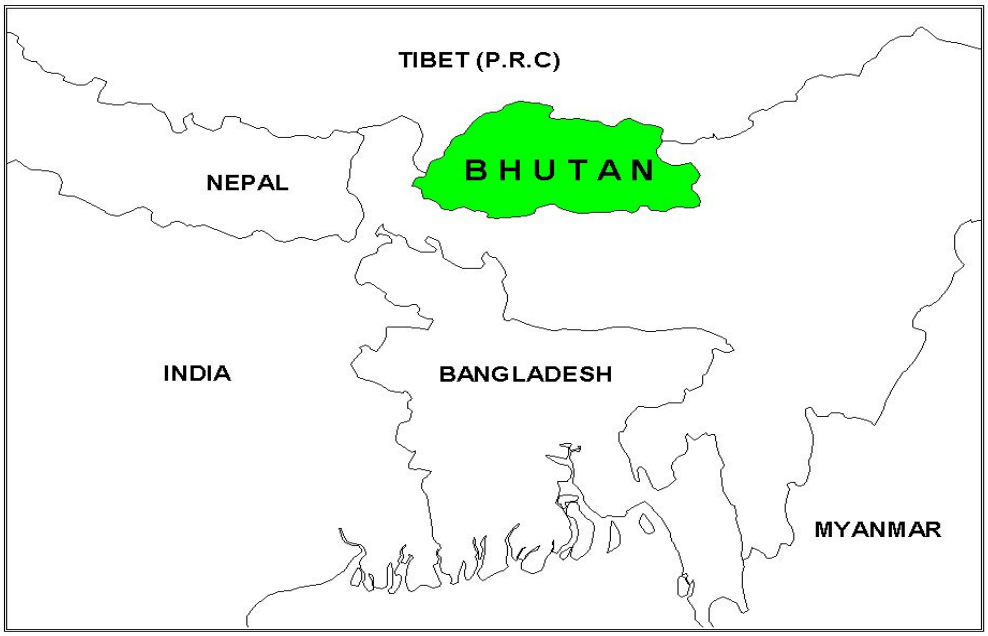
Besides the direct benefits accruing, to the people, from the sale of forest products like timber and non wood forest products other benefits resulting from ecosystem services, conservation services, ecotourism, gains from the utilization of bio-energy, clean water for drinking, irrigation and other uses etc. obtained as a result of scientific management of watershed of the area is fast gaining momentum. Bio-prospecting is another emerging area that is likely to offer big opportunity for economic benefits in future. Since the economic prospects for alleviating poverty of the rural people from the indirect benefits of the forest is likely to out-weigh the direct benefits, it has become paramount important to mainstream these programs in the national and local plans.

Involvement of local people in all aspects of planning and implementation will be very important if the programs are to make the contribution for the socio-economic upliftment of the people. The benefits arising from the management should go to the people so that they become the lead actor in the program.

1. Background

Bhutan is a small mountainous landlocked country located in the Eastern Himalayas. It has a geographical area of 38,394 square km and a population of 0.721 million (NSB 2012). The country is characterized by fragile mountainous ecosystem with elevations ranging from about 100 m in the foothills to over 7,500 m towards the north all within a range 170 km from the northern to the southern border. The most dominant land cover is forest, making up 80.90% of the land area including shrubs which account for 10.43%, cultivated agricultural land and meadows account for 2.93% and 4.10% respectively. Snow cover constitutes 7.44% while bare areas constitute 3.20%. Degraded areas, water bodies, built up areas, marshy areas and non-built up areas constitute less than 1% each.

Map 1: Location map of Bhutan



Environmental conservation constitutes an important part of national planning framework and has always enjoyed a high priority in the country's development agenda. Conservation of the environment has been robustly pursued even as Bhutan, a least developed country, is compelled to make enormous short term sacrifices to serve the long term interests of not just the country alone but the region and world at large. It is this unwavering commitment that has brought widespread global recognition for Bhutan's efforts to protect its environment and natural resources. The strong emphasis on protecting and conserving the environment is amply reflected in the 11th Five Year Plan (draft) as has been done over the last 10 plans. Indeed, the environment sector will require more attention than before in view of the accelerated pace of economic and development activities accompanied by increased expansion of infrastructure development, urbanization, industrialization, population expansion and consumption patterns that are likely to put an even greater burden and stress on the natural environment.

2. Forest Policy and Its Objectives

The goal of the National Forest Policy is to manage the country's forest resources and biodiversity sustainably to produce a wide range of social, economic and environmental goods and services for the equitable benefit of all citizens and natural environment while still maintaining a minimum of 60% of the land under forest cover thereby contributing to Gross National Happiness.

Based on the above-mentioned goal the following broad policy objectives are pursued;

- Manage forests for sustainable production of economic and environmental goods and services and to meet the long-term needs of society;
- Manage production forests for sustainable supply of timber, other forest products and environmental goods and services and to meet the long-term needs of society;

- Maintain species persistence and ensure long term sustainability of biodiversity, ecosystem services, natural habitats and cultural heritage through a network of Protected Areas, biological corridors and management of other parts of the forest landscape for positive environmental outcomes;
- Provide for effective and integrated watershed management, maintain and improve water and watershed conditions and contribute to sustainable livelihoods through provision of watershed services;
- Empower rural communities manage forests sustainably for socio-economic benefits, poverty reduction and to contribute to overall sustainable forest management at national level;
- Facilitate raising forestry crop on registered land of individuals or institutions and accrue ecological, social and economic benefits;
- Enable an economically viable and efficient forest based industry aimed at adding value to forest products and build capacity of private sector and rural communities to utilize, process and market forest products;
- Establish a dynamic organizational set up through institutional reforms for appropriate managerial and technical capacity to implement all policy objectives;

Out of the total forest area of the country 51.32% is managed as Protected Areas and biological corridors (NSB, 2012a). Bhutan is home to a diverse array of flora and fauna including 5,603 species of vascular plants, 400 lichens, 200 mammals and about 700 birds. These serve not only as rich repositories of biodiversity but indirectly serve as long-term stores of carbon, which mitigate the adverse impacts of climate change.

The Protected Areas encompass a continuum of representative samples of all major ecosystems found in the country, ranging from the tropical/sub-tropical forests in the southern foothills through temperate forests in the central mountains and valleys to alpine meadows in the northern high mountains. Bhutan also has an extensive network of river systems and well preserved forests that are shaped by high precipitation, numerous glaciers and lakes resulting in the upstream and downstream benefits such as water and other ecosystem services.

The Department of Forests and Park Services has a target to hand over a total of 4% of the total forest area to local communities by 2013 (DoFPS 2009). The communities are given usufructuary rights and control of forest products and services in community forests, but the land belongs to the government.

Forest products harvested include timber and wood, such as sawn timber, planks for the construction of houses and buildings, poles for scaffolding, fencing and religious flags, and fuelwood for cooking and heating. NWFPs such as food, medicinal plants, leaf litter collected for cattle bedding and manure, mushrooms picked for vegetables and cash income and trees and grass fodder for feeding domestic cattle. The forested watersheds of Bhutan also provide vital ecosystem services like watershed regulation for hydro-electricity generation, irrigation and domestic water supplies.

3. Poverty in Bhutan

Poverty Analysis Report 2012, (NSB, 2012a) indicates that the poverty of Bhutan has been reduced to 12% in 2012 from 23.2% as measured in 2007. This reduction indicates that Bhutan is well on its way to halving the proportion of the population below the poverty line by 2015. As per 2012 report the national poverty line is 1704.84 per person per month.

The poverty analysis report 2012 (NSB, 2012a) noted that despite the progress made in good governance and economic development in the country, poverty persists mostly in the rural areas (NSB, 2007). Poverty reduction strategies developed over the years for improving the living standards of the poor allocated resources for developmental activities such as rural electrification, farm roads, basic health units, rural drinking water schemes, telecommunication facilities, and environmental conservation through the promotion of community and private forestry. However, the RGoB recognizes that much more needs to be done to reduce poverty in the country, thus the RGoB and international donors emphasize support on assisting poor and vulnerable groups through special projects because about 69% of the population live in rural areas.

4. Contribution of Forestry to GDP

The Renewable Natural Resources (RNR) sector comprises agriculture, livestock, and forestry. According to data from the Statistical Year Book 2012 (NSB, 2012b) published by National Statistical Bureau the contribution of RNR sector to the national GDP, at the current market prices during 2011, was Nu. 13,459.39 million out of which forestry including logging share was Nu. 2,729.80 million. According to the same report RNR sector share was 15.74% which include 8.75% from crop, 3.79% from livestock and 3.18% from forestry including logging.

The contribution of forestry is mainly in the form of royalties, levies, and sale proceed of round logs supplied to the Bhutanese consumers, wood products, and commercially important non-wood forest products (NWFPs). The contribution of forests-based ecosystem services is currently undervalued or no valuation has been done, which otherwise could have increased the RNR sector's contribution to the national GDP. However the forestry contributes a lot to forest-dependent communities in rural areas but all goods and services are not monetized.

5. Program activities and the socio-economic contribution

5.1 Non-Wood Forest Products

Non-wood forest products (NWFPs) play an important role in the daily lives and overall well being of the Bhutanese people especially among the rural communities because they are a major source for off-farm income, food, medicinal and aromatic products, fodder, fibers, and local construction materials. NWFPs often are a safety-net for poor people during off-farm season or whenever needed. The contribution from NWFPs to peoples' livelihoods and the potential for commercialization has been widely acknowledged in Bhutan over the last few years.

The Department of Forests and Park Services has prioritized the NWFPs that has highest potential for future development based on criteria developed by the Department like (a)

potential for commercial marketing and sustainable management (b) current resource availability (c) potential for income generation and poverty reduction and (d) involvement of women for collection.

Besides selling the NWFP in the market there are also some Firms owned either by government or private which specializes in manufacturing products like (a) essential oil for spa products – wintergreen oil, Artemisia spp. (b) soaps (c) shampoo /conditioner – amla, soap nut and (d) herbal tea *example:* (i) a Pharmaceutical Unit under the Ministry of Health specializes in producing medicines and spa products. Since the Firm has the expertise on spa products, collaboration could be established between the Unit and the communities on essential oil extraction so that the communities can extract the oil in their home itself.

(ii) Bio-Bhutan, another privately owned Unit, which specializes in natural products and aims to create income opportunities for poor people through product development. They buy the individual ingredients from the local farmers and manufacture the products which are sold in the market. Until now, Bio-Bhutan has developed natural products, with the ingredients sourced from the local farmers. The products include: pure lemon grass oil, lemon grass spray, lemon grass gift pack, bio herbal tea (*Amla*, *Pipla* and *ruta*), bio ginger tea, honey, ginger, turmeric and *Ophiocordyceps sinensis* gift pack, Amla squash and three different kinds of Bio soaps.

There is a strong need to develop value and supply chain link along that line and developing a long-term marketing relations between the private sector and farmers that will enable farmers to sell their natural products for good prices, which is very promising way to address poverty reduction. Thus, natural NWFP products will be made more and more available in the markets in processed product formats through value-added activities by Bio-Bhutan so that backward linkages with community groups supplying raw or semi-processed NWFP species can be developed and communities would also be benefited.

Besides the NWFPs products mentioned above, there are many other species and varieties that are found in the country. Local people, normally, collect the NWFPs from both State forest (SF) or community/private forests and also Protected Areas. If the NWFPs are collected from SF and Protected Areas nominal royalty is charged by the DOFPS thereafter the people are allowed to use for their own *bonafide* purposes and also sell in the market.

The DOFPS supplies the following types of NWFP to the local villagers *e.g* leaf mould, forest top soil, clay soil, colour soil, sand, stone chips, stone dust, stone gravels, and boulders. During the period July 2008 to June 2011, total amount of Nu.34.22 millions were collected by the Department as royalty and deposited to the government revenue account.

Table 1: Amount of royalty collected by DOFPS for supplying NWFPs (July 2008 - June 2011)

Sl No	Prod. Types	Royalty (Nu.)	Sl No	Prod. Types	Royalty (Nu.)
1	Amala	2,325.00	36	Lacopodium clavatum	120.00
2	Aroo Baroo	23,050.00	37	needle	4,692.00
3	Balu/Solu	87,2.00.00	38	Orchid	7,960.00
4	Bamboo	191,459.78	39	Oroxylum	276.00
5	Bamboo leaves	20.00	40	Paan leaves	120.00
6	Bamboo rhizome	1,100.00	41	Pangkey	1,000.00
7	Bee wax	880.00	42	Pangpoe	110.00
8	Broom	1,232.00	43	Pepper	640.00
9	burrs	9,630.00	44	*Picorrhiza* sp.	20,000.00
10	Cane	10,900.50	45	Pipla	72,500.00
11	Cane shoot	8,451.40	46	pouzolzia	920.00
12	Charcoal	45,227.75	47	Putishing	3,000.00
13	Chirata	133,376.00	49	red soil	7,180.00
14	Clay	22330.00	50	Resin	1,022,280.20
15	Colour soil	18,400.00	51	Rosin	3,169.04
16	Ophiocordyceps	21,182.10	52	Rubea	47,2960.00
17	Dambroo	0.00	53	sand dust	23,086,400.64
18	Daphne bark	15,344.00	54	Sang	170.00
19	fern	258.00	55	Seabuckthron	500.00
20	flat stones	6,280.00	56	Shilajit	3,560.00
21	Fodder	270.00	57	star anis	8,360.00
22	Geyza metog	800.00	58	Stone	5,109,297.91
23	Incense	4,504.00	59	Stone chips	2,781,168
24	Kawla Bark	1,200.00	60	Stone dust	13,160.00
25	Lac	720.00	61	stone gravel	529,250.00
26	Leaf litters	5,966.00	62	Terminalia spp.	2,744.00
27	Leaf mould	74,829.00	63	Top soil	170,462.25
28	Lemon grass	13,724.50	64	*Viscum* sp.	200.00
29	Lycopoduim	114.00	65	Wildlings	19,431.00
30	Medicinal plants	10,200	66	Wood burrs	1,200.00
31	Minchury climbers	11,120.00	67	Wood cuttings	340.00
32	Moss	210.00	68	Woodchip	50,395.64
33	Mud	2,040.00	69	*Yongjiba*	780.00
34	Mushroom	142,126.00	70	Zanthoxylum	4,616.00
35	Mushrooms billets	39,478.00	71	Zhudu	4,000.00
				Total	34,222,582.71

Source: Sonam Peldon, 2011

Besides the revenue, in the form of royalty earned by DOFPS, people also earn good income through the sale of economically high value NWFPs in the local markets and sometimes in the international markets too. The following high value NWFPs are sold in the markets.

Mushroom, Fern shoots, and Amla products Mostly women and children are involved in the collection of mushrooms, fern shoots and sale at the roadside and in the local markets. These NWFPs contribute to household food security and nutrition and also help to generate additional employment and income.

The community management groups engaging in *Amla* marketing is good for community groups as it means self employment; particularly during the off-agricultural season when there is no alternative income generating activity at hand at that point of time. The technical interventions are needed to reduce wastage as lot of wastage could be reduced during the de-seeding and shredding process. Although the income is not substantial, it is a welcome cash income for the farmers who live in remote areas and are mainly engaged in subsistence farming.

Bamboo and Daphne Bamboo shoots are another product that is occasionally sold in the market but mostly used for home consumption. There is a national market demand for bamboo shoot pickle. There are some small Units that specialize in making pickles out of the young bamboo shoots. There is good opportunity for establishing link between these manufacturing Units and the local farmers.

In addition to that bamboos have very high demand in the countries which are used as flagpoles, scaffolding and house construction. Meeting the requirement from in-country production is not possible and large quantity is being imported from India every year. If the local farmers grow large scale plantations of bamboo then the farmers will have good opportunity to earn extra cash income from the sale of bamboo.

Daphne Traditional paper making is one of the cottage industries with potential for enhancing rural economy especially for women self help groups by enhancing their skills in product design, innovation and going beyond primary processing.

People also collect various other species of NWFPs and sell to the local products buyers who use such products for manufacturing various other products. In the process people are able to make additional income by selling the products to local NWFP dealers. Lemon grass, *Ruta* and *Pipla* are some of the important NWFPs which the villagers collect and sell to the local products buyer Units. During the year 2008 to 2010 the following amount of income was earned by the farmers by selling the NWFPs to the local products buyers.

Table 2: Income earned by farmers by selling high value NWFPs to the local products buyers (Bio-Bhutan).

Type of NWFPs	2008			2009			2010		
	Qty (Kgs)	Rate (Nu)	Amount (Nu)	Qty (kgs)	Rate (Nu)	Amount (Nu)	Qty (kgs)	Rate (Nu)	Amount (Nu)
Lemon Grass Oil	4,736	600	28,41,600	1803.00	600	10,81,800	2000	600	12,00,000
Dried Amla				54.50	98.50	5,395.00	171	109	186,39
Dried Ruta				139.25	200.00	27,850.00	100		200
Dried pipla	169	60	10,140	N/A					

Source: Sonam Peldon, 2011

The other high value NWFPs are *Ophiocordyceps* and lemon grass. Local people, who are resident of the area where *Ophiocorduceps* are growing, have exclusive right to collect *Ophiocordyceps* and sell to the traders in auction. The Department of Agricultural Marketing assists in conducting the auctions. During 2009, 2010, 2011 and 2012 (4 years) more than Nu. 390 million was earned by the farmers through the sale of *Ophiocordyceps*. Similarly through the sale of lemon grass oil Nu. 4.62 million was earned.

Table 3 gives the details of the income generated through the sale of *Ophiocordyceps* and lemon grass oil by the farmers.

Table 3: Annual income through the sale of ophiocordyceps and lemon grass oil.

Ophiocordyceps			**Lemon Grass oil**			
Year	Qty sold (kg)	Value in Nu	year	Qty sold (kg)	Rate per kg (Nu)	Value in Nu
2009	734.37	77,791,688.00	2009	1960.0	600	1176000.00
2010	550.65	90,249,566.00	2010	3793.5	600	2276100.00
2011	169.00	72,000000.00	2011	951	700	665,700.00
2012	235.00	150,000,000.00	2012	725.0	699	507000.00
	Total	390,041,254.00				462,4800.00

Source: Sonam Peldon , 2011

In addition to the income earned by the farmer, the lemon grass oil industries provide more than 200,000 man months of jobs to the local people for six months i.e. from June to November every year. The industries also plough back substantial amount of income generated from the sale of lemon grass oil for lemon grass growth and management through the communities (Peldon, 2011). The quantity of lemon grass oil production fluctuates yearly depending on the quantity of lemon grass produced.

Export of matsutake mushroom: Matsutake mushroom gets good price in the international market. The mushrooms after collected from the forest are graded as per the quality like Grade A and Grade B etc. and the prices are fixed accordingly. The prices are normally agreed between the communities and the traders. In 2009 the export price ranged from Nu 500 per kilogram to Nu. 200 per kilogram and is mostly exported to Japanese market. In 2009, 391 kilograms was exported which increased to 1784 kilograms in 2010. Communities manage the area where this mushroom is growing and they are allowed to negotiate the price with the exporters. In 2009, 1960 kilograms of lemon grass oil was exported to Belgium and in 2010 the export increased to 3794 kilograms was exported. Similarly export of *Ophiocordyceps* also increased from 372 kgs in 2009 to 497 kgs in 2010. The increase has been substantial. Details of export of high value NWFPS (like Matsutake, *Ophiocordyceps*, and lemon grass) during 2008, 2009 and 2010 is given in

Table ***4***.

Table 4: Matsutake mushroom, Ophiocordyceps sinensis & Lemon grass oil export figures

Sl No	**Commodity**	**2008**	**2009**	**2010**	**Remarks**

1	Matsutake mushroom		391 kgs	1784.44 kgs	Mostly exported to Japan
2	Ophiocordyceps sinensis		372 kgs	497.41 kgs	Exported to Hongkong
3	Lemon grass oil	4969.50 kgs	1960 kgs	3793.50 kgs	Exported to Belgium

Source: Sonam Peldon, 2011.

At present, there are 20 number of community forests management units exclusively managing non-wood forest products like lemon grass, cane, bamboo etc. Several numbers of households are benefitted from such community forests.

5.2 Timber

People living in rural areas have been greatly benefitting from the timber they are supplied by the Department of Forests and Park Services from the State Forest on subsidized royalty and from Natural Resource Development Corporation Limited (NRDCL) depots on subsidized cost for constructing their dwelling houses in the rural areas. In addition they also source the timber from their own community and private forests.

5.2.1 Community Forests

Community forestry is the practice of forestry where any area of State Forests, that are suitable for management by a community, is handed over to the community for management and such forest area is designated as community forest. The Department of Forest and Park Services is pursuing this program vigorously. It is hoped that, in future, the rural communities will obtain their requirement of timber, fuelwood, NWFPs and fodder, for their cattle, from their own forest.

Since the people living in the rural areas depend heavily on forest resources for their day today requirement like fuelwood, timber, grazing areas for their cattle and edible non wood forest products the community forestry program seeks to strengthen this link between people and forests. It is seen that the program can make a significant contribution to the livelihood improvement, environmental conservation and sustainable use of forests resources.

As of June 2013, a total of 526 number of community forests have been established in various Dzongkhags covering an area of 26,637 hectares where more than 11,546 CFMG members are involved in managing these forests. Dzongkhag-wise number of community forests and the area coverage in given in Table 5.

Table 5: Number of community forests and the area coverage.

Sl No.	Dzongkhags	Area (ha)	CFMG members	Sl No.	Dzongkhags	Area (ha)	CFMG members
1	Bumthang	614	242	11	Samdrup Jongkhar	1,966	701
2	Chukha	882	388	12	Samtse	889	543
3	Dagana	882	364	13	Sarpang	1,242	584
4	Gasa	376	145	14	Thimphu	651	335

5	Haa	559	217
6	Lhuentse	685	382
7	Mongar	1,113	755
8	Paro	1,570	577
9	Pemagatshel	550	849
10	Punakha	1,076	572
	Total	**8,307**	**4,491**

15	Trashigang	5,602	1,745
16	Trashi Yangtse	1,025	501
17	Tsirang	2,817	1,270
18	Trongsa	1,782	449
19	Wangdue Phodrang	1,116	534
20	Zhemgang	1,240	393
	Total	**18,330**	**7,055**

Source: SFED/DOFPS, 2013

The communities manage their forest in line with the management plans which are normally for ten years. The plans are prepared by the communities with technical support from forestry extension staff. The community forest have the potential to produce wood products, such as construction timber and firewood, and a range of non-wood forest products, such as mushrooms, medicinal plants, fodder for animals, cane and bamboo.

The community household members meet their own needs of timber and other forest produce first and if there is any excess of their requirement then they are allowed to sell and generate income for their group. As per the study conducted by the Department of Forests in 2010, enough timber including firewood was harvested to meet their requirement and also there was balance remaining to be harvested in the subsequent years.

This clearly shows that communities manage their resources according to the plans and can benefit from the resources, which they have in their forests. Table 6 shows the sustainable harvesting limits for different assortment of wood products for all the community forests and the volume harvested *vis a vis* the balance volume available for subsequent years.

Table 6: Total volume available and the harvesting limit (in cft)

Wood products	Total Harvesting limit of 233 CFs[2] (No. of trees) A	Harvested till June 2010 (No. of Trees) B	Balance (No. of trees) (A-B)
Drashing	153,186	3,479	149,707
Cham	142,436	3,362	139,074
Tsim	198,056	3,076	194,980
Dangchung	397,613	2,822	394,791
Shinglep	7,561	72	7,489
Fencing post	100,328	5,469	94,859
Flag post	29,408	2,739	26,669
Firewood	131,624	2,340	129,284

Source: DOFPS Community forestry leaflet , 2011

During same period the CFMG also earned substantial revenue by selling the excess timber of various assortments in the market. The fund is managed by elected committee members and is

[2] The figures are as per the study conducted by SFED/DOFPS and pertain to 233 Community Forests only.

kept in the Bank. The amount earned from various community forests (Dzongkhag-wise) is given in .

Table 7.

Table 7: Fund generated by CFMG by selling forest produce if community forests

Sl No	Dzongkhags	Fund generated (Nu)
1	Bumthang	778,921.00
2	Chukha	212,168.00
3	Dagana	65,130.00
4	Gasa	167,204.00
5	Haa	365,000.00
6	Lhuentshe	490,700.51
7	Mongar	1,015,725.72
8	Paro	1,442,768.99
9	Pema Gatshel	233,178.00
10	Punakha	492,636.00
11	S/Jongkhar	148,122.00
12	Samtse	422,476.44
13	Sarpang	648,653.95
14	Thimphu	640,265.42
15	Trashigang	659,397.49
16	Trashiyangtshe	493,445.00
17	Trongsa	369,848.35
18	Tsirang	307,359.85
19	Wangdue	365,252.67
20	Zhemgang	946,945.00

Source:DOFPS, 2010 (b)

5.2.2 Private Forests

Private forests are those forests or crops that are growing on the private registered land of the individual and constitute planting or nurturing of trees growing on such land. The owner needs to register such forest through the Dzongkhag Administration. The Department of Forests and Park Services does not levy royalties on the timber grown in private forest if the owner wants to use, sell or transport the timber within the country. However export of timber, in primary form, is not allowed. After the enactment of Forest and Nature Conservation Act 1995 and the Private Forestry Rules 2006 number of farmers from various parts of the country applied for registering private forests.

Discussions with private forest owners and survey findings reveal that the people's interest and willingness to own private forests is in direct response to forest resources security due to the rapid socio-economic development and institutional change, notably the enabling legal framework. Since these forests are grown in private land, the tenure and resource security are more assured than in community and State Forests.

Private forests contribute to food security in many ways. The types of trees commonly selected for planting in private forests include those for household use and having commercial value, mainly fast-growing trees. Desired species of trees for timber (for house building) are *Michalea champaca, Juglans regia* and *Cupressus corneyana*; for firewood (for cooking and heating), *Alnus nepalensis*, *Castanopsis* and *Quercus griffithii*; for tree fodder (for cattle feeding), *Ficus roxburghii, Ficus cunia*, *Saurauja nepalensis*; and for grass fodder, *Thysanolaena latifolia* commonly known as tiger grass.

Timber and firewood in excess of household use are sold for cash income as per the private forest rules. Integration of multi-purpose trees and grasses in the private forests is beneficial. *For example:* broom grass not only provides winter fodder for cattle but also is raw materials for making commercial brooms. This indicates that private forests have huge potentials to take on board and demonstrate forest management to the people than community forestry. It also

guarantees forest resources security, and reduces poverty. There are a total of 627 numbers of private forests covering about 840 acres distributed in various part of the country. Although community forestry has significantly advanced, private forestry is far from taking off.

5.2.3 Protected Areas

The natural resources available in the Protected Areas are timber for constructional uses, non wood forest products etc. These resources are supplied by the Protected Areas Management at subsidized royalty rates and in some cases free of royalty. Selling of timber for commercial uses is totally prohibited from the Protected Areas.

The revenue generated through the use of forest resources by the local people from the Protected Areas are in the form of royalty and in some cases the fine and penalties levied for misappropriating the natural resources. Such revenue normally gets deposited into the national exchequer.

Based on the study conducted by DOFPS in 2008, Park wise revenue generated through supply of forests resources is given in Table 8. As per the same study only six Protected Areas were in operation therefore no figures are available for other Protected Areas.

Table 8: Royalty collected by Park Management through the supply of forest resources

Sl No	Name of the Parks	Royalty collected for resources used by the local people (Amount in Nu)
1	BWS	327,782.00
2	JDNP	178,084.00
3	JSWNP	89,362.00
4	TNP	131,719.62
5	RMNP	67,686.00
6	SWS	88,617.00
	Total	883,250.62

Source: DOFPS, 2010

Unlike in many other countries, people still live in the Protected Areas and they are entitled to forest resources on subsidized rates for their *bonafide* uses. Timber and other produces are supplied from multiple use and buffer zones. Core zone is strictly protected and only used for conducting research. People living inside Protected Areas have been benefitting from this scheme.

5.2.4 Forest Management Units

Timber for various uses both commercial and rural constructional uses are produced from Forest Management Units. Ad-hoc and random harvesting is not allowed as per the prevailing laws therefore harvesting is strictly done based on approved forest management plans. Harvesting is normally done from the approved Forest Management Units (FMUs) which are defined in Forest and Nature Conservation Rules as geographic areas of government reserved forest designated according to the rules for scientific management of forests (RGOB, 2003).

They are discrete forest areas of variable size (typically ranging from 8,000 – 20,000 hectares) primarily identified for their potential for commercial timber production. The FMUs generally encompass a sub-watershed; therefore include a range of forest types and conditions. However, FMUs can also comprise a number of relatively small potentially operable areas that are not geographically contiguous.

In rural areas, where no motorable road exists, timbers are allotted by the Divisional Forest Officers on silvicultural availability and on selection basis. Timbers supplied by the Department are provided on subsidized rates and the royalty charged is a concessional royalty. The rural people are greatly benefitted from this scheme. Selling of timber supplied on subsidized rates is not permitted. People living in urban areas can also avail timber after paying commercial royalty which is still cheaper than buying from the open market. Timber supplied (royalty category wise) by the Department of Forest and Park Services from July 2008 to June 2011 is given in Table ***9***.

Table 9: Timber supplied by DOFPS for rural house construction (commercial & concessional royalty)

Timber Type	Concessional royalty		Commercial royalty		Free of royalty	Total	
	Vol in cft	Royalty (Nu)	Vol in cft	Royalty (Nu)	Vol in cft	Vol in cft	Royalty (Nu)
Cham	5,184,638.25	4,412,227.50	28,701.26	63,503.12	105,142.59	5,318,482.36	4,475,730.62
Dangchung	346,294.32	596,222.00	7,655.63	30,008.00	6,538.99	360,488.94	626,230.00
Drashing	3,998,577.74	3,981,037.06	633,126.56	3,892,271.20	219,921.27	4,851,625.57	7,873,308.26
Fencing posts	146,410.85	762,114.00	83,386.51	522,914.00	-	229,797.35	1,285,028.00
Firewood	5,926,760.42	1,779,024.70	3,879,099.33	2,546,929.94	244,387.22	10,050,246.97	4,325,954.64
Flag posts	129,769.79	331,657.00	19,977.90	116,912.00	-	149,747.70	448,569.00
Hakaries	-	-	9,798.00	61,994.86	-	9,798.00	61,994.86
Logs	209,618.34	6,441,025.07	2,008,438.28	45,246,269.38	18,523.45	2,236,580.07	51,687,294.45
Other poles	117,760.50	289,844.96	150,042.51	1,061,067.85	1,641.84	269,444.85	1,350,912.81
Other posts	20,783.29	43,542.00	17,242.20	122,099.75	-	38,025.49	165,641.75
Sawn timber	22,347.42	249,705.04	89,765.29	1,935,590.58	2,450.66	114,563.37	2,185,295.62
Shinlep	199,501.50	128,849.00	4,660.92	24,630.00	17,165.66	221,328.08	153,479.00
Tsim	173,912.48	958,306.00	4,625.08	28,758.00	6,257.46	184,795.03	987,064.00
Wood chips	4,855.13	5,248.50	1,240,491.41	1,966,191.79	4,126.68	1,249,473.21	1,971,440.29
Total	16,481,230.03	19,978,802.83	8,177,010.88	57,619,140.47	626,155.82	25,284,396.99	77,597,943.30

Source: DOFPS, 2011

Besides the supply made by the DOFPS, the Natural Resources Development Corporation Limited (NRDCL) a government owned Corporation also, has also been mandated to supply timber required for commercial purposes in the country. They harvest the timber from the Forest Management Units (FMU) having approved management plans. The Corporation is autonomous and is authorized to sell the timber in the market and generate revenue for them also. However the Corporation has to pay royalty for the timber harvested by them to the Department of Forests and Park Services.

The Corporation also supplies timber on subsidized rates to the people living in rural areas but connected by motorable roads, for construction of their dwelling houses. Subsidized royalty is levied to the people by NRDCL and the same is deposited to DOFPS revenue account subsequently. The amount of royalty deposited by NRDCL to DOFPS account since 2008 till 2011 is given in Table 10.

Table 10: Commercial and concessional royalty deposited by NRDCL in DOFPS account

Years	For concessional supply	For commercial supply	Total
	Royalty paid by NRDCL	Royalty paid by NRDCL	
	Amount in Nu	Amount in Nu	Amount in Nu
2008	122,020.88	20,159,701.12	20,281,722.00
2009	144,260.52	15,112,284.48	15,256,545.00
2010	198,491.82	20,201,403.18	20,399,895.00
2011	170,952.28	19,710,892.72	19,881,845.00
Total of 4 years	635,725.50	75,184,281.50	75,820,007.00

Source: DOFPS, 2011

The scheme of supplying constructional timber, on subsidy, for the people living in rural areas has greatly benefitted them and rural people have been able to construct decent dwelling house for their family in the villages.

5.3 Ecosystem Services

Bhutan is well known for its pristine environment and conservation of its forests. With the national policy of keeping 60% of the country's land area under forest cover for all times, the Bhutanese population have been benefitting from the forests' ecological services. However, the identification, quantification, and valuation of various ecosystem services need to be studied, which can greatly enhance the contribution of forests to GDP.

The contribution from ecosystem services, at national level, includes revenue generated from hydropower the source of water being from the Protected Areas. Besides hydropower the other important ecosystem services from Protected Areas, which are not quantifiable at the moment but are very important are regulation of air, water, climate, carbon sequestration, mitigation of climate change, natural disasters prevention, biodiversity conservation, habitat for flora and fauna including endangered species like black-necked cranes, pollination, research, educational, spiritual, aesthetic and many other conservation, social and cultural benefits. Many nationally significant cultural heritages are also found in the Protected Areas.

In Bhutan, the benefits derived from other types of services have not been studied therefore cannot be accounted for at the moment except benefits derived from hydropower. The revenue generated from this service, however, gets deposited in the national exchequer therefore it is not directly benefiting the people living in the areas. As per the study conducted by DOFPS in

2008 the benefits derived from ecosystem service linked to hydropower located in Protected Areas is given in Table 11.

Table 11: Estimated contribution of revenue from hydropower Plants linked to Protected Areas (Nu in million)

Name of the Protected Areas	Name of the Plants	Revenue from total power sale 2008	Revenue from power sale to PA	Estimated contribution from PA (10% of total revenue)
BWS	Kurichu	526.70	140.10	14.01
JDNP	Chukha	3795.90	3595.90	379.59
	Tala	7164.80	7164.80	716.48

Source: DOFPS, 2010(a)

Based on the same study the water sources for Kurichu, Chukha and Tala hydropower Plants comes mainly from BWS and JDNP. In case of Kurichu Plant, BWS contributes about 26.6 % (DGPC 2008 record) of the water from Khoma chu, the source of which comes from BWS. In case of Chukha and Tala, the water sources come entirely from JDNP (DOFPS, 2010b).

Using the above estimates on water sources, the valued contribution related to hydropower from Protected Areas for 2008 has been estimated at the rate of 10 percent of the revenue from power sale to Protected Areas.

5.4 Conservation Services

The contribution for socio-economic development from conservation related activities has not been studied so far however the fines and penalties collected from forest produce and wildlife related offences in Protected Areas are taken as indication of conservation efforts and amount collected by the Park Management adds to the contribution for conservation endeavor. The fines and penalty collected from forest produce related offences gets deposited in the national government revenue account whereas the fines and penalties for wildlife related offences are rewarded directly to the informers as an incentive to monitor wildlife offences and do not get deposited into government account. The total amount collected from various Protected Areas relating to forest produce offences in 2008 if given in Table 12.

Table 12: Fines and penalties collected for forest produce related offences

Name of the Parks	Contribution through fines and penalties (amount in Nu)
BWS	-
JDNP	17,181.00
JSWNP	25,401.00
TNP	-
RMNP	460,351.41
SWS	5,500.00

Total	508,433.41

Source: DOFPS, 2010(a)

5.5 Eco-tourism

Tourism is the second highest revenue earner for the country after hydropower. Culture and nature related tourism form are the main attraction for tourism in Bhutan. The number of tourists visiting Bhutan has increased manifold over the last three decades with just 287 tourists in 1974 to 27,636 in 2008.

The tourism industry, in Bhutan, began in 1974 with Bhutan Tourism Corporation Limited controlling the tourism until it was privatized in 1991. There were 741 registered tour operators in 2011 but only 318 local tour operators were operational. Potential for foreign exchange earnings is very high from this sector. Revenue generation from tourism sector has increased steadily from Nu. 1,402.72 million in 2009 to 1,645.37 million in 2010 and reaching 2,226.66 million in 2011. The tourism industry enjoyed continued growth rate with the tourist arrivals in the country rising steadily over the years.

The sector is increasingly being seen as a major opportunity for economic diversification and the country is experiencing increase in the volume of tourists coming to the country in the coming years. However the country does not wish to compromise the fast economic return from tourism with erosion of cultural heritage and loss in biodiversity.

The tourists who visit Protected Areas are mostly trekkers who come to trek the beautiful mountains. As per the Study conducted by DOFPS in 2008 the tourists who visited Protected Areas constituted about 2.4% of total arrival in the country. Besides the royalty the other earnings from the tourism are from hotels and food, transport, tour operators fees, guiding charges and also the handicraft items they buy from the local markets. The total earnings from the following Protected Areas, in 2008, is given in Table 13.

Table 13: Earnings in Protected Areas through Tourism & its related activities

Name of the PA	BWS	JDNP	JSWNP	TNP	Total
No. of tourists in 2008	22	486	105	156	769
Tourism royalty (Nu)	459,360.00	13,953,060.00	2,192,400.00	1,628,640.00	18,233,460.00
Others like TDF[3], Hotels charges, Food, Transport, Tour operators, Guiding, Handicraft (Nu)	539,770.00	14,967,585.00	11,078,675.00	1,222,260.00	27,808,290.00
Total	999,152.00	28,921,131.00	13,271,180.00	2,851,056.00	46,042,519.00

Source: DOFPS, 2010(a)

[3] Tourism Development Fund. Now done away.

It is to be noted that there is unequal distribution of tourists arrival in Bhutan in terms of time of their visit. Majority of tourist arrivals are in autumn (August-October) and spring (February-April) season. Culture and nature has always been the unique selling proposition for the tourism industry of Bhutan.

In recent years, community based tourism is being encouraged to make the benefits of tourism reach the rural communities. Such initiatives are currently piloted in a few areas. The rural poor receive minimal benefits through serving as porters and renting out their horses and mules for transporting luggages. They get paid based on the daily wage rate. The bulk of the benefits go to tour operators and national government because tourism operation is centralized.

Bhutan's Protected Area Networks is opening up markets for nature recreation, capitalizing on ecotourism, although the number of eco-tourists is very less compared to tourists interested in Bhutanese culture. Ecotourism pursues a policy of promoting conservation as well as development for local communities in and around the Protected Areas.

The income generated based on above-mentioned activities in the Protected Areas benefit the local residents partially because major portion of the revenue is directly deposited in the national government revenue account. Therefore the people living in the Protected Area have other tourism products, which directly benefit them. Some of the important community based ecotourism products, under implementation, in different Parks are given in

Table 14: Community based ecotourism products in different Parks

Name of the Parks	Products Types	Beneficiaries	Services provided by the communities
JSWNP	Community based Nature Tourism e.g. Camp Site Management	217 households along 6 villages of Kuda, Phrumzur, Jangbi (Langthel Geog) and Nimshong, Nabji Khorphu	Local guides, local cooks, dishwasher, waiter, porters and ponies, cultural program, traditional sports, Hot stone bath.
RMNP	Eco camp Management along Gomphu-Manas Norbugang Trail	150 households along Gomphu village, Pangtang, Shilingtoe, Pangbanag village,	Local meals & drinks, local guides, local cooks, porters & ponies, village tour/activities. Hikes, pilgrimages, bird watching, cultural programs, local festival and rituals, hot stone bath, local crafts, traditional sports, river rafting, elephant rides, fly fishing and biking.
SWS	Camp Site Management along Merak Sakten Trek	561 households under Merak and Sakten Geogs Trashigang Dzongkhag	Local guides, local cooks, Porters & Ponies, villages tour and hikes, cultural programs, mask dances, traditional sports and hot stone baths.
WCP	Homestay -	20 households in	Local cuisines and drinks, preparation of

	Alpine Organic Farm House Cooperatives	chokhortoe valley, Bumthang Dzongkhag	traditional cuisines, local guides, cultural programs, villages tour/farm activities, hikes, trekkings, hot stone bath, bonfire, traditional sports.

Source: DOFPS, 2010(a)

Beside the above-mentioned ecotourism products, the communities have also initiated annual Park festivals, which have attracted many international as well as local tourists. The income from such community-led activities goes to the communities themselves. The following types of Park festival are organized to attract the tourists.

Table 15: Annual Park Festivals organized by the communities.

Name of the Parks	Festival Types	Beneficiaries	Attractions
TNP	Mushroom Festival	Local communities and stakeholders of Ura geog under Bumthang Dzongkhag.	Mushroom tasting, picking, local cuisines, home stay, hiking, hot spring bath, cultural programs.
WCP	Nomads Festival	Nomadic communities from eight Dzongkhags of Haa, Paro, Thimphu, Wangdi phodrang, Gasa, Bumthang, Trashigang, Trashiyangthse, showcase their products and culture.	Cultural show, local products. arts and crafts for sale cuisines, traditional sports, homestay, and exhibitions by different agencies.
JDNP	Takin Festival	Local communities from Laya and Gasa.	Cultural shows and local festivities.
BWS	Black Necked Crane Festival	Local communities and stakeholders of Bumdeling, Geog Trashiyangtse Dzongkhag.	Food cultural programs, local arts and crafts and exhibition on cranes
RBP Lamperi	Rhododendron Festival	Local communities and stakeholders of Kawang and Chang GeogUnder Thimphu Dzongkhag Toeb Geog of Punakha Dzongkhag Nad Dagala Geog under Dagana Dzongkhag.	Local culture and cuisines, arts and crafts, traditional games, cultural program, exhibition, guided walks, and other activities.

Source: DOFPS, 2010 (a)

5.6 Bio-energy

The main sources of energy supply for rural Bhutanese households for cooking and heating are fuel-wood, wood chips, briquette and occasionally, animal dung. Biomass energy is predominant, having the largest share (42%) of the overall energy supply matrix, followed by electricity from hydropower Plants (DoE 2009). Biomass in the Bhutanese context includes wood, wood waste, saw dust briquette, agriculture waste, and straw.

Fuelwood forms the primary energy source for cooking, heating, and lighting for 69% of the rural population while fuelwood is used for room heating among the urban population in high altitude, especially during winter. The people living in rural areas are entitled to collect dry firewood for their bonafide consumption, free of cost. DOFPS do not levy royalty for such collection and use. This has helped the people augment their overall energy requirement matrix. As per study conducted by Department of Energy, Bhutan consumed about 725,000 tonnes of fuelwood (DoE 2009), which accounted for 57.7% of the overall energy supply matrix. Bhutan has one of the highest per capita biomass energy consumption in the world (DoE 2009).

This situation, however, is gradually changing with the emergence of hydropower-generated electricity and the policy of "electricity for all" by 2013 and fuelwood substitutes such as cooking and heating appliances. Until recently, vast volumes of sawdust generated from the sawmills were disposed of as wastes. The commissioning of briquette machineries by Natural Resources Development Corporation Limited efficiently converted sawdust as a firewood substitute for heating urban homes. The briquette machineries are located in urban centers (namely, Thimphu and Paro) with production capacity of 750 kg and 250 kg per hour, respectively. The initiative has promoted efficient utilization of wood wastes to reduce pressure on natural forests. Local farmers are employed as laborers on daily wage basis.

5.7 Watershed management

With technical support from FAO, the DoFPS is experimenting on PES initiatives that support drinking water supply of the downstream communities in some Dzongkhag (Mongar), conservation of the black-necked crane in Phobjikha through ecotourism, and watershed rehabilitation in Pachu-Wangchu. The initiatives focus on establishing relationships between the service providers upstream and the service users downstream with reference to a particular ecological service of the forests, such as sustaining drinking water supply, conservation of biodiversity (specifically, the black-necked crane), and watershed protection, for the benefit of rural communities and conservation of environment. Currently, mechanisms are being worked out and implemented to compensate the communities on an equitable basis.

5.8 Reducing emission from deforestation and forest degradation (REDD)

The DoFPS is aware of the emerging financial incentive in the form of REDD mechanism, which may accrue to rural communities. The development of policy guidelines initiatives is underway, which aim to capitalize on carbon storage of Bhutan's forests and to plough back funds for conservation, sustainable management of forests, and enhancement of carbon stocks. The strategy, however, is unclear how REDD+ can contribute to benefit rural communities and reduce poverty and also on benefits sharing.

6. Challenges and Opportunity

6.1 Over exploitation and unsustainable use of natural resources

Main challenge for the natural resource sector has been over-exploitation leading to unsustainable utilization of natural resources both timber and NWFPs. Lack of knowledge and awareness are the main factors leading to such apathy. More research on various aspects of

natural resource management and marketing is needed to address these issues. Resource user rights and arrangements must be provided adequately to avoid potential resource use conflicts and to ensure that benefits accrue mainly to local communities rather than market intermediaries.

6.2 Loss of biodiversity and climate change

Loss of biodiversity and climate change is also important issues facing Bhutan. The over-exploitation and unsustainable use of natural resources would accelerate the loss of biodiversity especially commercially valuable species such as *Ophiocordyceps* and other medicinal and aromatic plants as well as high value timber species. Already there are visible signs of local extinctions occurring in some pockets. Since natural resources are provided almost free of cost to rural population and the Bhutanese in general, as such the resources are not valued and appreciated leading to misuse and over-exploitation.

Further the threats related to impacts of climate change are already felt in Bhutan and around the world with increase in the intensity of natural disasters. One of the imminent threats related to climate change is the Glacial Lake Outburst Flood (GLOF). The human induced threats in the forests could lead to more increased risks from GLOF and other impacts of climate change. Thus conservation and sustainable use of biodiversity is important for long term conservation of environment.

6.3 Forest fire

Forest fire is also one of the main threats for sustainable management of natural resources. It has been posing big challenge for sustainably managing the natural resources in the country. Every year especially during the dry season in early spring and during autumn and winters, forest fires occur in different parts of the country. The main causes of forest fire are uncontrolled burning of pastures or tseri land. Large tract of forests are burnt leading to unprecedented destruction of valuable biodiversity.

The prevalence of forest fires are more in the eastern part of the country, where fires are intentionally set for lemon grass oil production and grazing. Forest fires leads to forest degradation and change in ecosystem as well as landslides and soil erosion.

6.4 Valuing ecosystem services

Forests are equally important for providing ecosystem services, such as regulation of water discharge for hydroelectricity, irrigation and drinking water supply, and ecotourism. The contribution of ecosystem services, however, is undervalued due to lack of appropriate policies, regulatory frameworks, scientific methods for quantification and valuation of these services that can greatly enhance the contribution of forestry to GDP and simultaneously contribute to reducing poverty of rural communities. There is a need to carry out research on this topic and develop framework for further work.

7. Way Forward

7.1 Payment for environmental services

Payment for environmental services (PES) is one type of economic incentive for those that manage ecosystems to improve the flow of environmental services that they provide. Normally, these incentives are provided by all those who benefit from environmental services which includes local, regional and global beneficiaries. Thorough understanding of the concept and market is also very important for the program to succeed. Among the vast environmental

services, ecosystems provides the ones that currently stand out for payment systems like watershed protection, carbon sequestration and storage, biodiversity protection and landscape beauty. Therefore if this program could be taken forward then vast majority of the people in Bhutan could benefit from the scheme.

7.2 Sustainable utilization of natural resources

High value NWFPs are depleting in some pockets of the country where they were found abundantly in the past. Well researched guidelines for management need to be developed so that the resource will benefit the people living in the areas. Occasional monitoring should also be instituted by the Department of Forests and Park Services. Besides the NWFPs even timber harvesting and utilization should be allowed with approved management plans only. Reforestation/afforestation of the degraded areas should be given high priority. The revenue/ income generated from NWFPs has been far exceeding than from the traditional timber business therefore scientific management technique and the market for NWFP products need to be explored so that it will benefit all sections of the population.

7.3 Bio-prospecting

Bhutan has rich biodiversity and has big potential for bio-prospecting. Bio-prospecting is a growing endeavour that involves search for new genes or chemical of great value. Local people, in Bhutan, use different plants and animals' products for medicine, dyes, spices and aromatics. If carefully undertaken it may offer an opportunity for substantial economic benefits. Therefore bio-prospecting is seen as a potential area for future research and also for economic potential.

7.4 Linking natural resource management to climate change

The ecosystem services from the forests helps in carbon sequestration and acts as carbon sink to reduce the impacts of global warming and climate change. Conservation of biodiversity is very important to maintain the quality of ecosystem services on which human lives and the well being of the planet depends. Thus, it is important to recognize and value the important role of forests in the mitigation of climate change and accordingly plans should be prepared to plough back global climate funds for addressing threats/issues related climate change. Carbon trading and carbon credits from forests need to be explored at regional and international levels.

Abbreviations And Acronym

BWS	Bomdeling Wildlife Sanctuary
CFMG	Community Forest Management Group
DGPC	Druk Green Power Corporation Limited
DOFPS	Department of Forests and Park Services
Dzongkhag	District
FMU	Forest Management Unit
GDP	Gross Domestic Product
ha.	Hectare
JDNP	Jigme Dorji National Park
JSWNP	Jigme Singye Wangchuck National Park
KM	Kilometre
M	Metre
MOA	Ministry of Agriculture and Forests
NRDCL	Natural Resources Development Corporation Limited
Nu	Ngultrum
NWFP	Non Wood Forest Products
REDD	Reducing emission from forest degradation and deforestation
RGOB	Royal Government of Bhutan
RMNP	Royal Manas National Park
SF	State Forests
SWS	Sakteng Wildlife Sanctuary
TNP	Thrumsingla National Park
WCP	Wangchuck Centennial Park

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FORSTRY IN RELATION TO SOCIOECONOMIC DEVOPMENT - Hussain Faisal & Ibrahim Shabau, MALDIVES

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Executive Summary

Forest has always played important role in the islands communities weather we know it or not. From protection to amenity to providing vital ingredients or daily use. Island forest ecosystem is a system is so inclusive that how and when ever we make changes the whole system is affected. As such we need to be very careful in dealing so as to keep a balance between the environment and economic benefit of the resource.

The key factors impacting forests and forestry in the Maldives are increasing demand on land area with or without forest. The land in demand is mainly for agricultural expansion, industrial growth and for housing. The increasing rate of population growth is creating a demand on the available land area. The expanding tourism sector, resulting in economic growth, increases demand for space on uninhabited islands. However this can be turned into a positive dimension by allotting one uninhabited island to each resort island for maintenance of forest biodiversity under eco-tourism.

In the past the timber requirement was relatively low given the low population and less demand on the material needs of the community. This was complemented by the planting and cultivation of more trees. Modernization and high demand on material needs have created a greater demand for timber. The tourism sector requires large quantities of timber to construct the resorts using traditional methods.

Forest resources are likely to be affected given the industrial and other infrastructure growth plans envisaged by the Government of Maldives. Legalization of forest policy with sound implementation guidelines will be a key factor in the positive growth of forest resources. Timber demand needs to be met by imports, as there is no domestic means to meet it. Forest biomass is used as fire wood by collecting coconut refuse and cutting the trees in the nearby forests.

Awareness on the role and value of forests needs to be created and enhanced by involving national and international NGOs in the protection of the islands from waste disposal that affects not only the coasts and coastal vegetation but also the coral reefs that the Maldives depends on heavily for tourism and economic growth.

1. Background of Forestry in Maldives

1.1 Physical Environment

Maldives consists of 1192 islands, formed in 26 geographical atolls, and grouped into 20 administrative atolls. The total land mass is 30 000 ha that is spread over a distance of 900 km from northern latitude 4 to slightly south of equator. The population of the Maldives is some 350 000. Some 200 islands are inhabited, another 105 islands are tourist resorts, and 80 are reserved for industrial use. Only 28 inhabited islands have land area of more than 100 ha. Eighty percent of islands have an elevation of less than one meter above the sea level, and the average elevation of all the islands is 1.5 meters above the sea level. Although the outer reef protects the islands from ocean waves, 88 of the inhabited islands have major problems with beach erosion. Rising sea levels due to the global warming is the major risk for the Maldives.
The forest area of Maldives is not known. The Global Forest Resources Assessment of 2010 estimated the forest area at 1 000 ha, and the Agricultural Development Master Plan (2006-2020) of Maldives quotes an estimate of 3,716 ha of forests. These estimates do not apparently include coconut groves that are by far the most common formations of woody vegetation in Maldives. Coconut groves in Maldives are typically mixed formations of various trees and bushes dominated by coconut palms. Littoral forests and bushes have an important role in coastal protection. However, trees and other woody vegetation cannot protect the islands from raising sea levels, and their capacity to prevent serious coastal erosion is limited.

Tree and bush species occurring commonly in Maldives are documented in Trees and Shrubs of Maldives (Selvam 2007). Due to the small size of the islands, salt tolerance is one of the prominent features that determine the adaptability of plant species in the environment of the Maldives.

Figure 1. Island Forest

1.2 Role of Forests and Trees in the Society

The Maldivian society and the lives of Maldivian people have been closely interlinked with forest and trees available on the islands, particularly coconut palm, other fruit trees and several timber trees. Lack of metals and stones, other than coral stone, made the people use wood and other forest products for practically everything they constructed or made. Trees and forests have a very important role in the society in Maldives. Still today people have strong attachment to forests and trees; they provide shade, amenity, consolation and hope.

Wooden boats are still commonly built, for sheer economic importance, but also for maintaining the cultural tradition. Boat builders are highly valued professionals who know by heart the designs and measures of fine traditional wooden ships and boats; they are not using

drawings. Every wooden boat is an individual, a piece of art, at the same time when it is invaluable as means of transport and for catching fish.

Along the process of urbanisation and increased living standards, the amenity and recreational roles of forests and trees, both outside and inside urban areas, have gained importance.

1.3 Role of Forests and Trees in the Economy

Forests and trees have several important functions in the economy of Maldives today. The direct benefits are becoming relatively less important than the increasingly important indirect benefits for the economy.

No quantitative estimates are available on the value of forest and tree products and services to the economy in Maldives. Only descriptive assessment can be given.

As regards the direct benefits, the most obvious and measurable ones are the wood used (i) in boat building (mainly the structural frames of wooden boats and ships, outboards are normally made of imported timber nowadays), (ii) as poles (house building, fencing, etc.), (iii) by local carpenters for furniture, window frame and door making, (iv) in woodcarving and woodturning handicraft production mainly for tourism souvenir items, and (v) as firewood in cooking and smoking fish (though in decreasing volumes as kerosene, gas and electricity have gained in importance). Secondly, and probably economically still more important are the non-timber forest and tree products such as (vi) coconuts and various products, including tourist souvenir items, thereof, (vii) other fruits and nuts, (viii) mats used for roofing, walls and other covering produced from coconut palm and screw pine leaves, (ix) gums and resins used in boat building etc., and (x) the various traditional medicinal products still widely used.

The increasingly important indirect benefit that have very large economic importance include (i) the coastal protection (against wave erosion, salt spray, wind), (ii) amenity and beauty that are absolutely vital for the success of the tourism industry, and (iii) the provision of shade in islands making everyday toils possible and bearable without excessive amount of electricity consumption for keeping fans or air conditioners running. It is also noted that forests and other growing vegetation act as carbon sinks.

Apart from the limited land area available for growing forest and tree products, the high transport cost, from production sites to potential markets, is one of the main bottlenecks hindering increased forest and tree-based production. Consequently, high value added and high unit value products must be targeted, instead of producing bulk products.

1.4 Policy and Institutional Environment

The Agricultural Development Master Plan (2006-2020) promotes agricultural expansion, which is likely to occur in many places at the expense of forests. The Agricultural Master Plan includes one priority programme that addresses forest issues: “Judicious Harnessing and Stewardship of Natural Resources”, with the following strategies and activities:

Periodic assessment of the status of natural resources on a regular basis (preferably every five years) by geographical area

Internalization of the ten-point action plan for the agriculture sector mentioned in the NBSAP

Synergy with the National Forestry Policy and Fisheries

Inter-agency coordination, by establishing and promoting functional mechanisms and coordination at both policy and implementation levels amongst the key Government agencies, local administrations, the private sector and the civil society.

These strategies address the present lack of (i) resource data (e.g. forest resource inventory), (ii) coherent legal framework that would support sustainable resource management, and (iii) overall macro-level land use plan providing security e.g. for longer term investments in sustainable and more productive agricultural and forestry production particularly in some of the uninhabited islands.

The National Biodiversity Strategy and Action Plan of the Maldives presents the objectives and broadly defined actions for the conservation, sustainable use and the equitable sharing of the benefits of biological diversity. The Regional Development Plan in its current first phase will emphasise economic development in the Northern and Southern Regions.

The Ministry of Fisheries & Agriculture (MoFA) is responsible for technical matters and advice regarding forests and trees. Presently, MoFA has a Forestry and Land Management Section which manages the forestry related activities with the assistance of other Agriculture Sections. Capacity in the areas related to forestry is a hindrance in promoting and development of the sector.

2. Policy Goal And Objectives

The forest policy goal is:

Green Maldives with protected coastline, plant diversity, amenity and income to local people, through participatory management of forests and trees by local communities.

The policy goal will be reached through the following policy objectives:

Protection of coastline: The inherently unstable shores of the low-lying coralline islands of Maldives, threatened by raising sea level due to the global climate change, are protected by well stocked and sustainably managed buffer zones of 30 meters wide, wherever possible, composed of multi-purpose salt tolerant trees and bushes.

Biodiversity conservation: The fragile terrestrial ecosystems of Maldives, threatened by population pressure, economic development, [invasion of exotic plant and animal species], and the mere small size of the islands, are protected through sustainable multi-purpose management of remaining forest areas, re-introduction of rare and threatened tree and other plant species, and conservation of adequate sample of terrestrial ecosystems by establishing a network of conservation islands.

Landscape beauty: In order to maintain and enhance the charm of the landscape of Maldives, and to provide pleasant and cool environment for everyday life in urban areas, appropriate and well-growing shade and other amenity trees, including suitable fruit trees, will be maintained and planted in increasing numbers throughout the country.

Forest and tree-based income: High value local timber and non-timber forest produce production (high unit value), further processing (high value added) and marketing is encouraged. Bulk products are mainly to be imported. The supply of the high value timber and non-timber forest products in a sustainable manner is to be secured through efficient and planned management of multi-purpose forests. This will provide income to local people both in procuring the necessary forest-based raw materials, and processing of the products, such as wooden boats, souvenir items, etc.

3. Key management approach

Decentralised management by devolution: The central government ministries have limited capacity to manage the forest resources. The management of forest and tree resources is done best at local level. Local managers / leaders and people living close to the forests and trees know best the local situation. Consequently, the management rights on ***public forest and tree resources*** of inhabited islands OR inhabited islands and uninhabited islands reserved for agricultural and forestry islands are to be given to local communities.

4. Strategies and key action

The strategies and key actions for each of the forest policy objectives, and special actions required to operationalize the Key Management Approach, are organized according to the main types of islands: inhabited islands, uninhabited islands (used for industrial purpose), and the tourist resort islands, the institutional and management set up being different in each case. Time frame for implementation is linked with the cycle of national development plans as follows:

Short term action (**ST**): 2 years:
Medium term action (**MT**): 5 years: by the end of the 7th National Development Plan (2010)
Long term action (**LT**): 10 years: to be implemented during the following (8th) National Development Plan

4.1 Awareness creation

There is a broadly perceived need for a major awareness campaign on the threats and opportunities related to forests and trees in Maldives. The present forest policy will be launched and communicated to people using a major awareness rising and information campaign mobilizing local mass media. (**ST**)

4.2 Inhabited Islands

Overall land management under the Local Councils. Technical guidance and advice to be provided by the Ministry of Fisheries & Agriculture.

Protection of coastline: Buffer zones are to be maintained and / or planted using multiple use salt tolerant, easily growing tree and bush species by the local authorities. The policy encourages the use of economically valuable and useful species so that some income can be obtained from the buffer zones through sustainable management and rotational harvesting of timber and / non-timber forest products. (**MT**)

Biodiversity conservation: There is normally little space for true conservation in inhabited islands in Maldives. Nevertheless, reintroduction of rare and threatened tree species to the forest, agricultural and urban areas of even densely populated islands is possible and encouraged. **LT**)

Landscape beauty: Suitable and well-growing shade and other amenity trees will be maintained and planted in increasing numbers in urban areas, particularly on common spaces such as road and street sides, public parks, port fronts etc. Fruit trees are best suited for planting on private housing plots. The procurement of high-quality seedlings of locally-adapted species and varieties, free of pests and diseases, will be mainly through commercially run nurseries by private sector and non-governmental organisations / community-based organisations, supported by the public agricultural and forestry extension services. (**LT**)

Forest and tree-based income: Growing of timber trees, fruit trees and multi-purpose trees is encouraged for the purpose of generating income to local people. Timber trees and multi-purpose trees can be grown on common areas such as buffer zones and community-owned forest areas. Fruit trees and some multi-purpose trees can be grown on private housing plots, and yards of offices, schools, health centres etc. Agro-forestry is strongly encouraged in agricultural areas. The staff of the agricultural extension service will be trained in agro-forestry, and they will provide training and technical advice to local people who practicing agriculture. (**MT**)

The handicraft /souvenir production is suffering from unfair competition by imported cheap items that are falsely labelled as "Produced in Maldives". Strong enforcement and control of correct labelling of origin is to be done by the Ministry of Economic Development to secure rightful information to the tourist and to protect the local souvenir production from unfair competition. (**MT**)

Decentralized management by devolution: Good management and sustainability of the ***public forest resource*** under the management / ownership of local communities is to be secured through participatory preparation, implementation and monitoring of simple 10-year management plans for forest and tree resources (**started: ST, continued to replicate: MT & LT**). The management plan is to be prepared by the resource manager, principally by the local community or the lessee / contractor, under the guidance of the ministry in charge of technical advice on forestry. Harvesting of timber from ***public forest resource*** is allowed only when there is a valid management plan approved by the ministry in charge of technical advice on forestry.

All timber and non-timber forest products harvested from forest and tree resources under the management of local communities are allowed to be sold to any client at prevailing market price to be negotiated between the seller and buyer. Possible taxes to be paid to the government must be duly paid according to the respective legislation. There will be no specific forest product tax on produce harvested from forests or tree resources owned by communities or private people.

Private forest and tree resources in Maldives are essentially private trees. There are no real private forests, though there are forest areas composed of privately owned trees. Such areas are to be managed following the traditional principles. No management plans are required. Privately owned trees are managed and used according to the wishes of their owners. The present policy strongly encourages increasing the number of privately planted trees, particularly on housing plots.

4.3 Uninhabited Islands (used for Agricultural Purposes)

Overall land management and technical guidance and advice to be provided by the Ministry of Fisheries and Agriculture.

Protection of coastline: Buffer zones are to be maintained and / or planted using multiple use salt tolerant, easily growing tree and bush species by the manager / lessee of the island. Similarly to the inhabited islands the policy encourages the use of economically valuable and useful species for income generation also from buffer zones. (**LT**)

Biodiversity conservation: Carefully selected uninhabited islands will be declared as conservation islands. [Ideally there should be at least one conservation island in each administrative atoll] OR [X% of land area of each administrative atoll should be declared as conservation areas.]. The conservation islands should be identified and selected based on their present and potential biodiversity value. Economic and social realities must be duly addressed in the conservation process; this means that small uninhabited islands would be more likely candidates for conservation that economically more important larger islands. Privately managed conservation islands (e.g. under the management of tourist resorts) can be taken into consideration when assessing the compliance with this policy, provided the conservation area under private management has similar legal status with other conservation areas in terms of permanence of the conservation. Any existing investments by local communities, individuals or companies on islands to be conserved should be fully compensated. (**LT**)

In other uninhabited islands that are managed for agricultural purposes, the biodiversity conservation will focus on securing sustainable management and maintenance of adequate amount of woody vegetation. On agricultural islands no less than 50% of the land area should be under forest and tree cover (regulation: **MT**). The coastal buffer zone, if under forest cover, can be included in the forest and tree cover area.

Landscape beauty: No specific strategies or actions needed on agricultural islands.
Forest and tree-based income: Similarly to inhabited islands, growing of timber trees, fruit trees and multi-purpose trees on the agricultural islands is encouraged. The use of agro-forestry techniques is strongly encouraged, and related advice will be provided by the staff of the agricultural extension service. (**MT**)

Some selected larger uninhabited islands, or parts of thereof, could be allocated specifically for forestry purposes, with special reference to growing valuable fast growing / relatively fast growing timber species to be used in boat building, wood working etc. (**MT**)

Well managed industrial scale / semi-industrial scale fruit production could also be possible on some selected larger uninhabited islands, either on pure stands (mono-culture) or preferably using mixed stands (combination of different fruit tree species) and / or agro-forestry systems. (**LT**)

Decentralized management by devolution: The management of the agricultural uninhabited islands is under the mandate of the Ministry of Fisheries and, Agriculture. The management responsibility of the agricultural islands is transferred to the agricultural leaseholders, either under varuvaa lease or a long-term 21-year lease agreement. From the forest management point of view, trees taking a long time to grow and their planting and management requires significant efforts and risk taking for a longer period of time, the long-term lease arrangement is by far the better and more recommendable system of transferring the management rights. The present forest policy encourages the MoFA to gradually phase out all varuvaa leases, whenever possible, and place respective agricultural islands under bidding for long-term lease. (**LT**) Successful bidder /lessee should be requested to prepare a simple forest management plan, to be submitted for the approval of the ministry, for the management of forest and tree resources on the island (on agricultural islands no less than 50% of the land area should be under forest and tree cover). (**MT**) Harvesting of timber from agricultural island by the lessee is allowed only when there is a valid management plan approved by the ministry in charge of technical advice on forestry.
The same rules as those in inhabited islands will be valid for the sale of timber and non-timber forest products.

4.4 Tourist Resort Islands

Overall land management under the Ministry of Tourism and Civil Aviation. Technical guidance and advice to be provided by the Ministry of Fisheries and Agriculture.

Protection of coastline: Buffer zones are to be maintained and / or planted using multiple use salt tolerant, easily growing tree and bush species by the manager / lessee of the island. (**MT**)

Biodiversity conservation: Biodiversity conservation on tourist islands will focus on securing sustainable management and maintenance of adequate amount of woody vegetation. On tourist resort islands no less than 80% of the land area should be under forest and tree cover. The coastal buffer zone, if under forest cover, can be included in the forest and tree cover area. (**LT**)

Landscape beauty: This is particularly important for the tourist resort islands. Professional landscape architecture / landscape planning is strongly recommended for each new tourist resort. Locally produced seedlings of shade and other amenity trees are recommended. If imported seedlings are used, they must fulfil international phytosanitary standards, and pass necessary quarantine measures to prevent introduction of pests and diseases. (**MT**)

Forest and tree-based income: Apart from small-scale fruit production and other multi-purpose production of tree-based products for the use by the staff living on the resort island, no other forest and tree-based production and income generation is encouraged on resort islands.

4.5 Forest Legislation

The revision of the relevant legislation if necessary and possible additional legislation enabling the implementation of the present policy will be prepared by the Ministry of Fisheries and Agriculture in consultation with other relevant ministries, and enacted by the government. (**ST**)

4.6 Capacity to Manage the Forest Sector

The small Forestry Unit should be established (**ST**) under the Ministry of Fisheries and Agriculture to:

- Follow-up the policy implementation, and to initiate the policy revision when needed
- Lead the preparation and enforcement of the proposed forest legislation
- Provide overall guidance and technical advice on all issues related to forests, trees and forestry to different departments of the government and central and local levels, as well as to non-governmental stakeholders
- Supervise and monitor the preparation, implementation and up-dating of the simple obligatory forest management plans

In order to establish necessary outreach / presence in the atolls, the Forestry Unit will work in close cooperation and establish a formal staff sharing agreement with the agricultural extension service of the ministry, and / or establish formal cooperation agreements with NGOs / CBOs in the atolls and islands with the aim of having an outreach network covering all the atolls in Maldives.

5. Programs / Activities

5.1 Rehabilitation of Coconut Groves in Maldives

Being about 80 percent of Maldives vegetation Coconut Palm has always being given an importance over others. Coconut palm is a multiple use tree and considered as one of the ten most useful trees in the world. It plays an important role in the economy and food and nutritional security of the people of the Maldives. Mature kernel is eaten as food and shredded kernel is used in curries, sweets and desserts. Cream extracted from the kernel is also used in curries and sweets and flavouring of a variety of local dishes including fish curries. Oil extracted from dried kernel (copra), which is rich in glycerine, is widely used in cooking and used to make soaps, shampoos, shaving creams, toothpaste, lotions, hydraulic fluid, etc. A sweet juice extracted from a clump of unopened flowers is easily boiled down to syrup, called coconut molasses, which is crystallized into a light brown or dark-coloured sugar. Left standing, it ferments quickly into a beer called “toddy”. After a few weeks it becomes vinegar. Husk of the nut contains fibre, which is combed out and sold as coir, a material for making rope and coconut matting. Fibre is resistant to seawater and is used as cables and rigging in ships, for making mats, rugs, bags, brooms and brushes and also as olive oil filter in some European countries. In the Maldives, trunk wood is used for house construction and outer wood, which is hard, heavy, strong and close-grained, is used for boat building. Mature fronds are commonly woven into thatching material, walls of temporary buildings and screens. Shell, which is hard and fine grained, is carved into all kinds of objects including souvenirs, drinking cups, scoops, smoking pipe bowl etc. Charcoal from the shell is used for cooking fires, air filters, in gas masks, submarines and cigarette tips. Regarding uses in traditional medicine, young leaves are used in the Maldives in the preparation of *rughaglu beys* used to treat muscle sprains and bone fracture. It is an excellent source of firewood; various part of the tree such as

leaf stalk, husk of the nut, leaflets, rachis etc., are used as firewood. It is one of the ideal species for coastal bioshield and can play an important role in it as a commercially important tree. Varieties of coconut: In the Maldives, the following varieties of coconut are commonly found: *Nulu ruh* (tall variety with green-coloured fruit), *Rathu ruh* (tall with red-coloured fruit), *Kuhi ruh* (tall variety with green- and red-coloured fruit), *Jafanah ruh* (short variety with green-coloured fruit) and *Dhanbu ruh* (short variety with red-coloured fruit). Among these, *rathu ruh* is more abundant and both *rathu* and *nulu ruh* are cultivated mainly for oil. The famous *kurumbapani* of the Maldives is the coconut milk of *dhanbu ruh*.

In 2012 Ministry of Fisheries and Agriculture started a programme of rehabilitation of the existing vegetation as the current stand was getting old. Under the programme target is to plant more than 10000 seedlings every year and creation of coconut palm stands. In light of the importance of coconut palm ministry have taken the action to create a Coconut Improvement Department in the ministry. In the coming years this department will play and essential role in diversifying the use of coconut palm, its rehabilitation and monitoring. Already, value addition projects are been implemented such as virgin coconut oil project. Under the project facilities were created in five islands communities engaging the NGOS's specially women. The programe provides extra income and employment opportunities to them.

5.2 Conservation and Protection

Being a country vulnerable to climate changes and developing at a fast phase, it's important to conserve and protect some pristine ecosystems for the future generations. As such in coordination with ministry of environment and energy and environment protection agency, islands are been protected. Under the law, it's the responsibility of EPA to enact such responsibilities. Thus coordination between the stakeholder agencies has to be strong in order to protect and conserve the natural resource.

In 2011 Baa Atoll with an area of 174 000 ha was declared as a UNESCO Biosphere Reserve. Baa Atoll, lies approximately 125km NW of Male', the capital of the Maldives. It has a total area of approximately 1,200 km^2. The atoll is comprised of 75 islands; 13 of these are inhabited with a combined population of approximately 12,000 people. Six islands have been developed as resorts; the remaining 57 islands are uninhabited. Baa Atoll, particularly its extensive coral reefs, harbours globally significant biodiversity including significant concentrations of whale sharks, manta rays and marine turtles, and also a unique diversity of benthic fauna, including rare pink hydrozoans corals (Distichopora nitida), Bryozoans (Bugula) and sea slugs (Tambja olivaria) that are only recorded from Baa atoll. Baa has a particularly high density of the ring-shaped reef forms called faroes, a peculiar reef structure unique to the Maldives, as well as other unique reef forms. Baa Atoll also has one of the largest areas of mangroves in the central part of the Maldivian atoll chain, and one of only two roosting sites in the Maldives for the frigate bird (more than 10,000 individuals). The proposed core areas and buffer zones comprise 11 geographically separate units of coral reefs, islands and mangroves, which have been selected for their important biodiversity. These are surrounded by a continuous transition area comprising mainly reefs and lagoons, but also inhabited, uninhabited and resort islands.

The core area comprises of 9 legally protected separate units of coral reefs, islands and mangroves, which have been selected for their important biodiversity. Each unit has its proper buffer zone. The Biosphere reserve is delimited by a continuous transition area comprising mainly reefs and lagoons, but also inhabited, uninhabited and resort islands.

The most important human activities in the area are tourism (six resorts) and fisheries. Whilst resorts have become the main economic driver, tuna and reef fishing remains an important activity. Production of handicrafts and other materials for the tourist industry is also significant.

It is the vision and target of the government that by 2020 the whole of Maldives to be declared as a biosphere reserve.

5.3 Monitoring of Forest Resources

In order to sustainably and better use of forest resource a proper assessment of the resource is a must. Forest assessment has been hindered by budget constraints and capacity of staff. In order organize the information about the forested islands a web based data system has been compiled by the ministry. "Atollsofmaldives.gov.mv" is a portal by which information about islands will be available to all interested parties, and this is the building block for forest assessment in Maldives. The site will cover general details to environment, historical, aquatic, vegetation and land tenure.

Assessment and monitoring of forest resource is always a difficult thing. This is doubles in case of Maldives where is the islands are so dispersed. Thus, decentralized mechanism is most suitable. As such under the decentralization act, monitoring of the resources are been gradually handed over to atoll councils. This will ensure a more responsible and better management of resources within each atoll.

5.4 Agroforestry Programme

Forestry sector in Maldives will be difficult stand on its own because of the scare resource and usage. Thus the sector needs to be tied with tourism and agriculture to better harness the resource and manage it. In order to better utilize the forested area and decrease the area of land converted to agriculture from forestry ministries is promoting agroforestry. This integrated management will up lift the socio economic of the island dwellers. Also with the sustainable and environmentally sound practices would minimize the impact on environment.

Trainings are been conducted to farmers on this regards and sample plots are been established in Hanimaadhoo Agriculture Center. Still more awareness and knowledge sharing needs to been done in order to effectively establish this system in Maldives. Already in some islands agroforestry has is been practiced.

6. Challenges

Being and island nation feeling brunt of global warming and its consequences has faced us different challenges. Some, natural and man-made challenges. With the changes in global environment more and sever torrential rain storms are been seen in Maldives. Coupled with sea

swells this has led to distruction of forest cover, especially in littoral forest. At the same time human impact on the resource has also lead to the reduction of forest resource. With the rapid development and urbanization more forest area are been converted to housing plots or other use.

Agriculture sector in Maldives has been developing and at fast phase and its one of the main source of income for island communities, thus more and more land area been converted to agriculture areas.

Changing government polices is another challenge, that is difficult to predict and adapt. Thus, more concrete polies need to be developed with future plans. Also institutionally forest sector needs to develop with emphasis on capacity building of its staff.

7. Opportunities and Way Forward

In spite of many challenges many opportunities for development of the forest sector is present in Maldives. Draft forest policy states the role of forest as "Green Maldives with protected coastline, plant diversity, amenity and **income to local people, through participatory management of forests and trees by local communities".** As such areas that are being developed and will be developed in the coming years are

Agroforestry: As mentioned previously this will reduce the loss of forest area to agricultural activities and will play a vital role in the food security and employment opportunities to island dwellers.

Eco-tourism: As the leading in come source for Maldives, eco-tourism will play a vital role and promote the island forestry concept. This will influence communities to be responsible and manage the resource in more sustainable and environmentally friendly manner.

Conservation & Protection: Every year more and more forested areas are being listed as conserved or protected areas. This will aid in understating the resource better and divulges a bit of the natural resource to the next generations.

Participatory forest management: Under decentralization act, each island council has to prepare a land use plane for the island, in which forest area has to be designated. Role of the ministry is to set the standards and guideline by which the forest area will be managed, which will be foster the most sustainable economic benefits without underestimating the natural resource.

Non-wood forest products: This is an area that still needs a lot of research and assessment. To an extent NWFP are being utilized by the communities, but their real economic and social benefits are not yet studied. Some of the NEFP currently harvested are; *Terminalia catappa* (Nuts), Gums for caulking boats, Coconut leaf, Coconut fruit, Coconut honey, Panadanus fruit, Bread fruit , Mat sedg/reed grass and Edible leaf-*Launaeea sarumentosa.*

Map of Maldives

Forest Island of Maldives

Mangroves of Maldives

Crab

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Executive Summary

Forests are crucial for the livelihood of millions of people in the developing countries by providing an array of benefits and services. Despite high importance of forests accounting their full range of contribution in the socio-economic development has received less attention. This paper illustrates policy innovation and contribution of participatory forestry in Nepal focusing at community forestry promotion. The community forestry in Nepal was popularized over the last 35 years to address deforestation through the common property resource management user groups. The country has transferred about 1.70 million ha of national forests into community forests to over 18,000 local level autonomous and self-governed community forest user groups. The program has contributed in the livelihood welfare of a large number of community forest user group households through subsistence, cash income, employment generation and income equalization. The community forestry user groups are now established into a well-organized and powerful democratic civil society institution. The Institute of Forestry under the Tribhuvan University in Nepal has evolved as a strong academic institution in producing human resources for management and research of the country's forest and natural resources. The institute has proven abilities and research capacity in providing policy feedback for addressing the current issues and challenges in the management of natural resources and community forestry in the region.

Keywords: *community forestry, forest user groups, rural livelihoods, environmental resource valuation, governance*

1. Introduction

Forests are crucial to the livelihoods of millions of poor people in developing countries. Forests provide an array of livelihood options, from the consumption and sale of forest products, by providing inputs for agriculture, and through employment. Household surveys and case study research show that poor tend to be disproportionately dependent on forest resources (Angelsen and Wunder, 2003). Forests also offer an important reserve, which poor people can rely on in times of their economic hardship. In addition to timber and Non Timber Forest Products (NTFPs), forests provide a range of environmental services and are important cultural and religious heritage. Not only poor people but also richer rural families make use of forest ecosystem goods and services for earning income (WRI, 2005). Numerous research show that the rich commonly derive or exploit more environmental income, in absolute terms, than the poor do, primarily due to their higher asset holding, e.g. livestock needs grass (Cavendish, 2000; Twine et al., 2003; Fisher, 2004; Narain et al., 2005; WRI, 2005, Rayamajhi et al., 2012).

Participatory forestry was popularized in late 1970s as an alternative approach for managing common pool resources which has also challenged the Hardin's theory "Tragedy of the Commons". Number of papers (such as Ostrom, 1990; Ostrom et al., 2002) have explained on common pool resources that are self-governed where actors, who are major appropriators of the resource, are involved over time in making and adapting rules within collective-choice arenas regarding the inclusion or exclusion of participants, appropriation strategies, obligations of participants, monitoring and sanctioning, and conflict resolution. Some common-pool resources that are located far centers of governmental authority are governed entirely by appropriators and are not governed at all by external authorities (Tachibana et al., 2001; Sakurai et al., 2001; Otsuka and Place 2001; Tachibana and Adhikari,, 2009). Empirical evidence has been put forward to support the proposal that local people are capable of managing natural resources through collective action (Hobley, 1996; Ostrom, 1990; Sakurai et. al., 2004). Collective action in community based natural resource management is pivotal in formulating rules for allocation of the benefits and costs among local people. Given that the collective action is possible for common pool resource management under the right conditions (Ostrom, 1999).

Over the last several decades, there has been an increasing concern over the alarming rate of loss of biodiversity in spite of devolution of power to the local level. Whereas rural incomes have on average increased in developing countries, natural forests have been disappearing at a high rate (Sunderlin et al., 2005). This situation has highlighted the daunting and largely unmet challenge in reconciling livelihood improvement and forest conservation in developing countries. Policy makers and scholars have casted doubts as to whether the two interrelated objectives of poverty reduction and forest conservation are in fact attainable. Furthermore, Sunderlin et al. (2005) stresses that there are substantial information gaps concerning the degree to which forest resources can contribute to poverty alleviation, and the compatibility of forest based poverty alleviation and forest conservation objectives. Despite the high economic importance of forests quantitative approaches to estimate the economic value of forest products and other environmental resources at household-level across different sites have only recently

been developed and experiences on using such methods are only presently emerging. This paper attempts in exploring the policy and contribution of participatory forestry in Nepal focusing to community forestry and also the role of academic institution in promoting community forestry.

2. Advent or Initiation of community forestry in Nepal

Community forestry is one form of participatory forestry in Nepal which now aims to contribute to the goal of poverty reduction, livelihood improvement and environmental conservation. It is still a major program in Nepal with gradual shift in focus in the forestry sector. The program was initiated with the aim of meeting subsistence forestry needs of local people and also reducing environmental degradation by transferring management responsibility to local people. It had emerged from the failure of classical forest management practice in controlling deforestation and forest degradation, especially in the hills. Participatory forestry in Nepal was formally introduced in 1978 by enacting legislation that allows transfer of forest management responsibility from the government to local *panchayat*[4]. The first national level community forestry project was implemented in 1980 in 29 hill districts with the aim of reducing ecological degradation and also increasing the supply of basic forest products for subsistence needs through people's participation (Manandhar, 1981). During the initial stage, the emphasis of the government and donor agencies was on resource creation through afforestation and reforestation projects. People's involvement in forest management was limited to activities directly related to the government project objectives (Collett et al., 1996). The policy of forest management through *panchayat* did not last for long as the need of establishing Community Forest User Group (CFUG[5]) was realized in the late 1980s as an appropriate local management bodies for forest management and implemented it accordingly. With notable success of community forestry in improving bio-physical environment, improving rural livelihoods and local institutions (Gautam et al., 2004; Pokharel et al, 2012) the government has initiated participatory approach in other areas as well such as protected area management and watershed area management. As experience gained, the government realized the potentiality of community forestry and initiated it as a tool for poverty reduction or livelihood improvement rather than limiting it to fulfilling basic forestry needs only.

3. Policy and Governance in Community Forestry in Nepal

On the basis of land ownership, forests in Nepal are broadly classified into two: national and private. For conservation and management purposes, national forests are further classified as government managed forests and different models of participatory forestry namely community forest, collaborative forest, leasehold forest, and religious forest. Nepal's forest policy is considered dynamic as there has been a drastic change in forest management practices transferring management responsibility from state control to local community. The National Forestry Plan of 1976 created space for local people through local *panchayats* in local forest management. The major emphasis of this policy was to engage local communities in protecting

[4] Lowest level political and administrative unit that was replaced by the term VDC after the 2006 political change
[5] A group of people who regularly uses a particular forest for various purposes and organize themselves in a group to protect, manage and utilize the forest by forming a group

new plantations without devolving any authority to local people (Kanel and Dahal, 2008). After the enactment of the Decentralization Act, some progressive policies were formed in 1982 to empower local communities. One such milestone on the way to community empowerment was the provision to form "forest user group" which was introduced by Master Plan for Forestry Sector (MPFS). The 25-year MPFS in Nepal was prepared during 1986 – 88 and recognized community and private forestry program as the largest among the six primary programs. The plan emphasized the need of establishing CFUG as an appropriate local management body responsible for the protection, development and sustainable utilization of local forests rather than *panchayat*. Since then CFUGs were considered as the local management bodies and the management responsibility was transferred accordingly. The MPFS, approved by the Ministry of Forests and Soil Conservation (MFSC) in 1989, was the first long term plan in Nepal's forestry sector which provided a long term (25 years) policy and planning framework. The MPFS guided forestry development within the comprehensive framework of six primary (community and private forestry, national and leasehold forestry, wood based industries, medicinal and aromatic plants, soil conservation and watershed management, and conservation of ecosystems and genetic resource) and six supportive (policy and legal reforms, institutional reforms, human resource development, research and extension, resource information system and management planning, and monitoring and evaluation) programs to achieve the objectives. The main features of the plan lied in an integrated and program oriented approach to forest and watershed management. This program approach was a turning point in the history of Nepal's forestry sector policy (Amatya, 2002). The plan clearly mentioned the following points related to community forestry:

- No ceiling on the area of forests to be handed over
- Handing over of forests to the local users and not to the *pnchayat*
- Involvement of women and poor in the management of community forests
- All accessible forests in the country to be handed over to the user groups to the extent that they are willing and capable to manage them
- A changed role for the forestry staff for advice and extension
- Community forestry to be regarded as the priority program of the forestry sector

With the guidance of the MPFS (1988) and lessons learnt from the past, a new Forest Act of 1993 and Forest Regulations of 1995 were introduced in the country. The new Act is recognized as innovative and progressive in forestry sector (Belbase and Regmi, 2002) which recognizes local people as key partner for managing forest resources (Pokharel et al., 2012). The new Act further strengthened community forestry by providing legal basis for implementation of community forestry and also recognized CFUG as self-governing, autonomous corporate bodies for managing and using community forests according to a community forest operational plan.

Governance in community forestry addresses the relationships, rights, responsibility and incentives among stakeholders including forest communities, industries and government (MFSC, 2013). Similarly, it focuses on pro-poor governance with the aim of benefiting poor and vulnerable people by securing their representation in the executive committee. An executive committee is one forum of CFUGs where management decisions related to community forestry are made through their representatives. CFUGs are required to include 50

per cent of women in the executive committee and also required to offer the post of either chair or secretary to a woman (MFSC, 2009). Similarly, they are required to invest 25 per cent of their income to forest development and maintenance, and pro-poor programs, respectively (ibid). The remaining income can be used as per the need and interest of community.

4. Outcomes of Community Forestry

4.1 Forest Management

Community forestry is well established management practice in forestry sector (Pokharel, 2009) and is the second largest forest management regime in Nepal under the national forest category. As of July 2013, Nepal has transferred over one-quarter of national forests to 18,132 CFUGs as community forests involving over two-fifth of the country's population (Table 1). Community forestry program in the country has made remarkable progress in rejuvenating forests in the denuded hills. Several studies indicate that the condition of community forests has been improved substantially (Branney and Yadav, 1998; Tachibana et. al., 2001; Gautam et al., 2004; Tachibana and Adhikari, 2009). Community forestry program is based on the policy that emphasizes people's participation in the development and management of forest resources by transferring management responsibility from the Department of Forests to CFUGs, who are willing and able to practice forest management. The concept and process of community forestry is well appreciated both nationally and internationally (Pokharel, 2008). Toney Hagen, a renowned Swiss expert to Nepal once said that if the community forestry concept and process were followed in other development sectors, Nepal would soon become a Switzerland in Asia.

Table 16 Present status of community forestry in Nepal

SN	Particular	Area/number
1	Total land area of Nepal (million hectares)	14.7
2	Total forest area of Nepal (million hectares)	5.83
3	Potential community forest areas (million hectares)	3.5
4	Forest area under community forests (million hectares)	1.70
5	Percentage of the country's forest areas under community forestry	29
6	Total number of CFUGs managing community forests	18,132
7	Total number of women CFUGs managing community forests	800
8	Total number of households involved in community forestry (million)	2.23
9	Percentage of women members in the executive committee	40

Source: CFDP, 1991; DoF, 2013; MFSC, 2013

4.2 Income Generation and Expenditures

CFUGs in Nepal are not managing forest resources only but generating products and income for users as well. Once the forest is handed over as community forest, the CFUG can fix the price of forest products and also sell the surplus in market. CFUGs are legally authorized for the sale of forest products and spend the generated income on forest development and various community related development works. The generated income is not shared with the government rather it accrues to their account. The annual income of the CFUGs in Nepal is estimated to be over US$10 million (Kanel and Niraula, 2004). Two separate studies

(Pokharel, 2008; Pokharel et al., 2011) show that on average the annual income per CFUG is Nrs. 63,202 and Nrs. 81,388, respectively. The former study also argues that the income can be increased by nearly five times by removing timber subsidy. Giving timber subsidy is common practice in a community forest.

The generated funds are being used in different activities including forest development, community infrastructure, pro-poor activities and forest administration – indicating that CFUGs are not limited to forest management and income but are also involved in different aspects of rural development (Chhetri et al., 2012b, Lund et al. 2013). The average annual investment of Nepal's CFUGs is estimated to be over US$5 million (Kanel and Niraula, 2004; Kanel, 2004). Similarly, the average annual investment per CFUG was Nrs. 51,574 (Pokharel, 2008, 2009). CFUGs have invested the generated income in many aspects of local development such as school building, temples, roads/trails construction, water reservoirs, biogas systems and community halls. A study conducted by Pokharel (2008) in the mid-hills shows that 100 CFUGs have invested approximately Nrs. 6 million in local infrastructures in five years. By investing generated income in different development activities, CFUGs are creating economic opportunities to rural people as well. It is estimated that the activities of Nepal Swiss Community Forestry Project (NSCFP) generated 16,080 employments of 90 days full time in a year (Pokharel et al., 2008). The total benefits within the NSCFP area per year from the employment generation were estimated to be Nrs. 43.4 million (Bhattrai, 2011).

Income generation through forest conservation has also started in Nepal by setting up PES mechanism and the Kulekhani hydropower project is one of them. Upstream communities received US$2,712 for the first time in 2006 from Kulekhani hydropower project. The amount was provided to the KWCDF to carryout out income-generation and conservation awareness programs. From the following year (fiscal year 2006/07), the DDC began providing money to the Environmental Management Special Fund to implement conservation and development projects. The local communities are receiving about US$63,963 annually, which is an additional budget for community development. This money has been used for different community development activities.

4.3 Rural Livelihood Promotions Focusing to Poverty Reduction

There is an increasing consensus among the policy makers that the community forestry can contribute in promoting rural livelihoods if managed properly and adopted the policy of good governance. The government initiated rural livelihood promotions by making mandatory for CFUGs to invest 35 per cent of their income from community forestry in pro-poor programs (MFSC, 2009). Pro-poor is a new concept in the community forestry, which aims helping poor to improve their economic condition by supporting the activities that generate income. Flow of loans, allocation of forest lands for cash crops, training to build skill for self-employment, scholarship, and financial support to poor are the activities under the pro-poor programs (Pokharel, 2008). Two separate studies (Pokharel, 2009; Pokharel et al., 2011) show that CFUGs have invested 22 and 38 per cent, respectively of their income in pro-poor programs with flow of loans being the major activity undertaken. Flow of loans is a popular program where CFUGs invest overwhelmingly under pro-poor programs (Pokharel, 2008, 2009). The people are attracted towards the flow of loans due to easy access in terms of official procedures

and travelling distance (Pokharel, 2009), which has also facilitated to increase the financial transaction in the village. Generally, loans in CFUGs are distributed among the forest users where the executive committee makes the decisions regarding the recipients and size of the loans. CFUGs in Nepal are investing a significant amount in giving out loans to their members. The total annual investment of 84 CFUGs in giving out loans to their members was Nrs2.24 million (Pokharel et al., 2011).

In highlighting the importance of forest products to livelihood a study conducted by Rayamajhi et al. (2012) in lower Mustang area shows that total forest environmental income on average contributes 22% of an average household's total income from all different income sources combined. This indicated a remarkably high reliance on the natural resource almost as much as on the income derived from agricultural products alone (ibid.). The study also points out that the less poor have higher absolute forest environmental income but lower relative forest environmental income while the opposite is true for the poor. Furthermore, the forest environmental income is decomposed by income source, arranged by major use groups, across quartiles (Table 2). The table shows that most important product groups are fuel wood and livestock browse and graze: in case of fuel wood the absolute value is constant across quartiles while the relative importance decreases with rising income; in case of browse and graze both the absolute and relative values increases with decreasing income; these figures clearly show the importance of forest products to all income groups whereas with higher reliance among the poor.

Table 17: Total annual household (n = 180) forest income (NPR) per adjusted adult equivalent unit by source and quartile, lower Mustang District, Nepal, 2006

Income sources	Poorest		Poor		Medium		Less poor		Sample mean	
	Lowest 25%		25 - 50%		50 - 75%		Top 25%			
	Abs[b]	Rel[c]	Abs	Rel	Abs	Rel	Abs	Rel	Abs	Rel
Fuel wood/charcoal	1582	35	1666	26	1848	19	1795	20	1723	25*
Browse and graze	568	11	1148	18	1834	20	4237	30	1947 *	20*
Timber/furniture	229	3	1198	9	1978	12	4429	11	1959	9
Bamboo/ bamboo products	1050	15	1176	14	1646	12	676	6	1137	12
Leaf litter/fodder grass	653	13	779	12	1396	14	1261	13	1022 *	13
Mushrooms/ wild vegetables	662	15	661	11	1016	15	879	12	805	13
Forestry wages	177	3	622	5	691	4	232	2	430	4
Poles/ sticks/ utensils	133	2	131	2	231	2	166	2	165*	2
Wild fruits/ MAPs/others	114	2	164	2	215	3	412	4	226	3
Total forest income	5168	100	7545	100	1085 5	100	1408 8	100	9414 *	100

([a] 1 USD = 65 Nr, [b] Abs=Absolute income, [c]Rel=Relative income. For each income source and quartile, these are calculated as the means of individual household forest income shares (and not just simply the share of the aggregated income in aggregated forest income) in order to reduce the influence of extreme individual household values on the means, * Means significantly different between income groups ($p<0.05$))

In Nepal, income inequality increased from 1995/96 – 2003/4 with Gini coefficient[6] changing from 34.2 to 41.1% with a net decline in headcount poverty rate from 42% to 31% (World Bank, 2006). Rayamajhi et al. (2009) indicated a five per cent improvement in income equality with the inclusion of forest environmental income, indicating that forests play small but has potential role in income equalization. A possible explanation is that all households participate in the extraction of essential forest products. The poor households inclusive of *dalit* have few assets and thus may not immediately be able to use more forest products for improvement of livelihoods and income generation.

4.4 Institution Development

One of the major successes of Nepal's community forestry is institutionalization of CFUGs for the management of community forests. CFUGs have established themselves as a strong institution at local level and there are over 18,000 local institutions[7] where local people make decisions regarding forest management and developmental activities. CFUGs are the only institution at local level that survived during the period of Maoist insurgency in Nepal (Pokharel et al., 2012). Moreover, they argue that CFUGs have proved as an effective democratic local institution by holding elections regularly to choose their representatives in the executive committee as compared to the government where the government has not been able to hold local election for the last one and half decades. An increasing interest of women, poor and marginalized groups to take part in the decision making processes has also been observed in community forestry. Women representation in the executive committee and occupying key positions is in increasing trend and also their representation is significantly higher than local government institutions (Pokharel et al., 2012; Pokharel and Tiwari, 2013; MFSC, 2013). Nearly 800 women run CFUGs and 40 per cent of women representation in the executive committee indicates that women are coming forward and taking the leadership. There is a representation in the executive committee not only women but also from poor and marginalized groups which has facilitated them to empower by making aware of their rights, rules and responsibilities. Number of studies (such as Pokharel et al., 2010; Pokharel and Tiwari, 2013) show that the executive committee is more or less inclusive in terms of gender, poor and marginalized groups.

By giving the space for all members of the community to have a voice in forest management decisions, community forestry has contributed to the development of local democracy as well. Moreover, it has supported inclusive democracy by ensuring equal representation of women and men in the committee and also reserving 33 per cent of leadership position for women. It is mandatory for CFUGs to represent 50 per cent women in the executive committee and also

[6]Gini coefficient is good measure of income equality and has been applied in analyzing the role of forest income in rural income equalization

[7] The list is exclusive of user groups formed under various other participatory natural resource management approaches in the country e.g. protected area buffer zone, leasehold forestry, and watershed management.

required to give them at least one key position. In many cases, CFUGs have proved themselves as an effective local institution. They have served as good model for development and attracted the planners and policy makers to follow the model in other sector as well. There is an increasing trend of different development providers to use CFUGs as entry point for the development works in rural areas. A network of national level Federation of Community Forestry Users in Nepal (FECOFUN) has emerged and is democratically functional as a strong and powerful civil society organization.

5. Institute of Forestry and its Role in the Development of Nepal's Community Forestry

Human resource is one of the crucial factors for a program to succeed and this factor was considered wisely in Nepal while visioning participatory approach in forest management. The MPFS (1988) highlighted the need of human resources' particularly mid-level and junior forest technicians in order to achieve the targeted goals envisioned by the forestry sector master plan. The plan also projected employment over 2 million in forestry sector. The government encouraged with the plan established the Institute of Forestry in Pokhara in 1987 at a cost of US$5 million loan from World Bank to produce mid-level and junior forest technicians. In the early 1990s the IOF brought massive change in its curricula by introducing participatory courses such as community forestry, forestry extension, eco-tourism, bio-diversity and watershed management. The new curriculum was drafted by IOF faculty with the assistance of American partner teachers and was ratified by faculty board which includes the representative of Ministry of Forest and Soil Conservation. The intention of new curricula was to orient the graduates working with local people emphasizing bottom-up approach in forest management rather than limiting them in traditional forestry science emphasizing top-down forest management. It is noteworthy to mention that the new curriculum was effective in orienting the graduates towards establishing working relation with local people who played a vital role in promoting participatory forestry in the country. The MFSC consumes nearly four-fifth of IOF graduates who are involved in managing nearly 40 per cent of the country's forest coverage including community forestry (Pokharel, 2012).

From the beginning of the new millennium the IOF started to produce Masters level technical human resource and also embarked on offering PhD level research. This gave a new dimension to the IOF in directing more research in its academic curricula and the role of the IOF is paramount in carrying out research and outreach activities that is supported by a number of donor agencies through long and short term research collaboration and support. In this front major contribution has been made by the USAID project in infrastructure development during the 1980s and a Danish long term research project for establishing research base in all the three physiographic zones of the country. The DANIDA funded Community Based Forest Management in the Himalaya (ComForM) I-III from 2003 till 2013 was instrumental in developing research culture at the IOF. The long term forest product valuation (Rayamajhi and Olsen 2008) and panel household income studies complemented with forest growth monitoring in permanent sample plots (Puri et al. 2013) are the major research activities under this project with over a dozen scientific articles published in international journals as major outputs.

5.1 Academic Programs

The IOF offers four year Bachelor, two year Master and research based PhD programs which aims to advance forestry knowledge through applied research, train the students in a wider range of academic and professional skills to fulfil personal, societal and national needs and to explore the new areas of teaching and research relevant to the country's' developmental needs. So far, the IOF has already produced 2,500 field level forestry technicians, around 1,500 BSc and 150 MSc and 2 PhD forestry graduates. The IOF has phased out two year proficiency certificate level program very recently.

5.2 Research Activities

The importance of research at the Institute of Forestry can be seen in the form of rising expectations, greater competition for external grants and the possible decline in state funding. In addition, faculty members are eager to increase the quality and quantity of their research in ways that enhance their teaching and enrich learning experience of the student. Research activities are often embedded in national and international partnership agreements; from small-scale national peer-to-peer contacts to large-scale international research programs. IOF operates her institutional researchers through various projects by mobilizing her faculty and students and also on a peer-to-peer basis in many academic networks; regional, national and international. IOF has been developing and expanding the task of research activities in recent years. Collaboration with several projects is steadily growing in carrying out research in and outside IOF.

All BSc and MSc final year students are required to conduct research on subjects of their choice for the partial fulfilment of the requirement of their Degree at respective levels. Respective instruction committees (departments) accept the research proposals, and allocate supervisors accordingly. Proposal may be on topics that are biological, socio-economic and institutional in nature or some combination of any of these. In recent years, many students are highly attracted to carryout climate change related researches and linking the effects of climate change to rural livelihoods. Academically competent students are receiving funding support to carrying out their research from various funding agencies such as Winrock International Nepal; World Wildlife Fund (WWF); Nepal Swiss Community Forestry Project; Livelihood for Forestry Program; Hariyo Ban Program, and DANIDA fellowship through Natural Resource Management Sector Assistance Program (NARMSAP). The IOF manages several research sites in different ecological settings. A number of studies are being conducted at these sites in accordance with the research priorities.

At present, IOF has an ongoing DANIDA supported ComForM Project and the two others, NUFU (NORAD supported) and MemCoE (Memorial Central of Excellence, USAID) has just been terminated. The overall objective of these projects were to enhance the capacity of teaching and research at IOF, to develop the institute facilities, to train faculty/staff and to develop network and linkages with European, American and Asian universities to ensure quality of teaching and research.

6. Current Issues and Challenges of Community Forestry

There are some contradictions observed in the forestry laws. Though Forest Act 1993 is much progressive than many other Acts of Nepal, it is still insufficient to meet the larger spirit of national constitution. Forest Act 1993 illustrates that CF rights are originated from the state in its entirety (HMG, 1993). Thus, the users entertain only usufruct rights of management of forests and do not have direct ownership rights to the CF land. Users state that "*Mandro sarkarko, biskun hamro*"(we are drying our grains in the mattress of the government). Several inherent contradictions are observed between Forest Act and Local Self-Governance Act about the control over natural resources. For example, according to Local Self-Governance Act, the authority to control forests that exist in the village area remains within Village Development Committee (VDC). However, according to Forest Act, CFUG are authorized to decide on CFs irrespective of the authority of VDC. Similarly, the Forest Act also has conflicts with Land Acts, Nepal Mines Act and acquisition of forestland under Public Road Act, Electricity Act and Water Resources Act. The policy objective of CF is to fulfil basic need such as fuel wood, fodder and timber of local people living nearby forests. Currently, many CFs are moving towards commercial use of the forest products however, CFs still remains poverty alleviation resource in the policy arena. Such contradiction is leading many confusions and conflict among different user groups and government due to lack of clear policy guidelines.

The key challenges are also to change the attitude of government officials and other non-government agencies that have traditionally been hierarchical and technical in character. Developing systems for improved internal decision making within FUGs and building beyond the existing DoF-FUG relationship to look at how FUGs can be integrated into the wider fabric of institutional relationships at local and district levels is also equally important. Challenges in the valuation of provisioning services: Contribution of the rural livelihood through ecosystem services is a new concept at present. It is very difficult to obtain a reliable indicator for forest ecosystem services. Even though many of the ecosystem services are intermediate in nature and do not enter directly into household income. Overcoming existing bottlenecks to the pricing, trade and marketing of the valuable forest environmental based NTFPs has good potential for poverty alleviation and biodiversity conservation (Larsen et al., 2000). In addition, there is a need to empirically develop valuation methods (equations) for many of the forest environmental products including livestock graze and browse (Rayamajhi and Olsen 2008).

Finally, the poverty alleviation and public finance potential of forest resources in Nepal have remained rhetoric. More research is needed on understanding the root causes of poverty, equity and complexity of human-nature relations in different scale, time and contexts. Collecting more information on households' vulnerability to poverty, through both quantitative and qualitative methods, could help to formulate better policy options for helping the poor to improve their livelihoods. Research on ecotourism, payment for environmental services, and carbon sequestration should also be carried out to provide policy feedback where forest benefits can be shared with local communities.

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ROLE OF FOREST TO SOCIO-ECONOMIC DEVELOPMENT IN NEPAL- Prabhat Sapkota, Nepal

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Executive Summary

Poverty reduction and sustainable Socio-economic development are major challenges of 21st century. Forest sector is widely known source to address these problems. On the other hand the increasing population, over dependency of people on the forest resources for daily forest products needs has created tremendous pressure on the forest resources. It reduces the resource base as well. In this context this paper tries to assess the role of forestry sector program on socio-economic development and poverty reduction based on literature review.

Major policies, programs, activities, their achievements and challenges and opportunities were assessed with respect to poverty reduction and socio-economic development and economic contribution for the nation. The most influencing policy in the forestry sector of Nepal is the Master Plan for Forestry Sector which enabled the favorable environment for the success of community forestry in Nepal. It has covered more than 28% of national forest providing benefit to about 35% of the total population. Leasehold forestry for poor has significant positive impact on poverty reduction. Collaborative forest management with three collaborators Central Government, Local Government and Local Users is found a bit more successful in plain areas of Nepal (Terai) region that covers the distant users as well. Similarly, the forest based industries and NTFP Program also has positive impacts. However there is a lot of space for further improvement. The protected area system has covered more than 23% of national area and has helped incredibly for tourism and employment. The contribution of forestry sector to Gross Domestic Production seems about 9% when calculating the direct benefits only and the amount is very big when the indirect goods and services are taken into account. However, many organizations have calculated it differently and there exists a great deviation in the amount. The absolute poverty line in Nepal has reduced from 42 to 25.4% due to various programs; however the Ginny Coefficient shows greater difference between rich and the poor.

The major issue in Forestry Sector in Nepal is protection oriented forest management system. Most of the forests is under-harvested due to inactive forest management. It has not only reduced the forest health but also missing a large sum of money, income and employment opportunities. There is a strong need to apply scientific forest management principles in management system to reverse the system and multiply the benefits by many folds.

Key words: *Forest, Socio-economic, livelihood, GDP, Poverty, Nepal*

1. Introduction

The agenda 21 of United Nations Conference on Environment and Development (UNCED) recognized poverty as global problem. It clearly emphasized the role of natural resources management for poverty reduction. Accordingly, the Government of Nepal (GoN) has also applied forest as means for poverty reduction. Covering an area of 147,181 square kilometers, Nepal is located in between China and India. The country's altitude ranges from 70 m above sea level in the south to 8,848 m at the summit of Mount Everest. So it experiences a wide range of climates, ranging from sub-tropical in the lowlands to the arctic climate in the high mountains. It harbors a total population of 26.49 million with 1.35% annual growth rate. About 83% of the total population lives in the rural areas (CBS,2012).

About 25.16 percent of Nepal's population lives below the poverty line, i.e, about seven million are "The Poor"(CBS,2011). Forestry sector's role in poverty reduction has been widely acknowledged in state policies like Poverty Reduction Strategy, Five years/three years plans of the recent years and Agriculture Development Policy (Dangi et al, 2008).

Forest is the base for agriculture, industry, water sources, environmental balance, tourism and many more (DoF, 2012). Its role has been realized more important for poor and developing countries for their livelihoods. The economy of many countries like Nepal and others having similar situation can not be geared up without forest resources as their rural economy depends on fuelwood , fodder, forage, farming, ploughing etc.. Subsistence farming is the mainstay of household economy. There is strong symbiotic triangular relationship among agricultural practice, livestock farming and forest. The forest area covers 39.6% of total area of Nepal (DFRS, 1999) and fulfils more than 70% needs of national energy and more than 40% feeds of livestock (MFSC, 2012). The conservation, management and utilization of forestry sector greatly helps for socio-economic development and has immense contribution (27.55%) on Gross Domestic Production(GDP) with 9.45% directly and 18.1% indirectly(Oli, 2007). However, some organizations have underestimated the contribution in GDP as they don not count indirect values of the forest based goods and services. .

The forest resource has been facing a great pressure due to growing population and high dependency of rural people on it. Encroachment, illegal felling, poaching, landslides, illegal collection of sand and stones from forest are most common problems. As a result, the forest area has decreased at an annual rate of 1.7%, whereas forest and shrub together decreased at an annual rate of 0.5% during the period of 1978/79 to 1994. Later studies during 1990/91 to 2000/01 by Department of Forest in 20 Terai districts revealed that forest cover decreased at an annual rate of 0.06% from the period of 1990/91 to 2000/2001 (DoF, 2005). Deforestation and degradation are a serious concern in many countries around the world and also in Nepal. As a result, the forest cover of around 60% in the 1960s had shrunk to 29% in the 1990s (Adhikari, 2002). This is why World Bank in 1978 postulated that this region would be devoid of trees by 1993.

The present situation is quite contrast to the World Bank's declaration due to proper planning and implementation of Master Plan for Forestry Sector Program in Nepal along with planned development program. The plan emphasized community forestry as most weighted program in

Nepal. About 35% of total population is taking benefit from community forestry. It has covered more than 28% of national forest (DoF, 1012).

Now the changing paradigm has brought other issues as livelihood, good governance and sustainable forest management. Now the time to assess the socio-economic contribution of forest has come. It will be fruitful to share the ideas not only within national level but within the regional level and the other areas where the similar condition exists.

2. Objectives and rationale

The general objective of this paper is to assess and analyze the socio-economic contribution of forest for poverty reduction in Nepal and to share the ideas and knowledge within SAARC member states and the specific objectives are to introduce major forest management policies, programs and activities in terms of socio-economic development and poverty reduction assess contribution of forest in national economy identify the major opportunities and challenges and give a way forward. Since the UNCED, 1992 agenda 21 recognized forest as one of the most important sectors for integrated poverty reduction strategy. This paper helps to know how different countries are utilizing a forest resources for their socio-economic development which may shearing ultimately may lead to common understanding for its the betterment .

Forest resources are delicate resources and the large landscape level conservation with combined effort has been realized. Such type of shearing helps for the same in the landscape level conservation.

3. Methods

This paper is mostly based on literature review, field experience of the author and group discussion with the professionals and sharing with academia of this field.

4. Results and Discussions

4.1 General Status

4.1.1 Forest Status and its trend

The last National Forest Inventory (NFI) was carried out in the early nineties in Nepal. According to that inventory, forest and shrub together cover about 5.83 million ha, which is 39.6% of the total land area of the country (table 1).Table 1: Forest cover change from 1060 to 1994.

Table 1. Change of forest cover over the years.

Cover type	1960	1978	1986	1994
Forest	56	38	37.4	29
Shrub	4	4.7	4.8	10.6
Total	60	42.7	42.2	39.6

Source: GoN,2009, Nepal Forestry Outlook Study

The rate of forest area decrease was 1.7% per annum during 1978/79 to 1994, whereas the rate of forest and shrub depletion was 0.5% per annum during the same period. Population growth rate during the period was 2.54% annually which is the main causes of over forest destruction. So that World Bank in the late 1970s postulated that this region would be devoid of trees by

1993. Later studies from 20 Terai districts revealed that the rate of forest cover change was at an annual rate of 0.06%, during 1990/91 to 2000/2001. Macro level studies and visual interpretations revealed that Nepal's forest coverage and condition is significantly improving due to the Community Forestry (CF) intervention.

There are 35 major forest types and 118 ecosystems found in Nepal. In terms of growing stocks *Shorea robusta*, *Quercus* spp, *Terminalia alata, Pinus roxburghii, Abies spectabilis, Rhododendron* spp*, Alnus nepalensis, Schima wallichii, Tsuga dumosa* are the major tree species. Based on the last NFI, total stem volume (over bark) of reachable forests is 388 million cubic metres and the total biomass of stems, branches and leaves is 429 million tonnes (air dry). For the whole country, the projection of total volume and biomass is estimated at 759 million cubic metres and 873 million tonnes respectively. The mean stem volume (over bark) of Nepal is 178 cubic metre/ha, the mean stem volume up to 10 cm top is 131 cubic metres/ha and the average number of stems per hectare is 408.

4.1.2 Policy Status

The history of forest management shows the management strategy has changed over the time. During Rana regime before 1950 the strategy was to convert forest land into agricultural land to feed the growing population (Acharya,2012). Most of the accessible forest was also privatized. In 1957 all the private forest was again nationalized. Due to such policy effect there was a heavy deforestation during 1960s (table 1). The saying "Green forest Nepal's treasure" was popular all over Nepal and still, forestry for prosperity is the motto of Ministry of Forests and Soil Conservation Nepal (MFSC,2012). This certifies that the forest is one of the great resources for poverty reduction and socio-economic development in Nepal. Major policy statement for poverty reduction and socio-economic development are as follows.

Master Plan for Forestry Sector (1089-2010)

The Master Plan for Forestry Sector (MPFS, 1989) is the key document for forest sector management in Nepal for a period of 21 years (1989-2010). The long-term objectives of the MPFS were as follows:

- to meet people's basic needs for fuelwood, fodder, timber, and other forest products, and to contribute to food production through an effective interaction between forestry and farming practices,
- to protect land against degradation and other effects of ecological imbalance
- to conserve ecosystems and genetic resources and
- to contribute to the growth of local and national economies by developing forest management and forest-based industries and creating opportunities for income generation and employment.

To meet these objectives, six primary and six supportive programs were designed focusing on decentralization, income and employment opportunities.

Forest Sector Policy, 2000

This policy updates the objectives of Ministry of Forests and Soil Conservation. High priority is given to sustainable livelihoods of people through the scientific management of productive forest of plain areas (Terai and inner Terai) of Nepal. It has designed collaborative forest

management (CFM) with joint support of three collaborators as local government, forest users both nearby and the distant and the central government.

Bio-diversity Strategy, 2002

The Nepal Biodiversity Strategy, 2002 envisions a prosperous life of the Nepalese people through biodiversity conservation and wise use of the diverse natural resources in the country. It highlights the close linkage of biological diversity for the livelihoods and economic development. It has widely been taken as the text and reference document to guide biodiversity conservation and socio-economic development.

National Wetland Policy

Wetlands are very important for biodiversity conservation, livelihood improvement and economic development. Nepal is rich in wetland biodiversity as well. The major objective of this policy is to prevent overuse and misuse of wetlands to contribute for sustainable livelihoods of the local people.

Herbs and Non-timber Forest Product (NTFP) Development Policy, 2004

The Herbs and NTFP Policy (2004) aims at encouraging livelihoods options through the sustainable use of medicinal and aromatic plants (MAPs) and NTFPs as a source of income generation to the local people. It also promotes, inter alia, regeneration, processing, production, sale and distribution of MAPs and NTFPS; commercial cultivation and ex situ conservation to contribute to employment opportunities and national income; development of NTFPs collection and processing centres; and support for technical knowledge, skill, know-how and marketing to improve the living conditions of the poor people.

Leasehold Forest Policy, 2002

Leasehold forestry is one of the participatory models practiced in Nepal. One of the three categories also known as pro-poor leasehold forestry purely targets on poor people in which a small piece of forest land is handed over to a group of identified poor for certain period of time to carryout income generation activities.

Periodic Plans

A planned effort for development in Nepal was started since 1957. Infrastructure developments, fulfillment of basic need, rural development were the most common objectives of the plans. Poverty has been a major challenge for the country. Poverty reduction program was initiated since 8th five year plan (1992-1997). The 10th plan (2002-2007) specially focused on poverty reduction that synchronized with Millennium Development Goal (MDG) so it was also called as poverty reduction strategy paper in Nepal.

The recently completed three years interim plan (2010/11-2012/2013) aims at reducing poverty through productivity enhancement, employment and expanding livelihood opportunities (Forestry for prosperity). The major strategies of forestry sector were scientific forest management, participatory and decentralized forest governance.

4.2 Programs and Activities

Followings are the major programs, associated policies and activities designed to implement the above policies.

4.2.1. Community and private forest development program

Community forestry is a strategy to improve the condition of forests in the Mid-hills as well as satisfy the basic needs of forest products of rural people. Tamrakar & Nelson (1991) calculated that there are 3.5 million hectares with potential for community forestry in Nepal. Community forestry involves handing over use rights and management to local people who have traditionally used the forests and are willing to accept management responsibilities.

GoN's policy is to adopt community forestry for all accessible Mid-hills and high mountain forests as well as in some Terai districts. The main components of the programme are the formation of user groups, the preparation of operational plans, plantations where appropriate, and training to strengthen the organizational capacity of user groups and to improve the skills of field staff and the users in forest management. Other components include seedling distribution, training, tree planting related activities and management, and registration of private forests.

4.2.1.1 Policy and legislation

Community forestry in Nepal has evolved through policy restructuring and the strengthening of rules and regulations on local control over forest resources. The first legislation that encouraged involvement of local people in natural resource management was the National Forestry Plan of 1976. Community forestry was implemented, and later the Decentralization Act, 1982 and the MPFS, 1989 specified provisional strategies for the phased handing-over of all accessible Mid-hills forests to user groups. The Forest Act, 1993 and the Forest regulations, 1995 reaffirmed the government's policy of assigning more responsibility to the local communities (NBS,2002).

The Forest Act, 1993 classified forest into National Forests and Private Forests. Any forest, excluding private forests, whether marked or unmarked within a forest boundary, is the National Forest in Nepal. According to the Forest Act, 1993, there are five sub-categories of National Forest (table 2).

Table 2: Forest category based on Forest Act, 1993

Forest type	Management objectives	Responsible institution
National Forest		
Forest Managed by GoN	Production of forest products	District Forest Offices
Community Forests	Production of forest products and multiple purpose use	Forest user groups
Leasehold Forest	Rehabilitation of degraded forests, production of forest products, tourism	Leasehold groups, NGOs, Industries
Religious Forests	Protection of religious site	Religious institutions

Protected Forests	Protection of wildlife, conservation of environment, soil and water	Dept. of Forest, DNPWC, NGOs
Private Forest		
Forest of trees farms, land ownership of which does not belong to HMGN	Production of forest products	Individual, Industry, NGO

The 12th Interim Plan, (2010/11-2012/2013) with motto "Forestry for Prosperity" encourages poverty reduction through productivity enhancement, employment and expanding livelihood opportunities.

4.2.1.2 Major Achievements

According to the database of the Community and Private Forestry Division of the Department of Forests, about 16,00,000 hectares of forest (28% of national forest) were handed over to 17,809 forest user groups by the end of 2012 .About 35% of the total population of the country is benefited with this program. Nepal has demonstrated that community forestry is a viable strategy for the rehabilitation of abandoned and degraded lands through plantations and by fostering the return of a diversity of species. It has made easy access to basic forest goods and services. Community forestry has also contributed to an increase in natural regeneration.

The Department of Forests carried out a forest cover change study of 20 Terai districts in 2004 revealed that the rate of forest cover change was at an annual rate of 0.06% during 1990/91 to 2000/2001. Macro level studies and visual interpretations revealed that Nepal's forest coverage and condition is significantly improving due to the Community Forestry (CF) intervention.

4.2.1.3.Challenges and opportunities

There is no doubt that Community Forestry has brought substantial contribution to livelihood improvement and poverty reduction with enormous indirect contributions to economically poor and socially excluded Forest User Groups. However, there are some issues, which need to be

addressed. The issues in forest management are found changing with time (Fig 1).

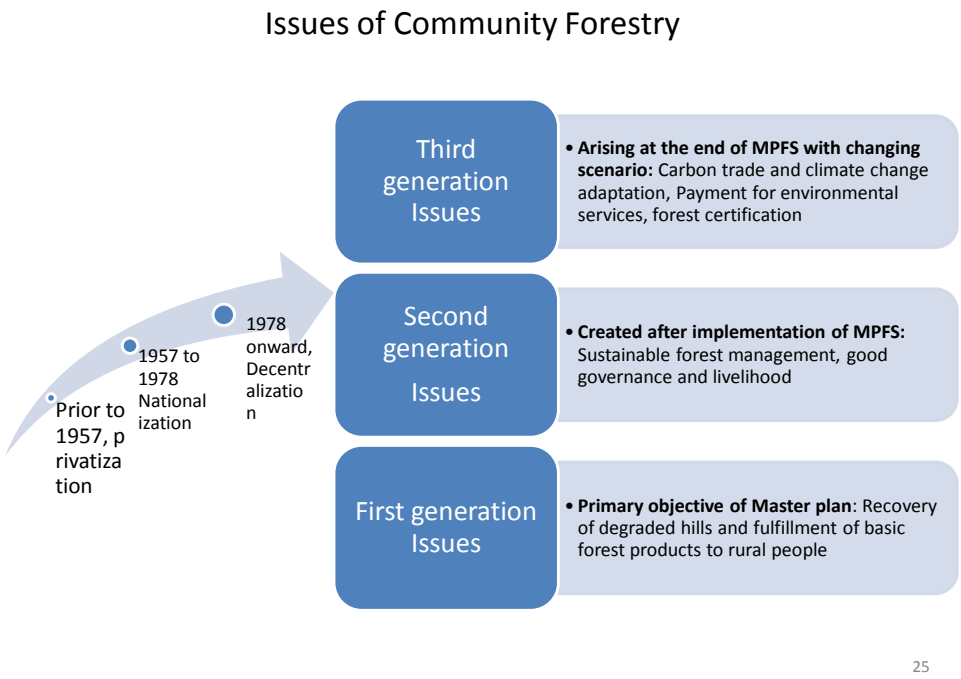

Figure 1: Issues of Community Forestry and its with respect to its generation

The issues are mostly categorized with respect to the MPFS,1980 as it is the most influencing document for community forestry in Nepal. The Private Forest Nationalization Act, 1947 nationalized all private forest which were given by the Rana Rulers to the individuals who served them. The people missed the ownership of the land and over exploitation took place. Looking with the broad view, the first generation issues were the recovery of the denuded hills and at the same time fulfillment of basic forest goods and services. The second generation issues were the issues which came after implementation of the plan for about two decades after realization of the contribution of forest for livelihood. It was realized that livelihood can be improved through sustainable forest management and practicing good governance in the forestry sector. The third generation issue includes all the issues coming at the end of the plan. Most of them came along with national as well as international issues of forest management such as carbon trade and Climate Change adaptation, payment for environmental services and forest certification, eco-tourism etc.

Specific analysis of the community forestry shows that there is protection oriented forest management system that hardly allows to harvest the full potential of the forest. Thus there is huge gap between theoretical forest product capacity and actual forest product harvested and utilized (Subedi,2011).

Besides these, there is very poor linkage among Forester, Forestry and Market. In one hand the forester's are hardly applying the scientific forest management principles to increase forest productivity that one the other hand there are several non foresters working in the forestry sector. There is no risk to be noticed immediately, however we are missing huge amount of

forest products, royalty, income and employment opportunity due to those above mentioned reasons.

Besides these there is lack of good database system. Although the scenario has changed the MPFS, 1989 has been taken as reference data for many forestry articles.

The Community Forestry Inventory Guideline, 2004 guides to prescribe sustainable harvest but it does not support to the good health of the forest. It estimates 1 to 5 % of the total stock as annual increment according to species whatever may be the condition of the trees i.e. old, young, dead etc. It also neglects age class structure of forest when prescribing harvest leading to improper forest health.

The Community Forestry Development Directives, 2009 has created a good opportunity for socio-economic development and poverty reduction. It has addressed the second generation issues of community forestry (sustainable forest management, good governance and livelihood of poor) properly. It guarantees to maintain good governance with balance participation of all marginalized groups of people including women in program planning, implementation and benefit sharing. It further emphasizes public auditing and public hearings. It is especially pro-poor focused and there is compulsory provision of well being ranking so that poor are given more opportunity for income generation activities and the forest products can be distributed in lower rate. In addition to these there is clear provision to invest the 25% of fund for forest development and 35% fund for pro-poor focused program and other as per their prioritized need. Since the Community Forest User Groups (CFUGs) earn huge money from various source such as entry fee, penalty, forest product sale, donation from different organizations and government etc. The annual monitoring report of the Forest User's Group (FUG) shows positive initial result from the case study of different districts (Kaski, Tanahu, Syngja), however overall comprehensive study is still inadequate.

Besides these the community forestry program is well supported by government but the private forests though have enough contributions are inadequately supported by the program.

4.2.2 National and Leasehold Forestry Program

National and leasehold forestry aims to develop and manage forest resources through government agencies or private sector leaseholders, complementing community and private forestry. All areas that have not been handed over to FUGs as community forests or set-aside as leasehold forests and that are not religious forests are either Government-Managed Forests or Protected Forests.

These forests are managed according to approved Operational Forest Management Plans (OFMP). All responsibilities and rights of use of such forests remain with the Department of Forests. Improving the productivity of natural forests, developing forests on degraded areas and protecting forests on both sides of rivers and streams and environmentally sensitive areas are the major activities of the national and leasehold forestry programme.

Most of the government managed forest is without management for long time. Only the management is collection of dead and fallen trees in lower plain area (Terai). Most of the Non-timber forest products are collected from such government managed forest by the poor. The higher altitudinal grassland type national forests are very rich in high value and low mass products such as Yarsa Gumba (*Cordyceps sinensis*) which has tremendous opportunity of livelihood upliftment for the poor. The royalty of Yarsa gumba is only Nrs 10,000 /kg (approximately US$ 100) but the market value in Pokhara and Kathamandu is Nrs 7,00000/kg to 15,00000/kg where as average annual production is more than 3 quintals annually and more is harvested illegally. It shows immense opportunity of income and employment through such NTFPs (DoF,2012).

Currently another model of forest management system named collaborative forest management system in which the central government, local government and the local uses manage the forest jointly is being little bit more suitable and successful in Terai (southern plain areas of Nepal) and inner Terai. Its main aim is to include the distant users too in forest management and utilization activities through scientific forest management. Large blocks of Terai and inner Terai has been initiated with collaborative system of forest management. However, several efforts were made for effective management but it was failure with different political and other reasons in the past.

4.2.2.1 Collaborative Forestry

Collaborative forestry is being alternative to community forestry in Terai area of Nepal. Community Forestry is not practicable in Terai due to number of reasons. The users are not clearly identified, difficult to protect as it is accessible in all areas with vehicle for even illegal harvesters, most of the area is close to international boundary (India) and the traditional users are being distant users while the new encroachers as the close to forest. In this scenario the Terai forest is facing encroachment, frequent forest fire, and illegal felling. The government is also missing a big amount of royalty. Thus in this situation collaborative forestry with the partnership of local people, local government and central government is thought to be win-win model of forest management and found successful compared to other models. Distant users of forest are the focus of this program.According to this model, forest management activities are carried jointly and the benefit is sheared 50% to local area and 50% to the government.

Policy and legal status

The Master Plan did not envision this program in the Terai area however, the revised forest policy, 2000 is the base of the Collaborative forestry. The collaborative forestry has poor legal status and is under implementation by the directive of collaborative forestry. The directives of collaborative forestry were made based on Forest Regulation, 1951. However, it is under process for amendment to be recognized legally similar to community and leasehold forestry.

4.2.2.1.1 Achievements

After the introduction of collaborative forest management system the Terai forest management is gaining momentum. About 30 thousands hectares of productive forest is being managed with this system involving more than 3oo thousands households by 13 Collaborative Groups. More emphasis has been given to forest health and scientific management of the forest.

Challenges and opportunities

Benefit sharing and handling large group is being a challenge. It has weak legal status. However, scientific forest management for increased forest production and productivity is the opportunity of this program which can ultimately support for socio-economic development and poverty reduction.

4.2.2.2.2 Leasehold Forest for poor

Among the different types of leasehold forestry the pro-poor leasehold forestry is being more popular for twin objectives of land improvement and poverty reductions. The marginal lands, shrub lands, river bank areas, evacuated land from encroachment are handed over to a small group of identified poor groups to bring them out of poverty. Generally the household size for each group is 10-15 and average area is 0.5 hectare. The land is provided in lease for 40 years. The land ownership remains with government while the forest products ownership of such land remains with the group. The group carry out different income generation activities including improved grass and fodder, fruits trees in the land. Goat keeping, buffalo keeping for milk are common practices for income generation in such lands.

Policy and legal status

The Leasehold Forestry Policy, 2002 is the main guiding document. The forest act 1993 allows handing over the degraded land as leasehold forestry for the poor. MPFS,1989 designed it as one of the major programs. Similarly, the agricultural perspective plan (APP), 1995 emphasized leasehold forestry for Terai area. The previous and current periodic plans also have recognized the role of leasehold forestry for poverty reduction.

4.2.2.2.3 Achievements

The data from Department of Forest (DoF) shows there are 4001 Groups which manage 20450 hectare forest area covering 39, 465 households. The degraded forest has been recovered, the people have better linkage and idea for adaptation in degraded land, they have better linkage and coordination within and among groups, the income earned has been invested for education, health and domestic purposes. Thus, it has contributed to all assets of livelihoods i.e. physical, natural, social, human and economical. About 4% of the total poor under poverty line have got opportunity to escape from poverty line through this program.

4.2.2.2.4 Challenges and opportunities

Most of the programs are donor oriented. Degraded land is provided to poor people. The degraded land needs a big money to its rehabilitation so it is difficult to carry out such activities when they have no fund. The policy is favorable but leasehold forestry gets second priority. The duration is too long which is 40 years and needs at least two generation to complete.

Besides these there is great opportunity to rehabilitate and convert the degrade land into the productive one with negligible cost and to escape from poverty.

4.2.3 Forest based industry and utilization of medicinal and aromatic plants (MAPs) program

This programs aims at developing forest-based industry for income and employment. Forest-based industries in Nepal use both wood and non-wood products. Wooden handicrafts,

furniture, hand-made paper production, plywood and parquet are the industries that use wood products. Some enterprises, such as rosin and turpentine, herbal medicine, Sal seed oil and cane furniture production use Non-timber Forests Products (NWFPs).
Policy and legal status

The MPFS in 1989 gave emphasis to forest-based industries. One of the long term objectives set by the MPFS is to contribute to the growth of local and national economies by managing forest resources and forest-based industries, and creating opportunities for income generation and employment. It identified the development of forest-based industries as one of the six major programmes of the plan.

4.2.3.1 Achievements

A total of 478 forest-based industries have been established so far in Nepal. Of the total, 463 are wood-based and 15 are non-wood-based industries (FRISP,1998). Most of these industries have been established in the Terai and Siwalik region. There are about 46 veneer mills in the Terai region, which export their products mainly to India. There is one bamboo-based factory in Nepal that produces export quality bamboo products. The NWFP based industry has been showing signs of growth in Nepal despite armed conflicts in the past. The numbers of traders and industries are increasing each year. NWFPs can provide new opportunities to increase national income as well as the incomes of common farmers many folds.

Sustainable management of MAPs has been the subject of increased research and technical support since the 1990s. This is due to the realisation that the resource is being collected in an unsustainable manner in many parts of Nepal, particularly in the highlands, and that local people and the Nepalese economy are not receiving the potentially large economic benefits from their exploitation. Training programmes on harvesting techniques, propagation of some NTFPs such as Lokta and Chiraito, and resin tapping have been initiated in many districts. The Herbs Production and Processing Company, Ltd., launched a special programme for promoting NTFP cultivation and management in 25 remote districts, although it processes only a small fraction of the total harvest in the country owing to inadequate human resources and poor capacity. Humla Oil Pvt. Ltd. has been established to ensure the sustainable management of Jatamansi and equitable sharing of benefits amongst the local people in Humla district, who are benefiting from the local processing. Marketing links are being developed and user groups have been established as the first step in managing this resource in the wild.

4.2.3.2 Challenges and opportunities

Changing rules and regulations, political conflict, difficult in identification of NTFPs, inventory and calculation of sustainable amount of harvest and market confirmation are major constraints. However, there is big chance of utilizing them when managed sustainably.

4.2.4 Conservation of ecosystem and genetic resources program

Nepal comprises only 0.1% of the terrestrial area of the earth, however, has outstanding assemblages of plants, animals and ecosystems in a remarkable physical setting. It occupies 26th position and 11th position on the global and continental scales respectively.. It has 118 ecosystems with 75 vegetation types. Nepal possesses over 2.7 percent of the world's flowering plants, 5 percent of bryophytes, 3percent of pteridophytes, 9.3 percent of the world's bird

species and 4.5 percent of the world's mammal species. About 19.7 percent (28,999 km2) of the total area of the country is under the protected area system to conserve the representative biodiversity and outstanding landscape of the country (MFSC,2009).

The conservation of biodiversity, ecosystem and genetic resource has long term impact on livelihood and economic development of the people. Thus this program aims at conserving the rich ecosystem, species and genetic diversity of the country for better livelihoods of the people.

4.2.4.1 Policy and Legal Status

More than dozens of policy, acts and guidelines are functional for the conservation of biodiversity, ecosystem and genetic resources. Nepal Biodiversity Strategy, 2002, and its Implementation Plan, 2006-2010 are the most important guiding documents. The biodiversity strategy is also the commitment of the Government of Nepal (GoN) to conserve the immense diversity of the country and the obligation of the country as the signatory member of convention on biological diversity.

4.2.4.2 Achievements

Nepal has created impressive array of protected areas in order to include viable samples of biodiversity found in the country. There are 10 national parks, 3 wildlife reserves, 1 hunting reserve, 6 conservation areas and 12 buffer zones around the park and reserves, totaling more than 3.4 million ha of country's land, which counts to above 23% of the land of Nepal directly committed to biodiversity conservation (Acharya, 2012). Out of the total tourists visiting Nepal about 45% visit protected areas (NBS,2002) which has created good opportunity for extra income from tourism.

4.2.4.3 Challenges and opportunities

Increasing population and the same trend of energy consumption, timber and fodder requirement are creating pressure for the protected area system due to over demand of increasing population of the forest products. However, solar energy, biogas, hydropower, petroleum products as other alternatives are increasing. There is further tourism development opportunity for livelihoods of the local people utilizing the protected area system. The genetic diversity can be utilized for bio-prospecting i.e. use of biodiversity for commercial benefit as well.

5. Contribution to National Economy

It is well accepted that the forestry sector contributes a lot to the national economy. However, the methods used to estimate the contribution is different used by different organizations. Some include only direct benefits while others include indirect as well. On the other hand, sometimes, the contribution of forestry sector is combined with agricultural sector.

Comprehensive study on the contribution of the forestry sector to the GDP has not yet been carried out, but needs to be done. By the end of the Ninth Five-year Plan (1997- 2002) agriculture together with the forestry and fisheries sectors had a 39.3% contribution to the national GDP (NPC, 2002) whereas the figure was 34.9% by the end of the Tenth Five-Year Plan (2002-2007) (NPC, 2007). It is estimated that the forestry sector alone has a 15%contribution to the national GDP (HMGN, 2000). On the other hand, FAO has estimated

that the forestry sector contributed 3.5% to the national GDP in 2000 and 4.4% for the period of 1990 to 2000 (FAO, 2004). Recently, the contribution of agriculture and forestry is 32% (DoA, 2011).

The study by Department of Forest Research and Survey Center in 2008 has used production approach of estimating the contribution of forestry sector to the national GDP based on "Full Costs and Benefits Accounting". The value addition for the goods and services were estimated first and then aggregated to estimate contribution of forestry sector to total GDP of Nepal. As a result , the estimated GDP from the forest sector is estimated to be about 27.5%, which is much higher than the previous one.

The fact is more than 70% domestic energy requirement and 40% animal feed is supplied by forest (MFSC, 2012). Out of the total tourists visiting Nepal about 45% visit protected areas (MFSC,2009) where the contribution of tourism is estimated about 4%. Under estimation of contribution of forestry becomes problem in budget allocation in forestry sector as the government distributes the budget based on the contribution.

Analyzing the data within forestry sector more than 80% revenue was from timber and other 20% was from NTFPs and others (DoF, 2006). The last five years data of department of forest from 2007-2012 indicates about 49% of supply of timber in market is from the private forest, 37% from community forest and only 14% from the government managed forest(DoF, 2012).

The department of forest data from 2007 to 20012 shows the royalty of US$ 2,74,42,610 while the investment for development of forest was only its 57% (DoF, 2012). One positive indicator of positive effect of all program is reduction of absolute poverty line from 1998 to 2010 which has declined from about 42% to 25.4%.

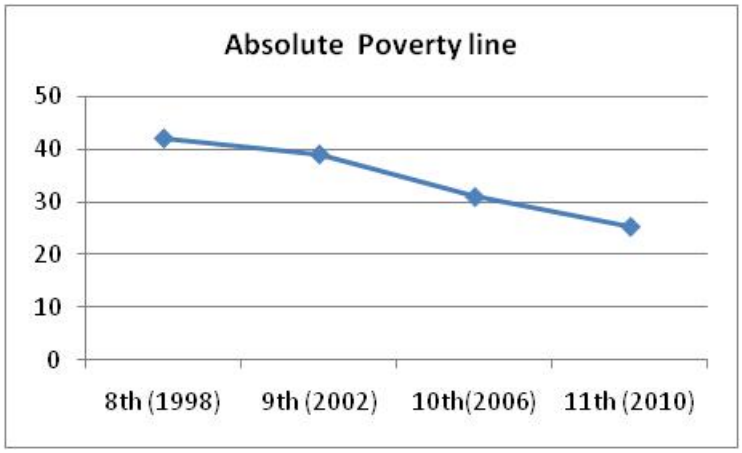

Figure 2: Trend of absolute poverty line in Nepal

However, Ginny Coefficient shows the disparity among the poor and rich is increasing. In average, currently, NRs 19,261 per person per year is poverty line (CBS,2011). It is approximately Nrs 53 per person per day. However, it differs with areas i.e. the amount is greater in Kathmandu and Pokhara while the amount is little bit lower in rural areas.

Forestry sector is directly contributing to the Millennium Development Goals (MDGs) 1,2,3,7 and 8 (Dangi et al,2008). Most of the people living near to the forest are poor and depend heavily on the forest. Studying the linkage of forest sector to MDG goals shown valuation of environmental services of forest sector and promotion of active forest management can increase the contribution of forest to national economy. Despite the big investment in different

forest management practices the outputs are inadequate to improve the livelihood of the poor because their needs are not properly addressed and the poor are also excluded from the benefit sharing mechanisms. Thus, the policies, acts, regulations and management regimes should be pro-poor focused and inclusive; forest should be managed sustainably with its full potential; and forest offers various economic and employment opportunities that should be optimally used.

The statistics (2007) shows that on average supply of timber and firewood from government managed forest is about 3 cubic feet per hectare per year of timber and 1 cubic feet of firewood per hectare per year. Similar data is observed from the community forest. Both the forests are under utilized because of passive forest management. The country is facing several financial loss while on the other hand deficits of forest products (Subedi,2011). It can be concluded that low productivity is due to absence of sustainable forest management system in place. The forest production can also be increased by technological innovations and promoting investment in forestry sector.

6. Conclusions

The forest status trend four 4 decades ago was sharply declining, however the trend has reversed now and most of the forest condition has improved. In overall the policies are favorable for livelihood improvement. Community Forestry is best suited in mid hills for easy forest products, income and employment to the rural communities. However there is enough room for improvement for addressing the livelihood and economic development issues through sustainable forest management maintaining good governance.

Collaborative forest is another model gaining momentum and successful in Terai Region for income, employment and better livelihood and socio-economic condition.

Protection oriented forest management; limited harvesting of potential production i.e. high gap between theoretical forest product capacity and actual forest product utilized are the key factors to be addressed immediately through scientific or sustainable management systems. It helps to increase production and productivity, maintains forest health, reduces illegal forest product harvesting, and maintains regular market and sustains the forest based income and employment opportunities as well. The linkage among three factors Forester, Forestry and market of forest products is week which should be improved to initiate scientific forest management which can improve the livelihood and socio-economic condition of poor people many folds.

The new global scenario shows Nepal can trap all environmental benefits, product benefits and other market benefits of carbon trade, ecotourism, payment for environmental services. However, it needs national commitment for political stability, timely improvement of rules and regulation. Above all, the most important way to multiply benefits and achieve the goal of "Forestry for Prosperity" is the initiation of scientific forest management that fully applies forestry principles into practices.

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CONTRIBUTION OF FORESTS FOR SOCIOECONOMIC DEVELOPMENT IN SRI LANKA - Meera Lebbe Abdul Majeed, Sri Lanka

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Forests Department
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Executive Summary

Sri Lanka is a tropical Island and has plentiful biodiversity because of the extreme variation in altitude and climate conditions. Around 78 percent of total population is living in rural areas. The closed canopy natural forest was 44 percent in 1956 and declined to 22.4 percent in 1999. Increasing population accelerate pressure on forest due to landlessness or lack of inadequate land and poor land tenure system. In-addition to legal transfer of forestlands to other land uses such as establishment of new settlement, village expansion, irrigation renovation and infrastructure development in the Island. One of the main causes of deforestation and forest degradation is the poverty. Forest Department has limited resources and manpower; it cannot control illegal harvesting by policing as the primary approaches for forest protection. So that since 1980, National Forest Policy and Forestry Sector Master Plan in Sri Lanka have promoted the concept of community forestry with the active participation of forest adjacent communities. The aim was created for effective participation on forest conservation while distributing forestry-based resources among local communities equitably to alleviate rural poverty.

There are number of projects implemented and trying to address the underlying issues on forestry in Sri Lanka from 1982. Based on experience & knowledge gained during the community forestry project and other projects periods, the Forest Department initiated self-operation on community forestry program from 2008.The second stage of CFP launched from 2012 with assistance of UNDP.

Anyhow the study shown that the involvement of local community participation from designing period is important and the collection of local community socioeconomics data, physical resources data and forestry related data are very much essential. A bottom up approaches should be implemented and post monitoring & continuous evaluation mechanism must be included after completion of projects. And also provide continuous community mobilization & awareness to local community and afford short-term benefits from forestry activities are also to be considered.

1. Country Profile

Sri Lanka is a tropical Island in the Indian continent and located in the Indian Ocean between 5^0 54'' and 9^0 52'' North Latitude 79^0 39'' and 81^0 53" East Longitude and 32 KM southeast of India. The total land area is 65,610 km^2. The current population is estimated 21,481,334 (July 2012 est.) and population density is 322.4 persons /km^2. The population growth rate is around 0.913 percentages (est. 2012). Sri Lanka is one of the most densely populated countries in the world ranking 19^{th} in population density. It is also second most populous nation among the countries in the South Asian Association for Regional Cooperation (SAARC). The 78 % of the population is occupying from rural areas and economy is predominantly agriculture and the annual per-capita income is around US $ 2,887 (Central Bank (CB) 2012).

Table 1: Number of poor persons and poor households (in million)

Sector	Total million	Male (M)	Female (F)	Poor persons,000	Poor households,000	Unemployment rate%	M	F
Sri Lanka	20.2	9.5	10.7	2805	571	4.0	2.8	6.2
Urban	3.6	1.7	1.9	184	32	3.7	2.5	6.1
Rural	15.7	7.4	8.3	2303	478	4.1	2.9	6.5
Estate	0.9	0.4	0.5	318	61	3.3	3.4	3.0

Source: 2006/2007 in Sri Lanka and Population in 2012(Censes Dpt.).

In the total population 47.2 % are labor forces and among them 4% are unemployed. The latest calculation of poverty indices shows that poverty level of the country reported 8.9% in 2009/10 (Department of Censes Household income and Expenditure survey 2009/10).

2. Forest Cover of Sri Lanka

In 2010, the forest cover estimated to be about 1,951,472 ha, which amounts to 29.74 percent of the total land area of Sri Lanka. The forest areas consist of 1.44 million ha of dense forests and 0.43 ha of sparse forests (Table 1). The per capita forest area is around 0.11 ha and the estimated annual rate of deforestation is 0.8 percent. Firewood and forestry contribute to national account as Sri lankan Rupees 36,010 million in 2011 and share to GDP as 0.6% (CB 2012). Income earned from forest products play a minimal role in household economy. It accounts only 0.04 percent of the total monthly household income.

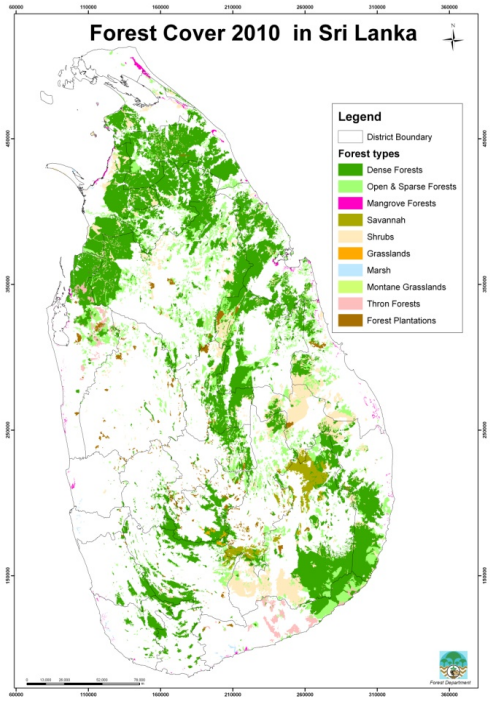


Figure 1.Forest Cover Map Sri Lanka 2010

	Extent in ha.	% of land Area
Montane	44,758	0.68
Sub-Montane	28,513	0.43
Lowland Rain Forests	123,302	1.88
Moist Monsoon Forest	117,885	1.80
Dry Monsoon Forests	1,121,392	17.09
Riverrine Dry Forests	2,425	0.03
Mangroves	15,669	0.24
Open & Sparse	429,485	6.55
Savanah	68,043	1.04
Total forest cover	**1,951,472**	**29.74**

Table 2. Forests Cover Extent in hectares

Table 3. Forests Plantation

Category	Extent (ha)
Teak	24,710
Eucalyptus	22,434
Conifers (Pines)	15,968
Mahogany	4,990
Acacia	3,808
Hora	280
Khaya	769
Miscellaneous	3,785
Total	76,744

Sri Lanka has initiated numerous activities to protect natural forests for their biodiversity and cultural as well as aesthetic values. Protected Forests areas are estimated to be around 16 percent of total area of Sri Lanka and administrated mainly by two Departments. Forest Department and wild Life Conservation Department are the main institutions for these administrations.

The Forest Department established in 1887 and it is administrated by forest Ordinance on 1907. The world heritage administrated by act National Heritage and Wildness Area -No.3 0f 1988.The Forests Department is administrating the following forest categories in table 4.

Table 4: FD administration of different forest categories.

Categories	Numbers	Extent (ha)
National Heritage	01	11,187
Conservation Forests	38	30,365
Reserved Forests	232	575,228
Residual Forests	257	563,567
Forests Plantations		76,744

Wild Life Conservation Department Established in 1939 and administrated by Fauna and Flora Protection Ordinance -No.2 0f 1937 and the following Forest areas are administrated as shown in table 5.

Table 5: Forest areas

Strict Nature Reserve	03 Nos.	31,537 ha	Sanctuaries	56 Nos.	283,326 ha
National Park	18 Nos.	505,449 ha	jungle corridors	02 Nos.	
Nature Reserve	07 Nos.	51,062 ha			

3. Forests in Context

As far as forest is concern, it plays a major role in Sri Lanka as providing environmental services such as protection of soil and water resources, habitat for animals, carbon sequestration, and other environmental functions. Certain amount of woods, fuel woods and non-wood forest products (resin, honey, fodder medicinal product). In addition to that it provides livelihood benefits to adjoining forests community for use in the agriculture practices, food and nutritional security, support rural economy and spiritual values.

4. Timber Source and Timber Supply

Sri Lanka comsumes about 694,000 m^3 Industrial round woods annually (FAO 2005). Owing to logging bans enforced in the natural forests, import of round woods have increased in the last few years. The forest plantation is providing about 6% of round woods through Timber Cooperation. The 60% of timber supply comes from non-forest areas such as rubber, coconut plantations and home gardens. The sources also supporting to timber supply in Sri Lanka shown in figure 2.

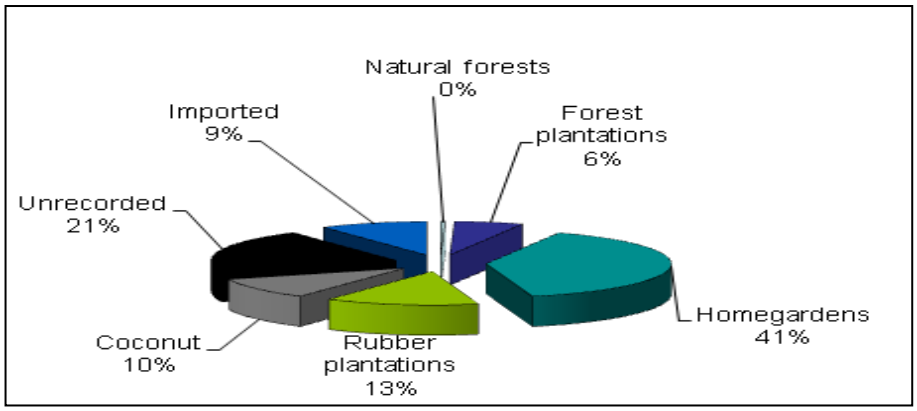


Figure 2: Source of timber supply in Sri Lanka

The home gardens are playing a vital role in timber supply. Hence Forest Department through Social Forestry and Extension division encourages home gardens and improves timber quality through tree management programme in tree resources outside forests. But, this programme is restricted by national budget.

5. National Forests Policies and People Participation

Forests covered 84% dense forest of the island in 1881. This figure dropped to 71% in 1902 as commercial coffee and tea plantations expanded in colonial period. It further declined to 44% by 1956, 30% by 1992, and less than 23% by 2000 due to the pressure from villagers looking for the shifting cultivation, illegal exploitation of timber, damage from periodic wildfire and the conservation forest land to other land uses as settlement and irrigation renovation etc.

The main underlying cause of deforestation and forest degradation is the poverty it is associated with landlessness, inadequate lack of land and poor land tenure system. It leads to pressure on forestland that strong link with population growth. Consider the causes and reasons and the importance of civil society involvements in the forestry sector the new Forest Policy was legislated.

The first Forests policy was published in 1929. This policy was further supplemented on a few occasions to incorporate comments. Final National Forest Policy was established in 1995 and the planning and implementation of forest activities of the Forest Department are done in accordance with National Forest Policy. That is emphasized and promulgated towards the Sustainable Forests Resource Management with consideration of welfare of rural population. The objective related to forests management and conservation is clearly mentioned the National Forest Policies;

- ✓ 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.

The Forests Department consist the **vision** that to Conserve and Develop the Forest Resources in Sri Lanka to Ensure the Prosperity of the Nation. And the **mission** is Sustainable management of Natural Forests and tree resources to meet the increasing requirement of timber and forest products to provide environmental services for the well being of people and the economy.

The new Forest policy induces the people's participation and devolution of forest management responsibilities in the following ways.

- ✓ The state introduces appropriate tenure arrangement for the management and protection of the natural forest and forest plantations with rural community and other stakeholders.
- ✓ To establish and manage industrial forest plantations on state land with participation of local community and other stakeholders to support effective environmental safeguards.
- ✓ To encourage homestead garden and agro-forestry activities to supply of wood and other forest products to meet house hold and market need.
- ✓ To promote establishment, management and harvesting of private forest plantations by local community and other interested groups.

- ✓ The responsibility given to local community and other interested group in commercial forest production, manufacturing and marketing.
- ✓ Nature based tourism will be promoted to the extent that does not damage ecosystems and provides benefit to the local population.
- ✓ The National Forestry Policy will be kept up to date and implemented in a participatory and transparent manner.

5. Sustainable Forests Management and Development

The first Forestry Sector Master Plan (FSMP) was established in 1980 and it was replaced by new Forestry Sector Master Plan in 1995 for next 25 year periods, because of several criticisms on the first master plan. The new master plan is a comprehensive biophysical, environmental, socio-political and economic projection of the forestry sector's optimal development and encouraged sustainable forests management through community participation.

Based on the master plan, Strategic Forests Resource Management plan was prepared for long term such as 15 years. On that basis separate management plans are prepared for Sinharaja, Knuckles, Kanneliya and other important forest areas in the wet zone and Dry zone (Hurulu kele). These kind of forests are opened to public for eco-tourism activities with participation of local community for their income generation.

Likewise Forest plantations also have separate plantation management plan for Teak, Eucalyptus, Pines and Mahogany etc. All forest plantations are managed as per the prescriptions of management plans. FORDATA / FORMPLAN are the main database used in plantation management. Each range prepares the operational plan in relation to above courted separate management plans to consider local community requirements based on physical data has been collected from the forests villages and the plan is for five years.

Forest plantations were established. Such as reforestation of clear-felled plantation sites, rehabilitation of degraded plantation, buffer zone area establishment for multiple use purpose, enrichment of low stock plantations, restoration of natural forests for multiple use production and conversion of pine monoculture plantation into mixed broad-leaved species. Silvicultural treatments such as cleaning and cleanup cutting, singling, pruning, pre-commercial thinning, commercial thinning, coppice maintenance and maintenance of plantations. All the activities are carried out by local communities.

National Forest Policy in 1980 has promoted the modern concept of community forestry followed by the international agenda to towards to the Socioeconomics development of local community and sustainable forests management.

6. Forestry Projects and Socioeconomic Development

The socioeconomic development of local community and sustainable rural development has been initiated to reduce pressure on forests. Since 1982 bilateral and multilateral funding projects and programs are implemented in the country. In addition to these projects, six integrated rural development projects are introduced to support social forestry. These all projects are aimed to improve management of natural resources while contributing to support livelihood development initiatives in the local community.

6.1 Community Forestry Project (CFP) (1982-1990)

The Community Forestry Projects started in 1982 and funded by ADB. Community forestry programs involve community in planting trees on state lands and managing and harvesting of fuel woods under arrangement of common property rights. The farmers can establish farmers' wood lots, community wood lots, demonstration wood lots and block fuel wood plantation on the degraded state lands. Land lots were allocated for individual or group of farmers to plant trees. The first phase of the CFP from 1982 to 1988 implemented and gave opportunity to experiment with participatory concept to the Forest Department.

6.1.1 Results / Impacts

- ✓ 4,055 ha Farmers Wood Lots were established in selected districts in Kandy, Nuwara Eliya, Matale, Badull and Batticaloa.
- ✓ One community forestry site established, one demonstration wood lot of 25 ha in established of the project districts.
- ✓ 14,000 ha of fuel wood plantation in Badulla district was established
- ✓ Commenced Social Forestry Division in the Forest Department.

6.1.1 Challenges / Opportunities

- ✓ Top-down approach followed, project designed by outsider without any real consultation with local people.
- ✓ Real problems not identified but problems were assumed and goal and target set according to assumption.
- ✓ Insecure land tenure, that discourage to farmers participation.

6.2 Participatory Forestry Project (PFP) (1993-2000)

- ✓ PFP was commenced in 1993 and extensively implemented in the Island with community participation.
- ✓ The objective of project is mainly to increase tree cover in the rural household and rehabilitate environmentally degraded areas. Secondly, create employment opportunity and reduce poverty in the local community. Thirdly, to increase income level of farmers and consequently raise the quality of livelihood. Finally, providing knowledge to establish, operate and maintain private nurseries. The component mainly focused on as homestead garden planting of fruit and timber and multipurpose trees to improve livelihoods of the families in terms of nutrition, cash income and improved wood supply.
- ✓ Establish farmers' wood lots, for growing trees on degraded government land by poor and marginal famers. An agro-forestry approach was encouraged.
- ✓ Protective woodlots were established on degraded land of the government own land for soil and water conservation.
- ✓ Trees are planted in miscellaneous areas such as public areas, school gardens, road side, railway line, coastal strips and bank of river side. It provide amenity and raise public awareness on the value of trees.

6.2.1 Results / Impacts

- ✓ Nearly 9,771.2 ha Farmers Wood Lots have been established within the project areas and 22,656 farmers were involved.
- ✓ 4,238 ha of protective wood Lots were established.
- ✓ 2,208.4 hectares of miscellaneous plantation was established.
- ✓ 346,266 families involved to plant tree in Homestead garden and 10,106,604 trees were planted.
- ✓ Institutional improvement and capacity builds for field staff was carried out.
- ✓ 387,000 household participated and benefited from the projects activities with 90 percent of the total involved in the homestead planting (PFP Final report).

6.2.2 Challenges / Opportunities

- ✓ Management plan for project component was not prepared.
- ✓ Monitoring mechanism is not available after project completion. The project focused on building the capacity of individual farmers rather than Community organization.
- ✓ Poor monitoring system implemented through motivators, they from local community but they are not a responsible officer to the government.
- ✓ Departure of motivators after completion of project, there is no mechanism to interacts with community.

6.3 Participatory Forest Management Project (PFMP – 1996 to 1998)

In the middle period of PFP, the Forest Department selected a forest in southwest area of Sri Lanka to test a model of participatory forest management.

The process included the collection of physical data of local community, forests products and non wood timber products available in the forests and forests products use in the village and marketing. Based on those data and develop, a management plans is developed in discussion with local community. Small groups were formed depending on their interest and micro societies at the village level, mother societies at the cluster level and a main organization at the district level. Capacity of community members was built to sustainably harvest NTFPs and develop NTFP-based enterprises and manage the forest based on the management plan.

6.3.1 Challenges / Opportunities

- ✓ Though the adjacent community not directly depends on the forest their involvement is critical.
- ✓ Key factors that affect the success of participatory forest management are site selection and community dependency.
- ✓ Provisions in the forest ordinance must allow the Forest Department to enter into agreement with communities and grant them user rights.

6.4 Upper Watershed Management Project (UWMP 1998 to 2004)

The project oriented to rehabilitate and manage sustainably and protect critical watersheds and to improve incomes of project beneficiaries. These objectives will contribute toward to protect the environment and to reduce poverty in the project areas. The forestry component focused on

rehabilitation and protection of comprising buffer zone planting, establishment of timber farms, improve home stead garden and the promotion of conservation oriented farming system with participatory manner.

6.4.1 Results / Impacts

- ✓ 2,328 ha of plantation on buffer zone was established
- ✓ About 600 km was demarcated, surveyed, and permanent boundaries were marked by the FD and DWLC reserve forests were achieved.
- ✓ 12,196 ha of conservation oriented farming system were established.
- ✓ Capacities were builds and institution. Strengthened.

6.4.2 Challenges / Opportunities

Completion of project, there is no any responsibility address to communities to continue the protection. The project builds the capacity of individual farmers rather than community organization.

Selection of site and species for the forestry component with less technical advice leads to malfunction of plantations.

6.5 South West Rain Forest Conservation Project (2000-2005)

The project contribute to the conservation of the unique bio diversity of the threaten rainforests of southwest of Sri Lanka. The project is funded by Global Environmental Facility (GEF) and United Nation Development Program (UNDP). The project's aimed to secure the protection of the ecosystems in the Sinharaja and Kanneliya, Dediyagala and Nakiyadeniya(KDN) forests through community co-management. Project activities focuses on improvement and protection of selected forests and conserve the unique bio diversity. To achieve this goal the following activities carried out by projects.

- ✓ Introduce alternative livelihood for forest adjacent villagers through a combination of micro finance and skills training.
- ✓ Forest areas develop Eco-tourism with community participation, previously inaccessible to the people.
- ✓ Infrastructure development for facilitate eco tourism.
- ✓ Demarcation of forest boundary and extensively implemented forest protection with community participation.
- ✓ Providing awareness to villagers and mobilize community.
- ✓ Capacity building for community members and relevant field staff on participatory forest protection.

6.5.1 Results / Impacts

- ✓ Surveyed and demarcated of forest boundary of the Kanneliya forest.
- ✓ Community mobilization training module was prepared.
- ✓ 30 CBO was established and provided awareness on forest protection activities.
- ✓ Eco-tourism was developed so called forests area and nature trial was established.
- ✓ Guides are trained for eco tourism.

- ✓ Capacities built to CBO and Field staff on eco tourism activities and participatory approach on forest protection.

6.5.2 Challenges / Opportunities

- ✓ After completion of project no proper follow up and monitoring mechanisms by Forest Staff.
- ✓ Inadequate data collected and project design.
- ✓ Community needs and aspiration village level issues were not adequately identified at the time of design projects.
- ✓ Lack of exit strategy was another weakness of project design.
- ✓ Not considered continues needs of awareness for CBO on participation in the management of eco tourism.

6.6 Forest Resource Management Project (FRMP 2000-2008)

The goal of project specify to increase the value and sustainability of the forest by creating an enabling policy and governance framework by enhancing participation of local communities and other stakeholders in forest resource development and management. The project encourages participatory sustainable forest management of a spatially demarcated permanent forest plantation for increasing forest protection and production. It is also providing employment and human resource development opportunities leading to poverty reduction.

6.6.1 Results / Impacts

- ✓ 17,279 km forest boundaries surveyed and 138 forests was gazette, it is covering 1,813 km.
- ✓ 3,865ha Agro-forestry wood lots were established and managed.
- ✓ 7,479 ha existing farmers wood lots were improved and maintained.
- ✓ 12,231home garden was developed and improved.
- ✓ 2,300 ha buffer zone was improved.
- ✓ 3,016 ha degraded plantation was rehabilitated.
- ✓ 5,415 ha state plantation harvested and reforested with improved genetic and silvicultural in core sub project areas.
- ✓ 2,341 ha forests areas was enriched and improved forest quality. Project Completion Report indicates 3,300 households participated and improved their livelihoods. Strengthened the Forest department staff capacity and reviewed the structure of forest department administration.

6.6.2 Challenges

- ✓ No criteria based site selection.
- ✓ Project target on development of agro-forestry wood lots and rehabilitate degraded plantation not achieved, because of lack of suitable sites.
- ✓ Agro-forestry practices not success in degrade areas because of not taken into account of wild animal damage and selection of adapted species for particular site.
- ✓ Sustain involvement of community organization is a difficult to the project due to boundary dispute.

The impact on the poor may have been less than intended, due to lack of short-term incentive to participate in forestry activities.

6.6.3 Opportunities

Forests Resource Management Project provides guidance and financial assistance to prepare Range operational plans such as Range Forests Resource Management Plan & Range Forest Protection Plan for the period of 2010-2014 (five year plan) with the supervision of superior officers. The each and every natural forests areas and forest plantations are respectively considered separately in the range plan. The following data was collected and analyzed before the preparation of operational plans.

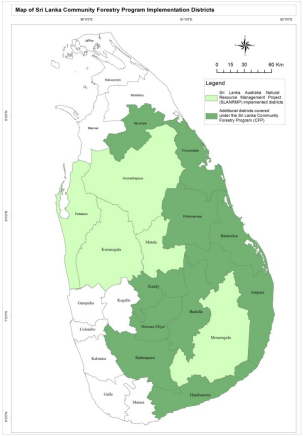
The particular Forest adjacent to community will be identified. The following socioeconomic date of the community such as gender percentage in the total population of the village, wealth rank, labor resources, education, land tenure, houses, monthly income and expenditure, available bare land, extent of cultivated lands, other physical resources of villagers including irrigation facility and available natural resources in the area are collected. Finally, discover the reason of forest degradation and deforestation and remedial measures to reduce pressure on forests.

According to data the annual work program for the range is prepared by RFO for a calendar year based on the operational plans and other sources. Lessons learnt during the implementation period were taken into consideration and incorporate in it.

6.7 Sri Lanka- Australia natural Resource Management Projects (SLANRMP 2003 to 2009)

The overall goal of this project was to protect natural resources through reduction of poverty of forests adjacent community. The project support communities to improve the management of natural resources, promoting a participatory and holistic approach to improve household livelihood through improved utilization and better integration of forestry and agriculture resources. The following components are applied.

- ✓ Improved delivery systems in farm forestry through home garden development and farmers' wood lots establishment.
- ✓ Developed operational guideline for participatory management of natural forests.
- ✓ Capacity building of field staff and local community.
- ✓ Opportunity to enhance income generation activities.
- ✓ Developed inter and intra sect-oral coordination mechanism for management, monitoring and evaluation.



Map 1- Community Forestry Program Implemented Districts

Lesson learnt from the SLANRMP, FD independently inaugurated community forestry program from 2008 with departmental funds and followed guidance of as same procedure of above project. From the Project and department both combined results as follows.

6.7.1 Results / Impacts

- ✓ Operational Guideline and Participatory tools were developed
- ✓ 55,Community Based Organization registered and 55-community forest management plan developed and approved.
- ✓ Around 11,6000 ha forests regenerated and nearly 50,000 rural populations involved and increased their income.
- ✓ Forest Department staffs and community members' manner changed towards to participatory approach.
- ✓ Capacity developed of CBOs and Department staffs and institute.

Program supported microfinance and micro enterprise such as beekeeping, rice & vegetable cultivation, fruit garden, food processing, handicraft and livestock developed. A total of 174 and 2440 home garden also was developed.

These results will have a positive impact on the socio-economic development of the country and especially on reducing regional disparities.

Attitudinal changes of forest department staff is a very important achievement. Now the staff FD are willing to work with village institution and households to promote alternative source of income improving farming system and develop joint management plan for forests reserves. Community Forestry (CF) approaches prefer to expanded and replicated.

6.7.2 Challenges

- ✓ The selection of sites is a critical for sustainable management by community.
- ✓ Long-term land tenure arrangements are needed to secure community participation.
- ✓ Forest boundaries must be clearly demarcated.
- ✓ Awareness is an important motivational factor for community participation, but must be complimented by adequate financial rewards.
- ✓ Community consultation must be organized around the seasonal calendar for agricultural work and be sensitive to customary and other obligations;

6.7.3 Opportunities

CF management is one of the best solutions for fire protection and encourages rural women participation.

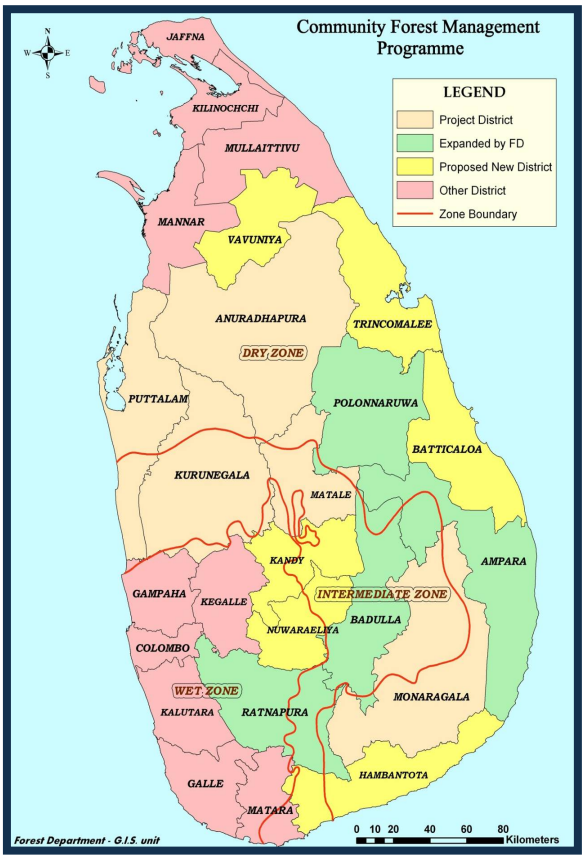
Local community themselves provides socioeconomics data to prepare the Community Forests Management Plan (CFMP). Participation of local community is indispensable for preparation of CFMP. The FD staff only play facilitating role and communities provide data without any hesitation.

7. Community Forestry Program (CFP 2012 to 2016)

Community Forestry Program launched in 2012 with support of United Nation Development Program (UNDP). The Objective of the program is to reduce deforestation and forest degradation by involving community in forest management and to build the capacity of the Forest Department so community forestry approaches can be implemented nationally. The map 2 had shown the current and proposed community forestry program areas.

This program planned to improve the forest cover around 23,000 ha in dry and intermediate zone while supporting 90,000 community members through the program activities.

According to the program the suitable site will be identified and community group will be formed and enhance their capacity on community forest management approaches. Then community forest management plan will be prepared to address leading cause of site-specific deforestation. There after community forest management plan will implement in partnership with other government and non-government organizations. In the mean time homestead garden development program will be implemented in the other/conflict-affected areas.



Map 2 Current & Planned CFP Sites: Location

8. The Way Forward

It is know that fridge communities have been using the forest resource without any management plans and degrading the forest resources. The convention method to manage the forest is not success and satisfactory .The forest adjacent people should be aware on importance of forest resources management.

Lessons Learnt through implementation of projects and programs encourages the participatory forestry. With those experiences now the Department inaugurated Community Forestry Program in the Dry zone and Intermediate zone of Sri Lanka with the goal of improving the management of Natural Resources to support livelihoods and contributes to poverty reduction in these areas.

When communities participate in planning process it is important to respond in a relatively short time frame to gain their confidence and maintain initial momentum, and transparency is all process and transaction is important to build confidence among participants and develop meaning full relationship.

Eco tourism is a one of the important and useful components to motivate the participatory manner from the local community. Eco tourism activities should be considered in the forests areas to support and encourage participatory forest management and forest protection through local community.

After completion of forestry projects, continuous assessment of forestry resources should be considered and apply uninterrupted monitoring and evaluation mechanism. Unremitting awareness program provided to the forest adjacent community will make good relationships and acceptance for both parties.

Forestry activities are not unaccompanied to reduce poverty. So linkages with Micro Finance Institutions (MFIs) are very important in this regard. They provide savings and credit services for the community to improve existing enterprises or to start new enterprises. The capacity building of identified community members is critical. It develops necessary skills. Credit linkage for enterprise development activities has to be considered in the design of project. And consider providing short-term benefits from forestry activities and arrangement of long term land tenure system will secure community participation.

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ANNEXES

Annex – I Programme of the Expert Group Meeting

SAARC Expert Groups Meeting on the Assessment of contribution of Forest to Socioeconomic Development in the SAARC Member States

20 – 22 August 2013

Pokhara, Nepal

Organized by the SARRC Forestry Centre in collaboration with the Institute of Forestry (IOF), Government of Nepal

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Programme

Day 1 (20 August 2013)

Time	Programme	
0830	Registration of Participants	
0900	Opening session Welcome Speech Key note address of the meeting Key note address Vote of thanks	 Dean, IOF Director, SAARC Forestry Centre Chief Guest Dr. Santosh, IOF
1000	Tea/Coffee Break	
1030	Introduction of participants Objectives and programme of the meeting	 KJ Temphel
Session I Presentations on Assessment of contribution of Forest to Socioeconomic Development Chairperson: Dean, IOF		
1100	Presentation and Discussions Sayed/Shafiqullah ,-Afghanestan Haradhan/Ali Kabir -Bangladesh Dhital/Kinzang - Bhutan	 Dr. Santosh/KJ
1300	Lunch Break	
1400	Presentation and discussions continues…. Pradeep/Harish - India Anuj/Sapkota - Nepal	Dr, Santosh/KJ

	IOF Meera Lebbe - Sri Lanka	
1600	Tea/coffee and snacks	
1630	Briefing about field trip	Dr. Santosh, IOF

Welcome Dinner

Day II (Field Trip – arranged by IOF) – 21 August 2013

Day III (22 August 2013)

Time	Programme	Facilitator
Session III - Stocking of Parameters used for Assessing the Contribution of Forest to Socio-economic development Chairperson: Dr. Sangay Wangchuk, Director, SAARC Forestry centre		
0900	Presentation of Parameters for assessing the contribution of forest to socio-economic development (compiled from presentation)	Dr. Santosh/KJ
0930	Group work – Parameters (theme wise)	
1300	Lunch Break	
Chiarpersons: Dean, IOF and Director, SAARC Forestry Centre		
1400	Presentation of Group work - discussions and finalization of list of possible parameters to be used for more effective assessment of contribution of forest to socio-economic development in the SAARC Member States.	Group
1600	Tea/Coffee Break	
1630	Closing session	

Annex – II List of Participants

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