Submitted To:

Ministry of Forests and Environment

Forest Research and Training Centre

Babarmahal, Kathmandu, Nepal

Final Report

Assessment of Forestry Sector Contribution to other Economic Subsectors

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July, 2020

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Disclaimers

The views and opinions expressed in this report are those of the contributor (s) and do not necessarily reflect the views or policies of FRTC

Required citation:

FRTC.2020. Assessment of Forestry Sector Contribution to other Economic Subsectors, Government of Nepal, Ministry of Forests and Environment, Forest Research and Training Centre, Babarmahal, Kathmandu, Nepal

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ISBN: ……

Publication Number: ……../2020

Publisher:

Forest Research and Training Centre, Babarmahal, Kathmandu, Nepal

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FOREWORD

Forestry is one of the major land use systems in Nepal, and forests resources could be a foundation for national economic development and prosperity. Forests and trees are the sources of vast array of goods and services for Nepali people. Forest resources provide basic supplies such as fuel wood, timber and fodder for rural HHs. Forests play important role in supporting biodiversity conservation, erosion control, carbon dioxide consumption, and above all protection of environment. In this regard, this report attempts to provide an overview of the economic contribution of Nepal's forestry sector to other sectors or sub-sectors of the economy. Perhaps, this report is the first effort of the FRTC towards a more insightful economic analysis to quantify the credible contribution of the forestry sector to national economy. The report attempts to explore the overall contribution of the forestry sector considering agriculture, industrial, travel and tourism, and other economic sub-sectors. Thus, it could help to forward the forest development agenda in the national economic development paradigm, and could serve as a foundation to departure towards meso- and micro-level economic analysis in future.

This publication has been prepared by an expert team through the Nepal Environmental and Scientific Services (NESS) Pvt. Ltd. The FRTC is thankful to the NESS Pvt. Ltd. for providing technical expertise in the preparation of the report.

I would like to extend my thanks to Mr. Thakur Subedi for his overall coordination and contribution of the program and Nandalal Sapkota, Statistician, Central Bureau of Statistic for his valuable input. I would like to express my gratitude to Meghnath Kafle, former DG and Dhirendra Kumar Pradhan, DDG for providing suggestions and guidance in preparing this draft. I would like to acknowledge Manju Ghimire, Ananda Khadka, Bishnu Prasad Dhakal, Amul Kumar Acharya ,Rajaram Aryal, , Deepak Mahatara, Keshab Ghimire, Dipesh K. Sharma and Mr. Kiran K. Pokharel, Assistant Forest Research Officers, and Bimal K. Acharya, Sunita Ulak and Rajkumar Giri, Research officers, FRTC for their feedback during the course of study. I further thanks to Sabitri Aryal, for her support in supervising this program. My special thanks also go to the FRTC Team for its support during the implementation of the field survey and for providing relevant secondary information. I would like to acknowledge the contribution of Mr. Sahas M. Shrestha, Forestry Expert in editing this report.

Yam Prasad Pokharel
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EXECUTIVE SUMMARY

Natural resources, in particular land mass, forests, water, and scenic landscapes are the foundation for economic development and agriculture, livestock, forest, and environment are the primary assets within the broader framework of Nepal's economic development. Nepal ranked 115th place in the Legatum Prosperity Index 2019 among the 167 countries across the globe and 142ndplace HDI (0.602) out of 189 countries and territories despite the robust economic growth (7.1%) in 2019. The estimated population below the absolute poverty line is 18.7 percent with per capita income of US $ 1,034 in FY 2018/19.

The Global MPI Country Briefing 2020: Nepal (South Asia) reported national multidimensional poverty index of the Nepal at 0.148 with head count poverty ratio of 34% and 22.3% of the vulnerable population. The transition to federalism is a witness to Nepal's desire to accelerate its pace of development to achieve ambitious goal for prosperity. The low performance on growth of per capita income, human resources and economic vulnerability are major economic and social development constrains accompanied with poor growth promoting infrastructures and connectivity.

It is widely understood that forestry sector has credible contribution to the national economy, mostly in the countries with agrarian economy like Nepal where forest is one of the major land covers(45%). However, the result of the previous global and national assessment on the forestry sector's contribution to the national economy seems to be underestimated and there is a rising contentious concern why the forestry sector's contribution is less in the national economy. It is argued that the existing GDP accounting system does not cover all the benefits that is received from the forestry sector.

This study aims to quantify the credible contribution of the forestry sector to the national economy through the various economic subsectors so that it could help to forward the forest development agenda in the national economic development paradigm. Therefore, this exercise attempts to explore the contribution of the forestry sector to the various sub-sectorsof the economy. These sub-sectors are Agriculture, Industry, Travel and Tourism, and other economic sub-sectors.

The economic contribution of forestry is usually accounted in terms of employment generated within the sector; monetary value of the harvested goods and services every year, share of the sector to the national economy (GDP), energy supplies and international trade. This study largely assumes that total the contribution of forestry sector to national economies is the genuine contribution of forestry sector to the forestry-based and forestry-supported economic sectors and their sub-sectors as specified in the objectives of the study. The study

credibly followed the accounting procedures of the System of National Accounting (SNA), the Industrial Standard Classification (ISIC) and the National Standard Industrial Classification (NSIC) of Nepal as far as practicable to identify the variables and monetary valuation of the forest products adopting production and consumption approaches to make them compatible and comparable to the global and national accounting system.

The study covered entire Nepal, representingall17 eco-provincial regions suggested and included by the Central Bureau of Statistics (CBS) for population census and other national level survey were chosen as the sampling strata to ensure representation of the diverse ecological regions of the country and make a homogenous unit. Additionally, the major units of enumeration of the survey were (i) the household, (ii) forest-based establishment, (iii) hotel and restaurants, (iv) community based forest management (CBFM)groups. Sampling was done at three stages, wherein in the first stage, 20 districts were selected randomly from 17 strata (at least one district in each eco-provincial strata). In the 2nd stage, 102 Enumeration Areas (EAs) or Primary Sampling Units (PSUs) were selected from each selected district. Finally, in the 3rd stage, 22 households were selected from each selected EAs using systematic random sampling to make 2,228 households. The survey included356 establishments, 112 hotels and restaurants and 274CBFM Groups. The summary results of the economic contribution of the forestry sector to the other sectors and their subsectors are summarized in table below.

The survey results showed that more than 19 types of the forest products are being collected by the rural households who entirely depend on the integrated agricultural farming system. For example, on an average 50 cft of round timber, 1485 kg of fuel wood, 193.75 Bhari green and dry leaves (grass, fodder, and bedding materials) and 5 kg of the NTFP products are collected by each household every year. Likewise, 3.5 cft of poles, and 1.3 kg of fruits are also collected from the forest annually. The estimated total monetary value of the forest goods utilized in year 2075/2076 is NRs 36.086 billion, which constitutes, NRs. 22.77 BN for timber and fuel wood, 13.218 BN for farming activities as an inputs/resources and 0.123 BN for consumable goods collected from the forest.

The travel and tourism industry of Nepal is one of the major sources of foreign income. Nepal received almost 1.2 million of international visitors (overnight) in 2019 and millions of domestic visitors. Out of total international visitors' arrivals in 2019, 36% (429,746) enjoyed with various protected Areas of Nepal. The revenue collected from the PAs grew by 16.96% annually over the last 10 years. The forestry sector contributed NRs. 40.296 billion to the tourism sector including both international and domestic travel and tourism activities. The average length of the stay in Nepal for international visitors who valued for protected area is

13.8 days and 3.5 days for domestic visitors including travel time. A total of 318,561 jobs are created in the protected areas through the travel and tourism activities.

Key Macroeconomic Indicators: Contribution of the Forestry to the other sectors of Economy

S.N.	Sectors	Amount (NRs.BN)		Employment ('000 days)
1	**Agriculture Sector**		**36.086**	
1.1	Timber &Fuelwood	22.744		
1.2	Agriculture productionactivities[1]	13.218		
1.3	Consumable goods	0.124		
2	**Travel & Tourism Sector**		**40. 296**	**318,561**
2.1	Travel & Tourism Impact (International)	37.629		
2.2	Travel & Tourism Impact in PAs (domestic)	1.926		
2.3	Revenue collected from PAs	0.074		
2.4	Fuelwood for campfire & other uses	0.0012		
3	**Forest Products production**		**27.084**	**11,112**
3.1	Round Wood	24.855		
3.2	Fuelwood	0.28		
3.3	Non-timber forest products	1.949		
4	**Forest-based Industries**	**13.413**	**12.368**	**269916**
4.1	Sawmill & furniture	7.418		31385
4.5	Pulp & Paper and Handicrafts	2.423		24500
4.6	Veneer and Plywood	0.899		92036
4.7	Bamboo and bamboo products	1.949		42025
4.8	NTFP Processing	0.387		55000
4.9	Micro-enterprises	0.33724		24970
4.10	Import of wood	*1.045*		
5	**Other subsectors**		**0.887**	
C	**Community-managed forest**		**17.322**	

Timber and fuel wood are the major forest products that are supplied in the economy. Principally, timber wood is used for production of the industrial forest products, whereas fuel wood is used as energy. The trend of the supply of the timber and fuel wood and the revenue collected by the government reveals that, on an average, the supply has declined by 6.25% annually. In the year 2075/76, the estimated supply of timer and fuel wood in the market, except household consumption, was 45,118,416.99 cft including the imported wood (12,574,184.07 cft). In the recent year, import value of the industrial wood, plywood and particle boards and wooden furniture has reached to NRs. 2,475,450 thousand. The total import bill of the forest-based products has reached to NRs. 2,583,878 thousand in 2019/2020.

[1]Agriculture production activities comprises field crops, vegetable farming, orchard, and livestock system.

The estimated monetary value of raw forest products in the year 2075/2076 is NRs.27.084 BN excluding the forest products that are collected by rural households for their home consumption from both private and various regimes of government forest. The value of the household-level consumption is accounted in agriculture sector as most of the forest products are used as raw material for field crops and livestock farming. Besides, the number of the temporary jobs generated from this sector is 11,112thousand person-days.

The study considered several types of forest-based industries that are using both wood and non-wood forest products to measure and establish the economic contribution of the forestry to the industrial sectors like Allo (Himalayan nettle) processing, bamboo processing, bread and bakery, furniture, sawmill, handicraft, plywood, herb processing,etc. The estimated overall economic contribution of the forestry sector to the forest-based industries was NRs.13.413 BN. This constitutes 7.418 BN for Sawmill & furniture, 2.423 BN for Pulp & Paper and Handicrafts, 0.899 BN for Veneer and Plywood, 1.949 BN for Bamboo and bamboo products, 0.387 BN for NTFP processing and 0.337 BN for micro-enterprises. Further, the value of the forestry products utilized by the other subsectors (road, hotel, religious activities, etc.) is NRs.0.889BN. However, the import bill of the industrial wood was NRs.1.045 BN. Hence, the total economic contribution of the forestry becomes NRs.12.368 BN.

Nepal's CBFM groups contribute to household-level livelihood through the convenient supply of forest products to household consumption. Additionally, CBFM group improves household-level income by creating employment opportunities with the involvement of local people in forest-based activities and enterprises. At the same time, there is a gradual recognition of CBFM groups' contributions to other sectors of the economy in Nepal, such as investing groups' income (fund) on socio-economic activities. A meta-analysis study of 30 years' experience of community forestry by MoFSC (2013) estimated around 30% of group fund was used for education (building, toilet construction, and teachers' salary), while 17% and 16% of the total fund were used for poverty reduction activities; and road construction and energy generation, respectively.

The estimated annual value of the forest products supplied from the various types of the CBFM regimes was NRs.17.332 BN. This constitutes 91.6% from community forest, 4% from leasehold forest; 3.5% from buffer zone forest and 0.9% from collaborative forest.

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ACRONYMS/ABBREVIATION

ACAP	Annapurna Conservation Area Project
ADS	Agriculture Development Strategy
AGDP	Agriculture Gross Domestic Products
ASFP	Aggregate Supply of Forest Products
BN	Billion
BZCF	Buffer Zone Community Forests
CA	Conservation Area
CBFMS	Community-based Forest Management Systems
CBS	Central Bureau of Statisticss
CF	Community Forest/Forestry
CFM	Collaborative Forest Management
cft	Cubic feet
CFUG	Community Forest Users Groups
COVID	Coronavirus Disease
Div.	Division
DoCSI	Department of Cottage and Small Industry
DoNPWC	Department of National Parks and Wildlife Conservation
FAO	Food and Agriculture Organization of the United Nations
FRTC	Forest Research and Training Centre
GDP	Gross Domestic Products
GO	Gross Output
GVA	Gross Value Addition
HAN	Hotel Association of Nepal
HDI	Human Development Index
HR	Hunting Reserve
IC	Intermediate Consumption
I-O Table	Input-Output Table
ISIC	International Standard Industrial Classification
Kg	Kilogram
Sq. Km	Square Kilometer
LHFs	Leasehold Forests
LIF	Legatum Prosperity Index
MAPs	Medicinal and Aromatic Plants
MoFE	Ministry of Forests and Environment
MoF	Ministry of Finance
MoICS	Ministry of Industries, Commerce and Supplies
MPI	Multidimensional Poverty Index
mt.	meter
cu m	cubic meter
NPC	National Planning Commission
NP	National Park
MPFS	Master Plan of Forestry Sector
NSIC	Nepal Standard Industrial Classification
NTFPs	Non-timber Forest Products
NTNC	National Trust for Nature Conservation

OECD	Organization for Economic Co-operation and Development
PAs	Protected Areas
PCS	Piece
RFs	Religious Forests
SAM	Social Accounting Matrix
SNA	System of National Accounts
SEEA	System of Integrated Environmental and Economic Accounting
SEEA-CF	System of Integrated Environmental and Economic Accounting-Common Framework
SNA	System of National Accounting
SAARC	South Asian Association for Regional Cooperation
SQM	Square meter
TAAN	Trekking Agency Associations of Nepal
TCN	Timber Corporation of Nepal
ToR	Term of Reference
UNDP	United Nations Development Program
UN	United Nations
UNSC	United Nations Statistical Commission
UNWTO	World Tourism Organization of the United Nations
USD	Dollar of United Stated
WAVES	Wealth Accounting and the Valuation of Ecosystem Services

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

Nepal is located between 26^0 22' N and 300 27' N latitude and 80^0 04' E and 88^0 12' E longitude and occupies a total land area of 147,181 square kilometers (DFRS, 2015) with an estimated population of 30 million (CBS, 2020). The country is landlocked and situated between China and India, extending altitude range between 70mt. above sea level in the south to 8,848mt. at the summit of Mount Everest (CBS, 2006). Nepal is endowed with a wide range of climates, ranging from tropical in the lowlands to the arctic climate in the high mountains as well with diverse type of the flora and fauna.

While global prosperity has steadily improved over the past decade, Nepal has been classified among the poor countries due to low performance on the growth of per capita income, low human development index (HDI) and high economic vulnerability. During the last two decades, Nepal's poverty has gradually decreased. The reason behind is, high economic growth in the recent years, investment on social and economic infrastructure and increment in the flow of remittances. Nepal ranks 115^{th} place in the Legatum Prosperity Index 2019 among the 167 countries across the globe (LIF, 2019)and 142^{nd} place in HDI (0.602) ranking out of 189 countries and territories (UNDP, 2020) despite the robust economic growth (7.1%) in 2019 (World Bank, 2019).

The population below the absolute poverty line is 18.7 percent with per capita income of NRs. 1,26,018 (US$ 1,085) in FY 2018/19 (MoF, 2020). The national multidimensional poverty index (MPI) of the Nepal is 0.148 with head count poverty ratio of 34% and 22.3% of the vulnerable population (OPHI, 2020). The multidimensional poverty is overriding in the rural and remote areas where the basis of livelihood is natural resources, in particular agriculture and forestry base (NPC and OPHI, 2018). However, Nepal's goal to create prosperous and happy country is very attainable if there is a rational prioritization of the key sectors, considering persistently high trade deficits (both in food and non-food goods) that elevate the risks to the external sectors. The transition to federalism is a witness to Nepal's desire to accelerate its pace of development to achieve an ambitious goal for prosperity as it hopes to be a prosperous middle-income country by 2030 and is committed to achieving a range of inspirational development goals, including the Sustainable Development Goals (World Bank, 2019).

Natural resources, in particular land mass; forests resources and scenic landscape; and water resources are the foundation for national economic development and prosperity.

Further, agriculture, livestock, forest, and environment are the primary assets within the broader economic development framework of the country. The Agriculture and forestry sector is one of the major contributing sectors to the national economy as this sector has employed more than 60.4% of the population and contributed more than27% to the national gross domestic products in the year 2018/2019(MoF,2020).Forests and forest products are vital to the livelihoods for most of the rural Nepali, especially for rural poor, as the forest-based livestock is considered as insurance against poor crop years and other adversities. Forest-related policies and legislation such as the "National Forest Policy 2076 (2018)" are prepared or amended in line with the national vision. These policies clearly define the role of Nepal's forest sand how the sector can contribute to attain the goal of prosperity. Thus, implementation of these policies towards the development of green economy through the promotion of forest-based enterprise, promotion of forest & biodiversity-based tourism, watershed management, and carbon trade are very vital for job creation to increase the income of the rural people from the forestry sector.

1.2 COUNTRY FORESTRY PROFILE

Forests are the major land use system of the Nepal and it covers 44.74% (around 6.61 million ha) of the total area of the country, which constitutes 5.96 million (40.36%) hector of forest and 0.65 million (4.38%) hector of other wood land. Out of total forest cover, 82.68% (4.93 million ha) belongs outside Protected Areas and 17.32% (1.03 million ha) belong inside Protected Areas. By physiographic region, middle Mountains constitute 37.80%, high Mountains and high Himal share 32.25% and that of Churia and Terai constitute 23.04% and 6.90% respectively (DFRS, 2015). The estimated growing stock of Nepal's forests is 982.3 million m^3 or an average stocking of 164.8 m^3 /ha. The mean carbon stock of Nepal's forests (including above and below ground biomass and soil carbon) is 176.9 t/ha with 61.5% of this in the tree component and 37.8% in forest soil(DFRS, 2015).

A large proportion of Nepal's forest is handed over to the community-based forests management (CBFM) groups under various models for protection, management, and utilization of forests with the participation of the local community. As of July 2020, altogether 31, 292 CFUGs are managing 2,711,413 ha. of total forest (more than40%), which constitutes, 87% under Community Forest. Likewise, 8.46%, 2.79% and 1.62% of forest area is managing under Buffer Zone Forest, Collaborative Forest and Pro-poor Leasehold Forest regimes respectively (See Section 4.6.1). Formal and registered private forest (PF) area cover just about 2,902 ha managed by 3,753 private owners (CFD, 2017 cited in Amatya & Lamsal, 2017).

Forests offer a wide range of economic and social benefits to the overall economy of the country. These contributions include employment, the raw material for wood and non-wood processing industries; trade of forest products and supply of energy; and investments in the forest sector. The benefits also include the hosting and protection of sites and landscapes of high cultural, spiritual or recreational value and ecosystem services as a whole. In a nutshell, forests usually play both direct and indirect roles to sustainable economic development and poverty reduction, supporting to the various sectors of the economy, particularly in the agriculture production system, tourism, forest products-based industry and household economy. In Nepal, forests provide a wide arrays of benefits: (i) Forests are integral part of the farming system of Nepal; (ii)They are primary source of fuel wood for the majority of the rural populace; (iii) They are important component for nature-based tourism; (iv)They play an important role in ecosystem services in the maintenance of nutrient cycle, carbon sequestration, hydrological and slope stabilization functions; (v) They provide virtually all of the country's timber needs for construction and small- and medium-scale industries and handicrafts; (vi) They are source of cash income through various non-timber forest products (NTFPs); and (vi) They are habitat for a numerous species of wild flora and fauna which have great roles in Nepali life and economics. Therefore, the economic contribution of the forestry could be viewed from the broader perspective rather than only share of the GDP accounted, considering forestry as a primary sector of the economy. It is notable that the role of the forestry is not only limited to the production of the forest products, but its economic contribution is extended in various other subsectors of the economy like tourism, transport, manufacturing, environmental services. Hence, policy makers need to consider the broader perspective of the contribution of forestry sector while making development plan and policies for country's economic development. It requires a periodic survey to estimate contributions of the forestry sector to the national economy, which allows us to figure out the present state of the economic contribution as well as helps in the planning process of the Forestry Sector in the development landscape of the country to harness the economic benefits from the Forestry Sector

1.3 SCOPE AND OBJECTIVE OF THE STUDY

It is widely understood that the forestry sector has credible contribution to the national economy mostly in the countries with agrarian economy like Nepal where forest is one of the major land covers. However, the result of the previous global and national assessment of the forestry sector's contribution to the national economy seems to be underestimated. Most environmental economists argue that value of the forest products and services, in general, are underestimated in monetary terms. This is also true in the case of Nepal since forestry sector contributes only 2% to the gross domestic products as per the System of National

Accounts (SNA) approach, though forests cover almost 45% of the total land area of the country.

There is a contentious and rising concern on why the forestry sector's contribution is less in the national economy. There are two distinct thoughts regarding this. One group claims that this is due to the underperformance of the sector, while other argues that the existing GDP accounting system does not cover all the benefits that is received from the forestry sector. The major shortfall of the present SNA is the exclusion of the contribution of the forestry sector to the tourism, agriculture, industries, and other sub-sectors of the economy.

Limited availability of the data, especially about the economic contribution has made the forestry sector less attractive for investment. At the same time, jobs and value addition opportunities have not been properly captured yet. Investment decisions are generally made based on quantification and interpretation of data with statistically justified benefits.

Therefore, the stipulated objective of this study is to measure the economic contribution of the forestry sector in the national economy to achieve the goal as stated in the 14th and 15th periodic plans. Further, this study has been conducted focusing on the contribution of the forestry sector to the national economy through other various sectors rather than GDP assessment. These are: (I) Industrial Sector, (ii) tourism sector; (iii) agriculture sector, and (iv) other economic sub-sectors. Besides, this study also covers the disintegrated contribution of CBFMS in the national economy.

1.4 LIMITATION OF THE STUDY

The study does not take into account the value of the ecological services or protective role of the forests, which minimizes the damage to infrastructures. For instance, the proper management of forest helps to reduce landslides and flooding, which minimizes the damage to roads, buildings and irrigation canals and only concentrated on quantifiable goods and services from the perspective of direct price measurement as specified in the ToR of the study.

Household and establishment survey have been affected by the lockdown of the country due to pandemic disease COVID 19, including field visit schedule of the expert team. The compilation of the dataset revealed several constraints and limitations, mostly related to the quality and availability of published statistics as well. For example, there is a discrepancy in the number to the establishment as provided by the responsible institution and field reality. Some establishments and industries were already terminated in the real field which makes it quite difficult for the survey. Several establishments have not kept their book intactand thus; it was difficult to get updated data related to establishments.

The response on the transaction of the inputs, raw materials, disposal of end products and utility cost are quite fuzzy, particularly in the small size establishment. Large size establishments are moderately responsible for use of the materials and their sources. The purchase and sale price of the timber is highly unresponsive. Generally, the response on the auction price of the timber is 15-20% higher than the royalty paid or base price of Timber Corporation of Nepal (TCN)/Nepal Ban Nigam Limited. However, the market situation is quite different from the perspective of price. Prevalence of multi-layer supply chain with high influence of dealers at various layer based on the timber species and information asymmetries are common obstacle realized for assessments.

Updated inventory of the forest-based establishment or industry operating in the country and comprehensive data pool is not prepared yet. High discrepancy of available data among the concerned institutions are the major constrains faced during the study and estimation of contribution of the forestry at both national and provincial level. Further, the inventory of the industries available from the Ministry of Industry, Commerce and Supplies and Department of Cottage and Small Industry (DoCSI) is not complete and updated, considering left industries after registration and real status of the industries. Therefore, secondary literature, information provided by the stakeholders during focus group discussion, Key informant is used to establish the inventory of the industries in the country as far as practicable.

It is noteworthy to mention here that limited availability of the data at districts and provincial level concerned institutions due to poor database management system, lack of disintegrated information, and discrepancies; assessment of contribution the forestry to other sectors or subsectors of the economy has been conducted considering broader perspectives. Similar situation was also understood in establishment and other sectors. Moreover, assessment of Tourism Sector was only concentrated to the protected area as the Tourism Satellite Account is not available. Therefore, the study only covers the broader image of economic contribution of the forestry sector to the other sectors or subsectors of the economy as mentioned in the ToR rather micro level assessment and results of the report provides a general trend for the sector at broader level.

This study only measures the monetary value of the forest products that collected and consumed by the agriculture households excluding secondary benefits of the forest products on improvement of the crop and livestock productivity.

CHAPTER 2: LITERATURE REVIEW

2.1 FORESTS - AN ECONOMIC SECTOR

There is no commonly agreed definition of the “Forestry Sector”. According to the Food and Agriculture Organization of the United Nations (FAO), the forestry sector includes “all economic activities that mostly depend on the production of goods and services from forests”, which further explained as all commercial activities that are dependent on the production and processing of wood fibre (industrial round wood, wood fuel and charcoal; sawn wood and wood based panels; pulp and paper; and wooden furniture) and non-wood forest products and the subsistence use of forest products including economic activities related to production of forest services (FAO, 2008).The forestry sector also includes the subsistence use of forest products as well as economic activities related to the production of forest services (although it would be difficult to determine exactly which activities are really dependent on forest services) (FAO, 2014).This clarifies that “forestry sector” is beyond “forest” which is largely known as an ecological entity.

Nepal’s several policies, legislative instruments, and management related documents carry a comprehensive meaning of the “Forestry Sector” in line with the meaning ofFAO. The “Forestry Sector” in Nepal signifies all forest-related policies, strategies, plans and programs, and activities including management and administration associated with promotion, development, and management of forest as a natural property for the sake of national prosperity while maintaining the balance among three critical elements of sustainable development including social, environment, and economy.

Based on tenure, Nepal’s forests are grouped into national forests and private forests (NLC, 2019) as shown in Figure 1. The national forest of Nepal is managed by both government and various form of the community-based forests management (CBFM) groups. Out of total forests, 61.20% of forests (forests- 38.99%, protected area 22.21%) are under the government management system while CBFM regime constitutes more than 40%. The community-based forests regime includes community forest, leasehold forest, collaborative forest, buffer zone community forests, and religious forests. The community managed forests are the part of national forests handed over by the government to the local people and institutions. The handover process and length of tenure use; management rights; and benefit-sharing differ across these approaches.

Forests as an ecological entity, play a vital role in regulating nutrient cycling, protecting crops from wind and hail, and help for pollination from the activities of the bees and insects thereby

improving land productivity. The forests and trees further support to improve agricultural productivity by maintaining and restoring soil fertility, stability, and helping water supplies. In the context of Nepal, farm trees and forests also supply important materials such as litter support to the crop production through compost manure and mulching materials to maintain soil moisture regime.

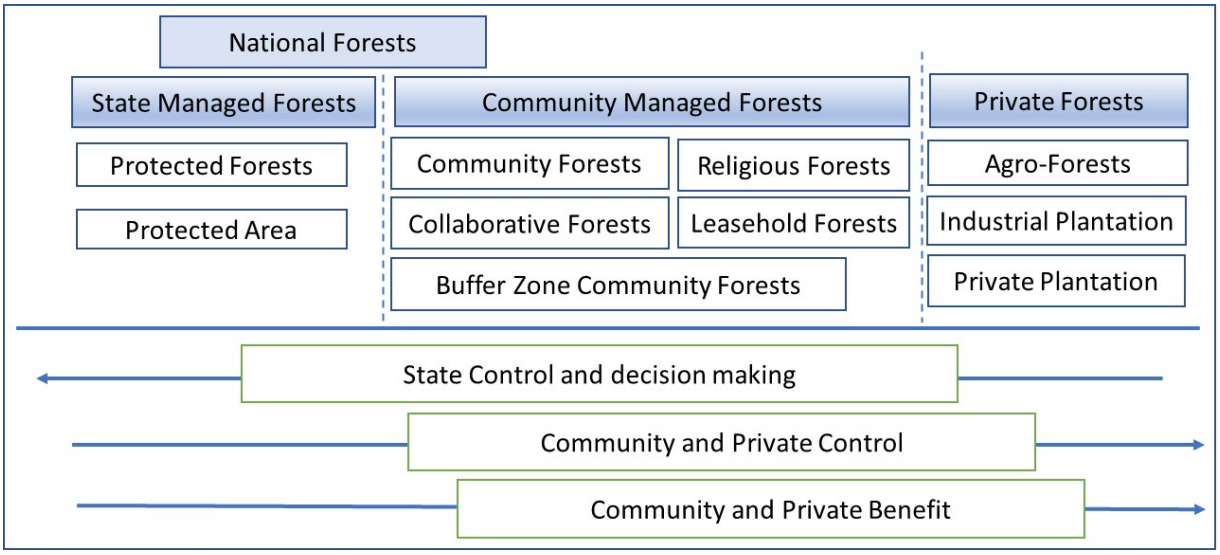

Figure 1: Various types of forest regimes in Nepal

2.2 SYSTEM OF ACCOUNTS

2.2.1 Input-Output (I-O) Accounts

An input–output (I-O) model is a quantitative economic model that represents the interdependencies between different sectors of a national economy or different regional economies. Wassily Leontief (1906–1999) is credited for the development of this model(Wikipedia, 2020).The I-O table depicts inter-industry relations of an economy and it has become an indispensable tool in any quantitative exercise as it demonstrates how the output of one industry is an input to each other industry. It also provides a detailed analysis of the process of production and the use of goods and services (products) and the income generated from the production process. A complete I-O table describes the cost structure of production activities: intermediate inputs, compensation to labor and capital, taxes on production. In 1970, Leontief modified the input-output model to study environmental issues relating to pollution. An I-O table is normally displayed in the form of a matrix. Given input is typically enumerated in the column of an industry and its outputs are enumerated in its corresponding row. This format, therefore, shows how dependent each industry is on all others in the economy both as a customer of their outputs and as supplier of their inputs (Shakur & Haque, 2012).

Traditionally, the economic contributions of forest products industries have been evaluated using input-output models adopting two ways. The first approach considers evaluation by computing the total impact of industry output on the economy and it assumes that input-output relationships are constant, regardless of output levels. Therefore, results should be viewed cautiously. The second approach assumes evaluation will be done by computing the marginal impact of additional industry output (economic multipliers) on the regional economy. Economic multipliers avoid this pitfall by focusing on the marginal impacts of additional output computed on a "per dollar" basis and fundamentally sound, but problems may arise when comparing regional economic impacts because the method does not account for regional differences in the dollar value of the output (Cox& Munn, 2001)

The standard Input-Output Table describes the sale and purchase relationships between producers and consumers within an economy, either flows of final and intermediate goods and services defined according to industry outputs or according to product outputs. It is a framework that consists of several matrices. Matrix A describes production sector outputs in row and columns represent sectors that use outputs of production as intermediate inputs. Matrix B reflects breakdown of a final demand on private consumption, government consumption, and investment. Matrix C represent cross boarder export. The direct purchase by nonresidents and direct purchases aboard are explained in Matrix D and Matrix E, respectively. For examples, the European System of Integrated Economic Accounts (EUROSTAT, 2013)and OECD Harmonized National Input-Output Table (OECD, 2020).

2.2.2 Social Accounting Matrix (SAM)

A SAM is an expanded version of an I-O table that is designed to capture specific details of various economic flows in a matrix format. Traditionally applied to analyze the causes and consequences of various aspects of inequality among household groups, and extended SAM is currently used as a conceptual and modular framework for policy and planning purposes. A detailed SAM integrates the four existing economic frameworks in any country, viz. (i) SNA, (ii) Balance of Payments, (iii) Flow-of-Funds, and (iv) Input-Output Table. The SAM, therefore, provides a comprehensive quantified description of the macro-economic and financial interrelationships in the country.

2.2.3 System of National Accounts (SNA)

The System of National Accounts (SNA) originated in 1947 by the Sub-Committee on the National Income Statistics of the League of Nations Committee of Statistical Experts under the leadership of Richard Stone with the aim to provide a comprehensive conceptual and accounting framework for compiling and reporting macroeconomic statistics for analyzing

and evaluating the performance of an economy as the United Nations Statistical Commission (UNSC) emphasized the need for international statistical standards for the compilation and updating of comparable statistics in support of a large array of policy needs (UN, 2020).

The 1953 SNA was published by UNSC which consisted of a set of six standard accounts and a set of 12 standard tables presenting detail and alternative classifications of the flows in the economy. The concepts and definition of the accounts were widely applicable to most of the countries in the world. The revision in 1953 SNA was done in 1960 and 1964 and this revision incorporated experiences of the SNA 1953 implementation and updated its consistency with the International Monetary Fund's Balance of Payments Manual. Further, 1968 SNA extended the scope of the national accounts substantially by; adding input-output accounts and balance sheets; giving more attention to estimates at constant prices; and making a comprehensive effort to bring the SNA and the Material Product System (MPS) closer together. The 1993 SNA represents a major advance in national accounting and embodies the result of harmonizing the SNA and other international statistical standards more completely than in previous versions. The 2008 SNA is an update of the 1993 SNA which addressed issues brought about by changes in the economic environment, advances in methodological research, and other needs of the users(UN, 2020).

SNA is the internationally agreed standard set of recommendations on how to compile measures of economic activity and describes a coherent, consistent, and integrated set of macroeconomic accounts with a set of internationally agreed concepts, definitions, classifications, and accounting rules. It provides an overview of economic processes, recording how production is distributed among consumers, businesses, government, and foreign nations. Besides, it explains how income originating in production, modified by taxes and transfers, flows to these groups and how they allocate these flows to consumption, saving and investment. SNA also provides an overarching framework for standards in other domains of economic statistics, facilitating the integration of these statistical systems to achieve consistency with the national accounts (UN, 2020).

By now, the SNA describes a coherent, consistent, and integrated set of macroeconomic accounts in the context of a set of internationally agreed concepts, definitions, classifications, and accounting rules. In addition, the SNA provides an overview of economic processes, recording how production is distributed among consumers, businesses, government, and foreign nations. In 1993, the United Nations (UN) Rio Summit recognized a system for integrated environmental and Economic Accounting (SEEA) to deal with

environmental issues. At present the SEEA remains a satellite system, not integrated into SNA Shakur & Haque, 2012).

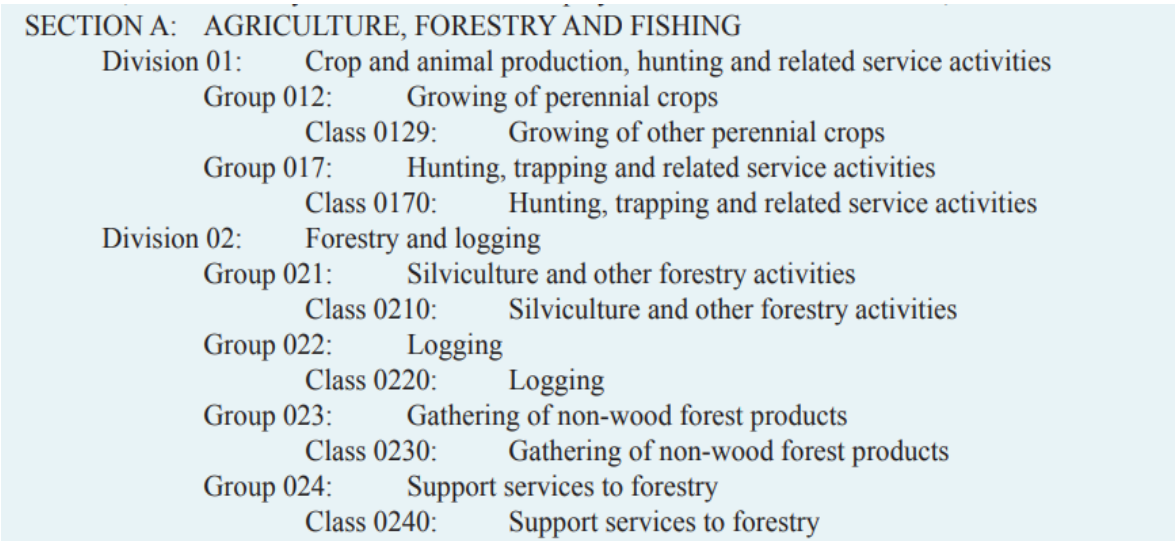
SECTION A: AGRICULTURE, FORESTRY AND FISHING
Division 01: Crop and animal production, hunting and related service activities
Group 012: Growing of perennial crops
Class 0129: Growing of other perennial crops
Group 017: Hunting, trapping and related service activities
Class 0170: Hunting, trapping and related service activities
Division 02: Forestry and logging
Group 021: Silviculture and other forestry activities
Class 0210: Silviculture and other forestry activities
Group 022: Logging
Class 0220: Logging
Group 023: Gathering of non-wood forest products
Class 0230: Gathering of non-wood forest products
Group 024: Support services to forestry
Class 0240: Support services to forestry

Figure 2: The location of forest dependent activities in the ISIC Revision 4 (FAO, 2014)

The ISIC Revision 4 is divided into four levels of detail, namely, Sections; Divisions; Groups; and Classes. The fundamental level of detail in ISIC Revision 4 is the Division, which is represented by a 2-digit code. Forestry and logging appear as a separate economic activity at the Division level in ISIC Revision 4 and forms part of Section A (agriculture, forestry, and fishing). Different forestry activities are broken down further into four classes of forestry, logging, and related activities in this Division. Hunting in forests and growing of Christmas trees are part of other classes of Division 01 in this Section(as explained in Figure 2.).

It is noteworthy to mention that 1993 SNA and successive revised SNA documents have categorized Agriculture and Forestry as a single account head among the 17 industrial categories of the account heads. Mostly, in national statistics, economic activities are divided into different sectors and sub-sectors (e.g., agriculture, forestry, fishing, mining, construction, etc.). The International Standard Industrial Classification (ISIC) of All Economic Activities is a classification system which is used to ensure comparability between different countrieswas used as the basis for most of this analysis (FAO, 2014). Generally, to quantify the economic contribution of the forestry sector, three indicators i.e. employment generated in the sector, the forestry sector's contribution to GDP (value added) and trade performance- sector's contribution to trade balances are well considered (FAO, 2014). However, these indicators are not well capable to capture the real contribution of the forestry sector in the national economy. For instance, it fails to capture the economic contribution of nature-based tourism and ecological services. Therefore, it is limited in clear identification of the real contribution of the forestry sector as a value added to the National economy in terms of GDP.

2.3 PREVIOUS STUDIES

2.3.1 Contribution of Forestry Sector to National Economy

Though historically different plans and policy documents have estimated the proportion of the contribution of the forestry sector to the national GDP, the estimated share to the GDP is not similar and there is a high discrepancy in the estimated data. For example, the Master Plan for the Forestry Sector 1988 (MFSC, 1988) claimed contribution of the forestry sector alone was 15 percent of the country's agricultural sector GDP, while Agriculture Perspective Plan (APP, 1995) mentioned it would be less than 10 percent of the agricultural sector. FAO estimated share of forestry sector to the national economy for the year 1990 to 2000 is 4.4 percent of agriculture GDP.

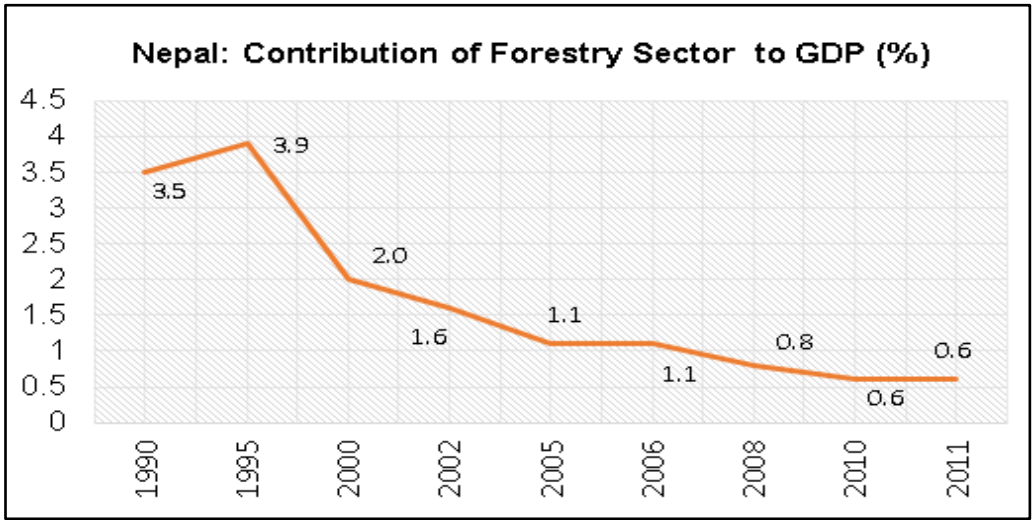

Figure 3:Trend of contribution of Forestry Sector in National GDP

The Global Forest Resources Assessment 2015 reported, the contribution of the forestry to the national GDP of Nepal was USD 50,000 (0.6%) for the year 2010 (FAO, 2015). However, a detailed assessment of the contribution of the forestry sector was conducted by the FAO and report on "Contribution of the Forestry Sector to National Economies, 1990-2011" was published in 2014. Based on the FAO's estimation Nepal's forestry sector's contribution to the national GDP was 3.5% for 1990 and 3.9%, 2%, 1.1%, and 0.6% for 1995, 2000, 2005 and 2010(FAO, 2014) respectively. This estimation shows a nonlinear trend of contribution while it decreases in later years. FAO has clearly highlighted the limitations of quality and availability of published statistics especially from developing countries for the estimation of the sector's contribution to the national GDP (Figure 3).

Forestry, agricultural and fisheries are considered as the primary sector of the economy that provide raw material to the other sectors of the economy specifically, for processing and manufacturing industries. It is important to note that the complete economic valuation of the

goods and services received from the forests is quite difficult, particularly for the ecosystem services due to wide range of variables and complexity in measurement, for example, cultural, social and spiritual values. The procedural complexity and lack of required data or information is the one of the major constraints that always arises for complete valuation of the forestry sector. Moreover, CBFM groups of Nepal produced diverse goods and services including financial services and part of this also goes to the household sector without entering to the formal market, which may have been overlooked in the national accounting system or there is a lack of sufficient data. Hence, the actual share of the forestry sector in their respective sectoral value and GDP calculation is always scanty.

An international statistic of the forestry sector contribution to the national economy in terms of GDP showed that a tiny part of the total GDP shared by this sector might be due to problems in accounting that lead to an underestimated value. For example, the statistics show less than one percent contribution of the forestry sector to the national GDP in Malaysia. Similarly, Bhutan's forests contribute less than 7% to national GDP, while both Afghanistan and Bangladesh's forests make less than 3% contribution to GDP (FAO, 2014). Finland (4%) and Sweden (3%) had the highest contribution of the forestry sector to the national GDP among northern European countries in 2011. In the same way, India and Pakistan's forestry sector contributes 2% and less than 0.5% respectively to their national GDP. However, the figure seems relatively higher in the case of Solomon Island, the forestry sector of which notably contributes 11% to the national GDP. On a regional scale, tropical countries' forests contribute 1.1% to the GDP and 4.1% of Agriculture GDP and temperate countries' forests contribute 0.9% of GDP and 4.3% of Agriculture GDP (FAO, 2014).

2.3.2 Role of Forest in Agriculture Production

Forests provide the raw materials for nursery (wild soil, decayed moss as a horticulture soil additive, decorative plant, etc.), poles for vegetable farming, hardwood for agricultural equipment (e.g., hoe and spade handles), harvest and transport materials (e.g.,*Doko,* a big basket), crop storage containers (e.g., yam storage stakes) as well as crop marketing equipment's. Forest products can also be instrumental in protecting crops (e.g., fencing materials and insecticides). Another contribution of forests is the support of the production of animal dung and draught, which is considered as an integral part of the agriculture farming system of Nepal. For example, Rasaily & Ting (2012) observed that fodders, grass, timber, and poles are the major primary supporting materials gathered by the farm families in the Mid-hills of Nepal from the community forests to increase their household income.

The forests provide timber, firewood, fodder, and other non-timber forest products (NTFPs) such as fruits, flowers, bark, dyes, fibers, gums and resins, latex including medicinal and aromatic plants (MAPs). Likewise, forests also provide water for drinking and irrigation and energy generation purposes. Apart from this, forests also help to maintain hydrology, and conserve soil and water together with working as a carbon sink. However, there are different initiatives to capture these items in forestry as SEEA-CF and WAVES, but these also have not been materialized fully. It needs a separate model for each, and the information should be integrated into a single account.

Trees and agriculture, especially annual crops and livestock are the main sources for the livelihood subsistence and income for the farm household residing in the mid-hills of Nepal. Livestock is a very critical element of subsistence farming system not only for food and nutritional security but also for cash income generation. They are also crucial for soil nutrition of annual crops. Trees on-farm and the community forest not only provide fodder and bedding material for livestock, but also provide fuel wood for domestic energy needs (Cedamon *et al*., 2019). Adhikari *et al*. (2004) concluded that rural households of the Kabhrepalanchok and Sindhupalchowk districts allocate their labor for collection of firewood, tree and grass; fodder, leaf litter; and some herbal plants for medicinal purposes, but the significant economic value of the labor was on firewood, tree and grass fodder, and leaf litter. The collection of these products varies by income groups and the poorer households on an average allocate a total of 116, 178, and 328 hrs. of labor annually for fuelwood, leaf litter, and grass and fodder collection, respectively. Likewise, richer households on average allocate 144, 871, and 989 hours annually in collecting these products (Adhikari *et al*., 2004;Table 1).

Table 1: Labor allocation & average quantity of forest products collection by households

Description	Poor		Middle		Richer	
	Labor(hrs.)	Bhari	Labor (hrs.)	Bhari	Labor (hrs.)	Bhari
Fuelwood collection	116	34	115	41	144	48
Grass& fodder collection	345	100	693	203	989	308
Leaf litter collection	178	83	394	174	871	407

Note: One Bhari green fuelwood = 50 kg; 1 Bhari fodder = 25 kg; 1 Bhari leaf litter = 20 kg; 1 Bhari grass = 20 kg

It is noted that very low attention has been paid for the research activities to measure the economic contribution of the forest to agriculture in particular, on the contribution of the forests to the field crop production, livestock or a mixture of both in farming systems. However, several literatures are concentrated to analyze the impact of forestry to the integrated farming system for livelihood improvement. Most literature mention that contribution of the forests to the agriculture production system could be realized in terms of:

(i) maintenance and restoration of soil fertility and soil improvement, (ii) erosion control, (iii) maintenance of biodiversity, (iv)direct production of food, medicine and collection of other necessities, (v)provisions of farm inputs- timber for shed and tools, soil and moss for nursery, and litter for compost, (vi) fuel wood for energy, (vii) grass and fodder and (vii) employment and cash income (Aju, 2014). Clearly, forest provides both ecosystem services and goods to the agriculture production system.

2.3.3 Role of Forests in Industrial Sector

Forests is the integral part of both rural and national economy in Nepal. They provide several goods which serve as raw material for many industries. Woods grown in forests serve as a source of energy for rural households. Obviously, each and every country in the world endowed with substantial forest resources have played and continue to play a key role in overall socio-economic development through the supply of various types of goods, raw materials for forest-based industries (both wood and non-wood) and environmental services. The forest supplies raw materials for forest based large and small-scale enterprises to produce forest products for domestic consumption as well as other products for international trade for example NTFPs, essential oil and other processed products.

The forestry sector has contributed to the development of manufacturing, processing, and transportation industries through the household-level to manufacturing and construction industries. Without a sustainable supply of quality raw material, these types of industries cannot go into a boom. Thus, in its value chain, it helps to generate a significant amount of revenue and a good share of different social benefits. However, in the present accounting system, employment, and revenue generated from the value chain are not well-recognized as the forestry sector's contributions. This is not a fair accounting system.

The industry sector (ISIC Rev.4 Division 02, 16, 17) generated 20, 000 employments in the year 2011. However, labor generated by the tourism, household sector and other subsectors were not included. It is noted that the ratio of contribution of the forestry sector to national GDP gradually declined by 3.9% in 1995 to reach only 0.6% in 2011(Table 2 and Table 3).

Table 2: Contribution of Forestry sector for employment (in '000)

Industry (ISIC Rev.4 Div.02)	1990	1995	2000	2005	2010	2011
Forestry subsector (ISIC Rev.4 Division 02)	6	9	12	12	12	12
Wood Industry (Div.16)	2	3	3	3	4	4
Pulp & paper (Divi.17)	2	3	3	3	3	3
Furniture Industry (Div. 31)	2	4	3	4	11	11
Forestry Sector (ISIC Rev.4 Division 02, 16, 17)	10	14	19	19	20	20

Source: Contribution of the Forestry Sector to National Economies, 1990-2011, FAO, 2014

Table 3: Contribution of Forestry sector to national economy

Industry Sector	GVA in million USD at 2011 price & exchange rate					
	1990	1995	2000	2005	2010	2011
GVA (ISIC Rev.4 Div. 02)	258	364	237	114	55	55
Wood Industry (Div. 16)	5	11	9	10	14	14
Pulp & paper (Div. 17)	7	10	14	31	39	37
Furniture (Div. 31)	5	14	7	8	34	34
Forestry sector (Div. 02, 16 & 17)	270	384	260	156	107	105
Contribution to GDP (%)	3.5	3.9	2.0	1.1	0.6	0.6

Source: Contribution of the Forestry Sector to National Economies, 1990–2011, FAO, 2014.

2.3.4 Role of Forests in Travel and Tourism Sector

The tourism sector has a positive impact on economic growth and development by several ways as it: (i) generates employment and income, (ii) stimulates other sectors of the economy creating demand of the goods and services, (iii) earns foreign receipts for positive balance of payments, and (iv) helps to increase economic activity at local level.

Generally, contribution of the tourism to the national gross domestic product (GDP) generated by visitor consumption is the most comprehensive aggregate illustrating the economic relevance of tourism including size of employment and fixed capital (Zurub *et al.,* 2015).

Nepal has an ancient history of tourists' arrivals but officially, it has been open for international tourism since 1951. Since then, Nepal has managed to attract tourists as a preferred destination. Sir Edmund Hillary and his travel companion on behalf of the British Mt Everest Expedition Team were among the first foreigners to visit Nepal in 1953(Neupane *et al*., 2012). The tourism industry is growing very rapidly in the globe; therefore, Nepal has tremendous potential for tourism development because of its unique natural and cultural premises such as snowcapped mountains, abundant flora and fauna, exciting trekking routes and rich cultural and religious diversity with internationally renowned cultural and natural heritages.

Nepal has signed various international treaties and obligations and committed to conserving its rich biodiversity. At present, 23.3% of the area of Nepal is under protected area (PA) systems, which includes national parks (10,853 sq. km); wildlife reserves (979 km^2); hunting reserves (1,325 sq. km); conservation area (15,425 sq. km); and buffer zones (5,602 sq. km). These PAs are home to large number of floral and faunal species and conserve diverse types of typical ecosystems.

A nature-based tourism commonly termed as “Ecotourism”, in which the visitor’s essential motivation is to observe, learn, discover experience and appreciate biological and cultural diversity with a responsible attitude to protect the integrity of the ecosystem and enhance the well-being of the local community. It increases awareness towards the conservation of biodiversity, natural environment, and cultural assets both among locals and the visitors and requires special management processes to minimize the negative impact on the ecosystem (UNWTO, 2019). Ecotourism has distinct attributes viz. nature-based products, minimal impact management, environmental education, contribution to conservation, and contribution to the community.

In fact, tourism is natural to Nepal. The country's extent of diversity ranging from ecosystems, flora, and fauna, landscapes, and culture is incredibly rich and unique. The landscape of the country lies from 70-meter altitude above mean sea level in Terai (South) to the highest peak of the world, Mt. Everest at 8,848 mt in the north. This offers variety of nature, biodiversity, and ecosystem. Almost half of the entire tourists coming to Nepal visit protected areas (PAs). Tourism in protected areas continues to provide significant opportunities for economic advancement to scores of rural communities, working as a powerful economic justification for conserving biological resources and natural heritage. For example, the natural and cultural features of Annapurna Conservation Area (ACA), which is the most popular trekking destination in the country as well as popular destination in world tourism map. It is attracting a majority of the country’s total trekkers and tourism, over the years, has been firmly established as one of the most important sectors of the ACA’s local economy.

It is clear that ACA has allowed local resident to live within the boundaries as well as own their private property and maintain their traditional rights and access to the use of natural resources. Currently, it is more focused on the role of tourism in economy rather than the role of forest in tourism. Thus, such sustainable financing modality of ACA would be an example to illustrate how forest and tourism linkage can contribute to sustainable development in Nepal.

The country ranks 37th in terms of travel and tourism direct contribution to GDP among 185 countries, with the industry directly supporting 497,500 jobs in 2017. By 2028, the industry is expected to rise to 638,000 jobs, 3.4% of total employment (WTTC, 2018).

The Nepalese forestry sector is credibly contributing tourism industry both directly and indirectly and out of the total tourists visiting in Nepal about 36% visit protected areas (FAO, 2009). The protected areas under the forestland (not necessarily the trees) are the one of

the popular nature-based tourism sites of Nepal. The list of the PAs and types of the tourism activities that could be successfully operated with its attraction are summarized in Table 4 (Aryal *et al*., 2019).

Table 4: List of PAs and Attraction

S.N.	Name of the Protected Area	Annotation	Area (sq. km)
1	Chitwan National Park	• Established in 1973 and located in Terai region of Nepal about 170 km far from the Kathmandu City. Daly flight from Katmandu to Chitwan; By bus (4–5-hour drive) • Attraction: Mega-fauna (Tiger, One-horned Rhino), various species of bird and Tharu Culture.	952.63
2	Bardia NP	• Established in 1976 and located in Terai region. Daily flight from Kathmandu to Nepalgunj and 3 hours' drive or direct bus from Kathmandu (15 hours) • Attraction: Megafauna (Tiger, Rhino & other mammals) and various bird species along with Tharu Culture	968
3	Sagarmatha NP	• Established in 1976 and located in Mountain region of Nepal, one-hour flight from Kathmandu to Lukla (entry point of Khumbu region). Namche bazaar -one-day trek from Lukla • Attraction: High mountain Scenic Landscape (Mount Everest, Sherpa Culture, MuskDeer & Himalayan Thar	1148
4	Langtang NP	• Established in 1976, and located in Mountain region, 202 Km from the Kathmandu (4 -5 hours' drive) • Attraction: Mountain landscape, Musk Deer & other mammals, Trek to Gosaikunda, Helambu and Langtang Valley	1710
5	Rara NP	• Established in 1976 and located in Karnali region • Attraction: Mountain landscape and Rara Lake,	106
6	Shey Phoksundo NP	• Established in 1984 and located in mountain region • Attraction: Mountain landscape, Shey Phoksundo Lake, Monastery, SnowLeopard, and BlueSheep	3555
7	Khaptad NP	• Established in 1984 and located west of Nepal in mountain area • Attraction: Mountain landscape, religious places – including Hermitage of Khaptad Baba, Saileswori, and Ramaroshan Living Garden of herbs and a museum of natural history, excellent bird watching opportunity, home to varieties of wild animals including Himalayan Black Bear	225
8	Makalu Barun NP	• Established in 1991 and Located in Eastern Mountain • Attraction: Mountain Landscape, characterizing eastern Himalayan forest types, birds and wild animals together withrich culture and history	1500
9	Shivapuri NP	• Established in 2002 and located in Kathmandu Valley	159

S.N.	Name of the Protected Area	Annotation	Area (sq. km)
		• Attraction: Meditation, Birds watching, conservation of water source to Kathmandu Valley	
10	Banke NP	• Established in 2010 and located in Western Terai region • Attraction: Tiger, various species of birds and other animals	550
11	Sukhlaphanta NP	• Established in 1976 and upgraded to National Park in 2017 and located in Far-western Terai • Attraction: Birds, Barasingha (Swamp Deer) and other wild animals	305
12	Parsa NP	• Established in 1984 and located at central Terai • Attraction: Tiger, Wild Elephant and various species of bird	627.39
13	Koshi Tappu Wildlife Reserve	• Established in 1976 and located in Eastern Terai • Attraction: Wild water buffalo, migratory wetland birds and Koshi River	175
14	Annapurna CA	• Established in 1992 and located in hills and Mountain region of Nepal • Attraction: World famous trekking route, Gurung Culture, Snow Leopard andBlue Sheep	7629
15	Dhorpatan HR	• Established in 1987 and situated in Mountain • Attraction: Wildlife, privilege of legal trophy hunting of Blue sheep (Naur) and Himalayan Thar (Jharal), landscape- Patan (grazing land)	1325
16	Manaslu CA	• Established in 1998 and located in Mountain • Attraction: Mountain landscape, diverse fragile natural resource base, rich cultural environment, and natural heritage	1663
17	Kanchenjunga CA	• Established in 1997 and located in mountain region • Attraction: Mountain landscape, mixture of cultivated land, pasture, forests, high-altitude lakes and glaciers, Flagship fauna- Snow Leopard, Red Panda, Asian Black Beartogether with rich culture	2035
18	Api Namppa CA	• Established in 2010 and located at north-west mountain region • Attraction: Mountain Landscape, ecological diverse featuring unique flora and fauna in Nepal's. Musk deer, blue sheep, Himalayan Thar, "Conservation forPoverty Reduction" Program	1903
19	Gaurishankar CA	• Established in 2010 and situated in mountain • Attraction: Mountain landscape create biological corridor for Sagarmatha National Park and Langtang National Park;full of natural, cultural (mosaic of Hindu and Buddhist cultures) and historical significance;Red Panda and 16 vegetation types	2179
20	Krishnashar CA	• Established in 2009 and situated in western Terai	16.95

S.N.	Name of the Protected Area	Annotation	Area (sq. km)
		• Attraction: Typical habitat for one of the endangered mammals -Black buck in Nepal. An example of dedicated species-based conservation effort and initiatives considering fragile existence of Black Buck.	

2.3.5 Distribution of Household by Use of Forest Resources

The status of the forest products used by the households as per the census 2011 by provinces is presented in Table 5. Table reveals that forest products except agriculture purposes, wood is used for foundation of the house, wall, and roof as well as for the purpose of energy and over 3.4 million of the household use firewood for energy purposes. Likewise, more than one million households use thatch or straw for roof and bamboo products. Further, 1.35 million households used foundation with wooden pillar for construction of their house.

Table 5: Distribution of household by use of Forest products by Province

Province	Total	No. of houses with use of forest products					Households using firewood
		Foundation with wooden pillar	wall with wood or planks	Bamboo	Roof with Thatch/ straw	Roof with Wood / planks	
Nepal	**5,423,297**	**1350151**	**287859**	**1096988**	**1,032,282**	**44,069**	**3,470,224**
Province 1	991,750	351228	75177	367048	303,086	10,874	664,953
Province 2	932,087	578971	40914	571396	211,637	8,151	485,156
Bagmati	1,269,144	97243	43743	31792	89,874	11,043	585,649
Gandaki	577,682	28702	11434	10869	64,176	4,213	395,522
Lumbini	884,757	141966	26866	69919	205,723	4,292	629,432
Karnali	298,174	18793	16179	1960	95,364	3,241	281,662
Sudurpaschim	469,703	133248	73546	44004	62,422	2,255	427,850

Source: Environment Statistics of Nepal 2019 based on the National Population Census, 2011.

CHAPTER 3: METHODOLOGY

This chapter describes the summary of the methodology adopted for the study. Details of the study methodology were annexed as technical note on methodology (Annex M-1).

As discussed in Chapter two, economic benefits are usually measured in monetary terms and, mostly it includes income received from employment in the sector; the value of the production of goods and services from forests; and the contribution of the sector to the national economy, energy supplies and international trade. In addition, the economic viability or sustainability of the sector can be assessed through the profitability of forest enterprises or the level of investment. The social functions of forests are often more difficult to measure and can vary considerably among countries, depending on their level of development and traditions. Therefore, a wide range of variables including production and consumption; recreation and tourism; employment, and investment need to be considered in accounting the economic contribution of the forestry sector. In addition, cultural; social and spiritual needs and values; health and safety; and community needs also need to be included during the accounting.

As we discussed earlier, the total contribution of the forestry to the national economies is the function of the contribution of the forestry sector to the forestry-based and supported economic sectors and their sub-sectors as specified in the objectives of the study. These economic sectors and their sub-sectors are: (i) forest products-based Industries, (ii) tourism, (iii) agriculture – through the household economy, (iv) other economic sub-sectors such as energy, religion and culture, transport industry, corporate sector, etc. In addition, this study also explains disintegrated economic contribution of CBFM groups in the national economy. The study considers a basic assumption that an aggregate demand for forest products and its measurable services equals to aggregate supply in the economy including stock of the previous years plus export less import.

In any economy, the flow of the products and money is circular in nature. Therefore, households and the firms (establishments such as industries) generally use parts of forest products derived from the production units (Government forest and private forest). The establishments produce final or semi-processed products by using raw materials (using intermediate consumption) with the mobilization of the value addition process using land, capital, and technologies. Final products of the establishments are supplied to the national market and export market, while semi-processed products further travel to secondary processing units or product markets, which are eventually consumed by the individuals or

households. The government generally functions as a regulating institution in the entire production and market flow system through regulatory mechanisms, including taxes and subsidies.

Inline to this generic production flow framework, it is obvious that forest products derived from the production units (for this study government-managed forests including protected forests and protected areas, private forests (registered and non-registered) and community-managed forest system including community forests, collaborative forests, leasehold forests, religious forests, and buffer zone community forests) are used by establishments and households. Therefore, this study considered the economic valuation of the forest products from both household-level economies and establishments through survey approach accompanied by secondary information.

This study focused on the estimation of the contribution of forestry sectors to the national economy through other various sectors of the economy as specified in the objective. The study credibly followed the accounting procedures of the SNA and ISIC/NSIC as far as practicable to identify the variables and monetary valuation of the forest products, adopting production and consumption approaches. The contributions of the forestry sector to the targeted economic sub-sectors were assessed in terms of income, employment, and value addition by adopting a composite approach of estimation that include production approach, consumption approach, and added value estimation to avoid double counting or minimize the errors.

3.1 DATA COLLECTION METHODS

Data collection procedures and availability of the data as per the objectives of the study is very crucial. Therefore, multiple methods were used for data collection following SNA 2008, data collection methods and sampling design as suggested by FAO report on “Economic Data and Information About the Forest Sector in Suriname” (FAO, 1999) and other literatures. Iterative review of the secondary literature and information; administration of questionnaires survey; focus group discussion; key informant interview and bilateral meetings were the major method used for data collection. The study has adopted iterative review process, consultation with experts and relevant institution (e.g. FRTC and CBS) and relevant stakeholders of the forestry sector. A broader overview of proposed techniques of data collection to the economic sectors and their sub-sectors are given in Annex M-2.

A survey is the most common and dominant research tool used for collecting primary data from a predefined group of respondents to gain information and insights into various topics of interest. Therefore, most of the primary data for this study were collected adopting

questionnaire survey approach. Household-level survey was administered to collect the quantity of the various types of the forest products consumed by each household in the year 2075/2076. The establishment or industry-level survey was also carried out to collect the primary data about the consumption of the forest products and its sources, skilled and unskilled labor used, sale of the processed products, etc. to know the gross margin of the establishment and estimate the added value of the products after processing. Hotel and restaurants operating at the vicinity of the protected areas were surveyed to assess the economic contribution of the forestry to tourism sector. The questionnaire Survey method was also extended to CBFM groups level to gather data about the different kind of forest products extracted from the CBFM regime and to explore their role in the community and social development, including contribution to the national economy.

3.2 SAMPLING DESIGN AND SAMPLE SIZE

As per the scope of the study, this study covers urban and rural areas, all seven provinces and three ecological zones, namely Mountain, Hills and Terai. Therefore, this study has adopted various types of the sampling approaches considering population of each sampling frame prepared based on each study objectives as specified in Chapter 1, Section 1.3.

The sampling design for the study was combined with the sampling design adopted by the Central Bureau Statistic (CBS) during population census and other national level survey as far as practicable to make geographical homogenous units and ensure representative sample. Hence, all 17 eco-provincial regions suggested and included by the CBS (Annex M–3)for population census and other national level survey are chosen as the sampling strata to ensure representation of the all-diverse ecological regions of the country and make a homogenous unit.

Multiple sampling methods were adopted (simple random sampling, systematic random sampling method and purposive or expert judgment) to select the samples for the study because of the diverse nature of the products and diversity in the nature of the establishment under the forestry sector. The major units of enumeration of the survey were (i) household, (ii) forest-based establishment, (iii) hotel and restaurant, and (iv) CBFM group. The survey followed a similar concept, definition and classification as adopted by CBS to ensure national and international comparability of the survey estimates.

The sampling was done at three stages: (i) from each eco-provincial region (strata), at least one district was selected randomly to make 20 sample districts and 51 Local Government Units (Rural Municipalities/Municipalities) were chosen (at least 2 in each selected districts)purposively adopting expert judgement approach considering forest cover criteria (>

50%, 25-50%, &<25% of the total land cover) and distance to forests from the dominant settlement of the local body, (ii) Enumeration Area or Primary Sampling Units were identified in each Local Body, and (iii) respondents households were identified.

The digital administrative boundary of the Ward of the previous Village Development Committee was overlaid on the administrative map of the current Local Government Unit, and the enumeration areas (EAs) or primary sampling units (PSUs) were identified randomly, ensuring at least one EA in each selected local government and 4–6 EAs in selected districts to make 102 EAs. The voter-list of the previous Ward was used to identify the list of the households from the entrance point of the Ward, and the survey questionnaire was administered to the respondent households in each EA.

3.2.1 Agriculture Sector Survey

A diverse type of the forest products is being collected by rural households in their agricultural activities as well for their livelihood sustenance. Therefore, economic contribution of the forestry to the agriculture sector could easily be transferred and reflected through the analysis of the household-level consumption pattern of the forest products and valuation of these products in monetary value. It is notable that secondary benefit on improvement of crop and livestock productivity is not accounted. Hence, household survey was conducted to gather the primary data of the forest products consumed by the agricultural households. The given sample size for household survey was 2,213(as per ToR). Therefore, sample size for each EA was 22 households (2,213/102=21.67~22). It is reasonable to select 15–20 households from each EA to capture the general consumption pattern of forest products. This survey covered 2,228 households instead of 2,213 households.

3.2.2 Forest Based Tourism Sector

This section attempts to explore the economic contribution of the forestry sector to the tourism industry through the forest-based tourism activities. The required secondary data for the tourism sector particularly, number of visitor arrivals in the protected area and revenue collected from the tourism activities in the PAs were taken from the DNPWC and Tourism Statistics of Nepal 2019 gathered from the Nepal Tourism Board.

Purposiveor Expert Judgement Sampling approach was adopted to identify the protected area (PA) to make reprehensive sample to ensure representation of the all types of PAs based on the set of the criteria, (i) high flow of the visitors in the respective PA, (ii) representation of physiographic region, and (iii) proximity – accessibility to ensure better estimation of the economic contribution received from the tourism sector. The survey has

also covered Hotel and Restaurants operating in the PAs. Contributors: Hari Sharma Neupane, PhD (Team Leader),

The selected sample PAs for the survey wereChitwan National Park; Shivapuri Nagarjun National Park; Annapurna Conservation Area (ACAP), Langtang National Park and Makalu Barun National Park.

Average days of stay, average expenditure, and other national figure were taken from the secondary sources for triangulation purpose. Altogether, 112 hotels and restaurants (90 hotels and restaurants operating within the vicinity of the PAs, and 22 line hotels and restaurants) were surveyed using semi structured questionnaire. The required data about the expenditure of the visitors was collected adopting reminiscence and consumption approach with the help of the hotel and restaurant management. Besides, focus group discussion and interaction with key informants accomplished for triangulation of the information.Other indirect spending of the visitors such as groceries, local fees and levies, souvenir goods, recreation, etc. are estimated with the help of the key informant interviews and interaction with local shops. The transportation cost and travel length of the visitors are estimated based on the: (a) information provided by the travel agency, trekking agency, hotel and restaurants, (b) expert judgement considering the airfare of the direct route and local transportation cost of the vehicle, and (c) distance of the PAs from the Tribhuvan International Airport

3.2.3 Industry Sector or Establishment Survey

The establishment survey was conducted adopting “Purposive or Expert Judgement” sampling approach after categorization of industries based on raw materials used and determination of number of each category based on a set of criteria. These criteria were: (a) If number of the establishment under the specific category is less than 10, a complete enumeration and (b) If, more than 10 establishments under each category of the consideration then sampling was done by purposive and expert Judgement to make representative. The sampling frame was derived from the Industrial Statistic of the Department of the Industry and 22 types of industries were considered for the survey.

It was found that the list of the forest-based industries provided in the Industrial Statistics is not updated and many of these industries have already left after registration. There are many forests based rural level micro enterprises in operation which are not registered to get formal recognition. This is major limitation faced by the survey team for accounting purpose. The establishment survey was done in each selected district. The establishment survey covered only 356 establishments as it was hampered by complete lockdown of the country

due to pandemic COVID 19disease. Contribution of the forestry sector to the industrial sector was estimated based on the average forest products consumption rate and sale of the final products including value of the stock and gross margin approach to avoid double accounting.

3.2.4 Other sectors

The study also considers other sectors as indicated in SNA 2008. The study includes hotels and restaurants (H) (it comes in Tourism), transportation, storage, and communication (I), Financial Intermediation (J), Public administration and defense (L), and health and social works (N). The data required for accounting subsectors under the other sectors were collected through, (i) focus group discussion carried out at each EAs during household survey, (ii) key informant of the concerned industry and institutions, and (iii) focus group discussion carried out during CBFM group survey.

The consultation meeting and key informants' interview was organized with the Government of Nepal, Department of Road, and Nepal Electricity Corporation to acquire the data about Fuel wood consumed for bitumen heating and wooden electric poles, respectively.

The development and financial activities supported by the forest derived income and sources accounted through the official records of CBFM groups, focus group discussion and key informant interviews of their members of the identified CBFM groups for survey. Some CBFM groups are involved in saving fund mobilization. Similarly, fuel wood used for business activities like brick factory and local breweries were estimated through the consultation with the Federation of Nepal Brick Industries, Key informant interview and bilateral dialogue with industry owner or manager with expert. The fuel wood and other forest products such as leaves, poles used for religious and social function and fuel wood used in dead body cremation was estimated through the focus group discussion and key informant interview.

3.2.5 Community-based Forest Management Groups

These institutions were surveyed for the assessment of the disintegrated contribution of CBFM groups to the national economies through the social and community development activities. The quantity of forest products (wood-timber, fuel wood, pole, fodder, grass, leaf litter, edible wild fruits, nuts, and other non-timber forest products) extracted in FY 2075/76 was collected from the official records of the sample CBFM groups.

The list of all types of the CBFM groups was the sampling frame for CBFM group survey. At least five CBFM groups were chosen from each local government, selected for household

survey adopting systematic random sampling methods preparing list of the CBFM groups. An adjoining Palika was chosen for survey of CBFM groups, in case the number of the CBFM groups falls short than required in the Local Government with Enumeration Areas selected for household survey. Expert Judgement approach was adopted to ensure inclusion of all types of the CBFM groups specially for religious forest and buffer zone community forest user groups. Altogether, 274 CBFM groups were covered for the survey. FGD and KII with knowledgeable persons including current and immediate-past executive committee members were organized for the triangulation of the data. The money value of the forest products extracted from each CBFM groups was estimated based on the average farm gate price of each product. Required secondary information were collected from the Divisional Forest Office of each selected district for household survey.

3.3 TRAINING AND FIELDING OF SURVEY TEAM

Competent and well experienced mid-level enumerators were hired and trained for field survey. Survey questionnaires were prepared for household survey, establishment survey, hotel, and restaurant survey and CBFM group survey including check list prepared for FGD and KII were used for training exercise. These survey tools were pre- tested and revised before the mobilization of the team. Supervisors were assigned for seven provincial clusters to supervise, monitor, and oversee the enumerators' progress and activities to avoid potential measurement errors from the enumerators.

3.4 DATA MANAGEMENT AND ANALYSIS

Both secondary and primary data/information were tabulated, cleaned, and summarized to avoid errors and duplication before the analysis to generate summary of the accounting tables. Descriptive and ratio analysis tools were used for data analysis. The average ratio of the concerned variable derived from the sample was used for simulation and generalization of the results at national level. The result for this study is presented in the form of point estimation for the accounting period i.e., FY 2075/76. The results are interpreted by using appropriate visual charts and summary tables.

CHAPTER 4: STUDY RESULTS AND FINDINGS

4.1 THE AGRICULTURAL SECTOR

The relationship between human being and the forest has been continuous since the very ancient of humankind and their existence for collection of the food, firewood, and shelter from the forest. The survival of the human being is directly allied with the forest as food, firewood and other required materials were obtained by felling, clearing, and burning of the forests. At that time, human beings were associated with the forest both for a safe haven and for gathering fruit for food. Forests and forest floor, therefore, have long been at the center of human interest and pursuit for the idea of evolution of plants, forest, biocenosis, and botany. It has had a significant impact in the creation of the fields of silviculture, agriculture production management, and the use of medicinal plants(Matić, 2012).

The economic contribution of the forest is evidently realized; forests produce timber and non-timber products, conserve soil, recharge groundwater, purify the air, provide habitat for biodiversity, and benefit local communities. For low income countries like Nepal, agriculture, forestry and fisheries are some of the high contributing sectors in the national economy in terms of both employment and share of gross domestic product (GDP) and public spending on agriculture and forestry is an important policy instrument for promoting agriculture growth and food security. Forests act as a source of food, medicine, and fuel for more than a billion people. Along with helping to respond to climate change and protect soils and water, forests hold more than three-quarters of the world's terrestrial biodiversity, provide many products and services that contribute to socio-economic development, and are particularly important for hundreds of millions of people in rural areas, including many of the world's poorest(FAO, 2018).

The comprehensive national data about the incentive or contribution of the forestry sector to agriculture at the household-level are not available in Nepal. However, review of relevant literature and case studies clearly indicates that forest-based products are an integral part of the farming system in Nepal. Trees on agricultural landscapes provide goods and services necessary for the sustenance of their livelihood for rural population. Several authors (such as Gilmour & Nurse, 1991; Garforth *et al*., 1999;and Balla *et al.*, 2014) have argued that trees and forests are prominent features of the food production and livelihood systems in Nepal where farmers for generations have been heavily reliant of the goods and services they provided (Cedamon *et al.*, 2019).

The dependency of rural households on the common or public forest is one of the concerns of the policy makers for the sustainable management of the forest resources linking with the rural livelihood and economic benefits. In such common or public forest, local users could allow to collect forest products to meet their subsistence needs considering the requirements of everyone in the community (Arnold and Campbell, 1985).

Nepalese rural households rely on the forest for the various ranges of products. Generally, the integrated crop and animal farming system that has been practiced traditionally has been supported by the forests. These forest-based resources are both direct household inputs of fuel wood and timber; grazing animal in the forestland; grass and forage for animal husbandry, bedding materials, etc. The dependency of the forest-based products also extended to the commercial farming. The requirement of the forest products is extended to the timber for animal shed, poles for vegetable farming as well as packaging materials, and so on.

It is quite tough to explore the economic contribution of forestry to the agriculture sector in monitory values, as forestry provides both direct and indirect contribution, and vague and diverse types of the variables, and agriculture sector also benefits from the environmental services. Generally, agricultural and forest activities are carried out as seasonal activities for livelihood. In an integrated farming system of Nepal, cereals and horticultural crops including home gardens and animal husbandry are found around their homes in which forest products are used widely, for example, green manure; litters for compost, pole for gourd crops, bamboo for storage facilities; fuel wood for energy; timber for animal shed & grass and for animal husbandry (Hlaing *et al*., 2017). Therefore, the economic contribution of the forest to agriculture could be measured through the valuation of the diverse forest products used by farm households in their farming regime.

The economic contribution of the forestry to the agriculture sector is easily transferred and reflected through the household consumption pattern of the forest products in their agricultural activities for example, wood used for animal shed, grass and fodder, poles used for vegetable farming and storage and packaging materials (Table 6).

Table 6 explores the per capita average forest products consumption of the agriculture households who are directly involved in the agriculture activities and it reveals that 50cft of round timber including timber for animal shed and farm tools, 1485 kg fuelwood, 117.6 Bhari of ground and thatch grass, 89.4 Bhari of fodder and bedding material, 8.5 kg of consumable goods and 11.17 number of the bamboos for vegetable farming, carrying basket and storage mat are utilized by each farm households.

Table 6: Average per capita forest products consumption by agricultural households.

S.N.	Headings	Unit	Quantity
1.	**Wood and fuel wood**		
1.1	Timber	cft	50.111
1.2	Fuelwood	Kg	1485
2	**Agriculture**		
2.1	Wood used for Animal Shed & Farm tools	cft	11.44
2.2	Pole for Vegetable	cft	4.5
2.3	Ground and thatch grass,	Bhari	117.6
2.4	Fodder and bedding materials	Bhari	89.4
2.4	Spade &sickle handle	No.	1.6
2.6	Fuelwood for animal feed cooking	Bhari	12.8
2.7	Bamboo for vegetable farming and Storage	No.	11.17
2.8	Grazing (108.56hrs.)	Days	13.57
2.9	Fibre Materials	Kg	0.7
3	**Consumable and other goods**		
3.1	Wild Honey	Kg	0.3
3.2	Bamboo Shoot and Tusa	Kg	1.83
3.3	Mushroom and wild vegetables including yam	Kg	1.73
3.4	Medicinal herbs & NTFP for local use	Kg	2.3
3.5	Wild fruits and nuts	Kg	2.3

Note: one Bhari green grass and fodder= 30kg, Dry leaves= 20kg
Source: Household survey 2020.

Table 7: Estimated quantity of forest products utilized by agriculture households 2075/76

S.N.	Descriptions	Unit	Quantity
1	**Timber and fuelwood at household-level**		
1.1	Timber	cft	3,617,776
1.2	Fuelwood	cft	84,333,309
2	**Agriculture production**		
2.1	Wood for animal Shed and farm tools	cft	5,420,028
2.2	Pole for Vegetable	cft	4,133,130
2.3	Ground and thatch grass	Bhari	44,913,557
2.4	Fodder and bedding materials	Bhari	48,316,490
2.5	Spade &sickle handle	No.	2,755,679
2.6	Fuelwood for animal feed cooking	Bhari	11,236,832
2.7	Bamboo for vegetable farming,basket, and storage mat	No.	2,605,677
2.8	Fibre materials	Kg	18,591
2.9	Animal Grazing	days	200,023
3	**Consumable and other goods**		
3.1	Wild Honey	Kg	18,373
3.2	Bamboo Shoot and Tusa	Kg	1,131,467
3.3	Mushroom and wild vegetables including yam	Kg	84,757
3.4	Wild fruits and nuts	Kg	133,415
3.5	Medicinal herbs & NTFP for local use	Kg	95,067

Source: Household survey 2020

Mostly, agriculture households are using unprocessed forest products (round wood, branches of the trees, bamboos, raw NTFPs etc.) at household-level from their private land or such products collected from CBFM. However, these household are also using readymade furniture and other processed forest products purchased from the market. Therefore, value of the readymade and process products is not included. The value of the forest products used by agricultural households is estimated based on the, (a) local market price or local user price of the forest products, (b) per capita average quantity of the forest products that consumed by farm household in each ecological zones, and (c) proportion of the farm households using forest products derived from the household survey (2,228 sample households) and focus group discussion during the field survey (Annex FPA-1) and (d) proportion of the agriculture households in each province based on the total number of the household as per the population census 2011 considering each ecological zones (Terai, Hill and Mountain). Table 7 depicts the estimated quantity of the forest products that utilized in agriculture sector at household-level.

Table 8 depicts direct and indirect contribution of the forestry to the agriculture sector and estimated monetary value of the forestry sector to the agriculture sector is NRs. 36.086 billion. The direct contribution of the forestry sector to the field crop and livestock farming activities is estimated as NRs. 13.218 billion except consumable forest products valued 0.124 billion extracted from the forest.

Table 8: Contribution of the forestry sector to the agriculture sector (2075/76)

S.N.	Descriptions	NRs. (billion)
1	**Timber and fuelwood**	**22.744**
1.1	Building, furniture & and maintenance	3.959
1.2	Firewood	18.786
2	**Agriculture**	**13.218**
2.1	Animal Shed	3.327
2.2	Poles and wood (farming activities and agriculture tools)	1.744
2.3	Bamboo, fibre, packaging, and storage materials	0.290
2.4	Thatch grass, forage and fodder including grazing	6.204
2.5	Fuelwood for animal feed cooking	1.653
3	**Consumable Goods**	**0.124**
3.1	Bamboo shoot, Tusa and wild fruits and nut	0.076
3.2	Mushroom & vegetables including Yam	0.007
3.3	Honey, medicinal Herbs, and other consumable products	0.041
	Total	**36.086**

Source: Household survey 2020

4.2 THE TOURISM SECTOR

4.2.1 Tourism as an Economic Sector

Tourism is a social, cultural, and economic phenomenon which entails the movement of people to countries or places outside their usual environment for personal or business/professional purposes. These people are called visitors (which may be either tourists or excursionists; residents or non-residents) and tourism has to do with their activities, some of which involve tourism expenditure (UNWTO, May 12, 2020).Over the decades, tourism has experienced continued growth and deepening *ot noitacifisrevid eht fo eno emoceb*fastest growing economic sectors in the world and tourism industry established as a credible economic sector. Tourism has seen continued expansion over time, despite occasional shocks, demonstrating the sectors strength and resilience (UNWTO, 2019). Inclusive growth and ensuring a future with quality jobs are the concerns of governments everywhere in the globeand perhaps; tourism represents such a sector that provides quality jobs.

Globally, international tourist arrivals (overnight visitors) reached 1.5 billion (annually grew by 4%) in 2019(UNWTO, 2020)and travel and tourism contributed US$ 8.9 trillion,10.3% of global GDP and 330 million jobs, or 10.3% of total global employment (WTTC, 2020)and supports one in every ten jobs on the planet, is a dynamic engine of employment opportunity (WTTC. 2018). Tourism breeds direct and indirect impact in the country's economy through the catalytic activity in the places visited (and beyond), mainly due to demand for goods and services that need to be produced and provided. Therefore, the 'economic contribution' of tourism refers to the 'economic impact' in a broader concept encapsulating the direct, indirect, and induced effects of tourism. Economic impact studies aim to quantify economic benefits, that is, the net increase in the wealth of residents resulting from tourism, which is measured in monetary value, over and above the levels that would prevail in its absence (UNWTO, 2020).

The travel and tourism industry of Nepal is one of the major sources of foreign income as other developing countries in the world. Nepal, as a tourism destination, received almost 1.2millions of international visitors (overnight) in 2019, excluding millions of domestic visitors. Foreign visitors' arrivals crossed the one-million mark for the first time in 2018 (NTB, 2019). The contribution of travel and tourism to GDP was NRs. 231 billion (USD 251.4million), which accounts for 6.7% of the total economy of Nepal. Further, this sector contributed 1,034,000 jobs (6.9% of the total employment and received NRs. 93.9 billion (USD 833.8 million) from international visitors, accounted as 30.8% of the total export of the country (WTTC, 2020). The average spending of the foreign visitors including SAARC nationals was USD 696.46 per person which makes USD 53.57 per day with 13days of stay in 2019 (Mo,

2020). Out of total spending, leisure spending of international visitors comprises 86% and 14% for business activities.

According to the Nepal Tourism Board, Nepal tourism reached the magic figure due to a jump in arrivals from India, China, and the United State of America, Sri Lanka, and the United Kingdom (KP, 2019). The inbound arrivals constitute 17% from India, 13% from China, 8% from the United State and 6% from both the United Kingdom and Shri Lanka and the remaining 51% from the rest of the world (WTTC, 2020).

4.2.2 Tourism Activities in Forest Protected Areas

The global Forest Atlas asserts that protected areas are regions or zones of land or sea that are reserved for purposes of conserving nature and biodiversity. These areas serve a broad range of functions including scientific research, protection of wilderness, preservation of biodiversity and species protection, safeguarding environmental services such as watersheds, maintenance of specific cultural sites and natural features, education, and tourism and recreation (YU, 2020)

Protected areas (PAs) are an emerging economic activity with tremendous potential to generate foreign exchange through tourism. Local residents benefit from the management of protected areas. Tourism is one of the major sectors of the economy; however, the SNA further breaks down into different sectors like hotels and restaurants, transportations, recreation, etc. Since the forestry sector contributes to tourism, but this contribution is not accounted to the forestry Sector. The economic contribution of the forestry is usually measured in monetary term as income received from the production and sale of raw and processed forest products and number of the employment generated in the sector and value of the forest services. In particular, the value of the production of goods and services from forests and the contribution of the sector to the other sub sectors of the national economy, for example, tourism, wood industry, energy supplies and international trade.

As a natural ecosystem, PAs are conserving a wide spectrum of the biodiversity and offering a wide range of ecosystem services and other benefits from local communities to global communities either directly or indirectly. These PAs help to carbon sequestration and maintain attractive site for the ecotourism. Hence, these sites have credible value for biodiversity conservation and recreation and tourism purposes to boost the local community associated and national economy.

Most of the Nepalese Pas are offering both services related to the leisure and recreation such as view-points, elephant safari, jungle drive or walk, camping, boating, hunting, bird watching, village tour and so on, and educational services such as information centers and

museums related to the biodiversity and rural ethnic cultural marks and legends. In buffer zone villages, the local people are getting benefits from cultural tourism, and are trained as nature guide, trekking guide, cook, hotel manager, handicraft producer, etc.

a. Trend of Visitor Arrivals and Revenue Collection in PAs

In 2075/76(2019), the number of both international and domestic visitors reached to 429,764 and 276,704 respectively in PAs. In the year 2075.2076, PAs constitute nearly 36% of the total international arrivals in the country.The outlook of visitors' arrivals in the PAs explores a very interesting fact that flow of the international visitors is highest in Annapurna Conservation Area (42%) followed by Chitwan National Park (33.18%) and Sagarmatha National Park (13.34%), which constitutes nearly 89% of the total international visitor arrivals, while remaining 17 PAs only constitute 11% of the total arrivals. Therefore, these 17 PAs are amazing far from the exploration of the tourism potentiality. Therefore, Annapurna Conservation Area, Chitwan National Park and Sagarmatha National Park are established as important destination for ecotourism.

Further, based on the total visitors' arrivals, Chitwan National Park (26.5%) is preferred destination followed by Annapurna Conservation Area (25.96%), Shivapuri Nagarjun National Park (23.9%), Sagarmatha National Park (8.2%) and Bardiya National Park (3.5%) and these 5 PAs constitutes more than 88% of the total arrivals. Likewise, a high number of Nepali visitors is attributed to Shivapuri Nagarjun National Park (>56%) followed by the Chitwan National Park (16%), Koshi Tappu (6.7%) and Bardiya National Park (5.9%). Both Shivapuri Nagarjun and Chitwan National Park are establishing as a preferred destination for domestic visitors. This might be due to accessibility of the location and nearby the capital city Kathmandu. As per the composition of the visitors, foreign visitors constitute 61%, (SAARC national 11% and other foreigners 50%) and remaining 39% were Nepali(Table 9).

Table 9: Number of visitors' arrivals in major protected areas (2075/76)

National Park/ Conservation Area	International				Domestic		Grand Total	
	Other than SAARC	SAARC	Total	%	No.	%	No.	%
Chitwan NP	117,707	24,779	142,486	33.18	44,623	16.13	187,109	26.50
Annapurna CA	132,180	49,566	181,746	42.32	1,577	0.57	183,323	25.96
Shivapuri Nagarjun	11,814	682	12,496	2.91	156,338	56.50	168,834	23.91
Sagarmatha	54,515	2,774	57,289	13.34	741	0.27	58,030	8.22
Bardiya	7,455	805	8,260	1.92	16,298	5.89	24,558	3.48
Koshi Tappu	352	36	388	0.09	18,358	6.63	18,746	2.65
Langtang	11,814	318	12,132	2.83	5,559	2.01	17,691	2.51
Rara	366	55	421	0.10	11,659	4.21	12,080	1.71
Other	13,798	428	14,226	3.38	21,551	7.79	35,777	5.11
Total	350,221	79,443	429,764	100	276,704	100	706,148	100
Percent	**49.56**	**11.25**	**60.82**		**39.18**			

Source: Department of National Parks and Wildlife Conservation, Kathmandu

Figure 4reveals that the trend of the number of the visitors' arrival over the last decades (between 2065/66-2074/75) in the protected areas is fluctuating and positive growth is observed annually, but a deep shock was observed in the year 2072/73 immediately after the deadly earthquake in Nepal. However, it is notable that number of the visitors' arrivals grew by on an average annual growth rate of 9.17%**.**

The revenue collected from the PAs through tourism activities by the Nepalese government is one of the major contributions of the forestry to the tourism sector.

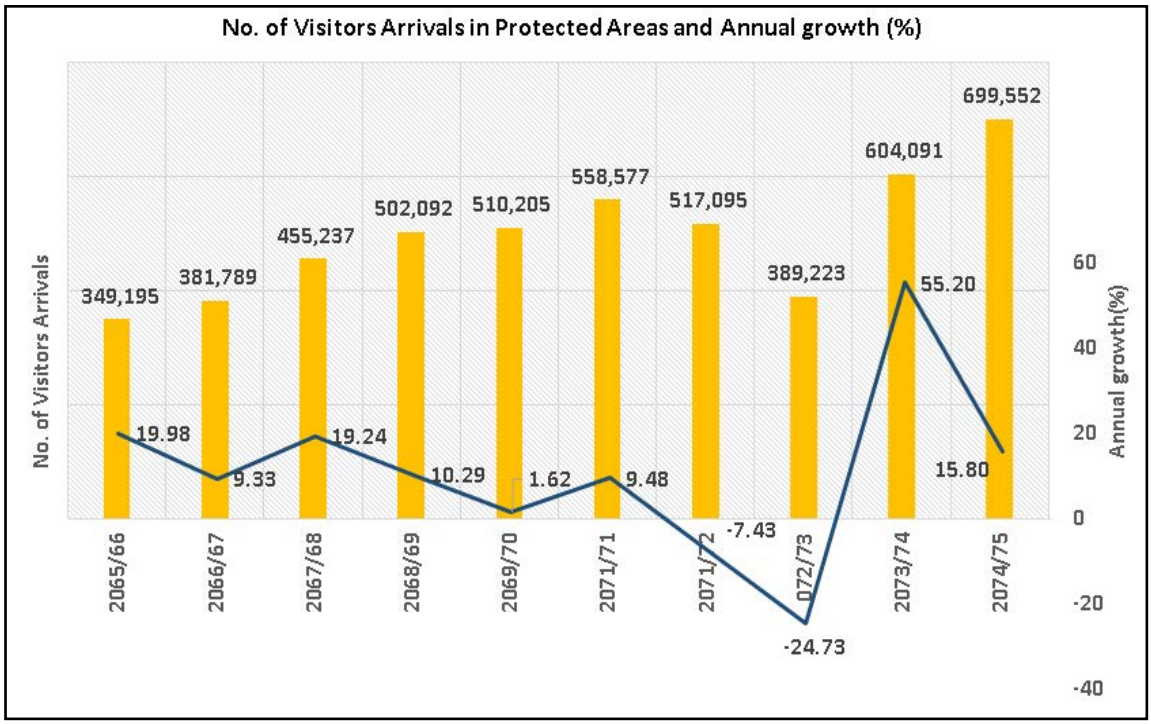

Figure 4: Trend of the visitors' arrivals in protected areas

Data source: Department of National Parks and Wildlife Conservation, Nepal

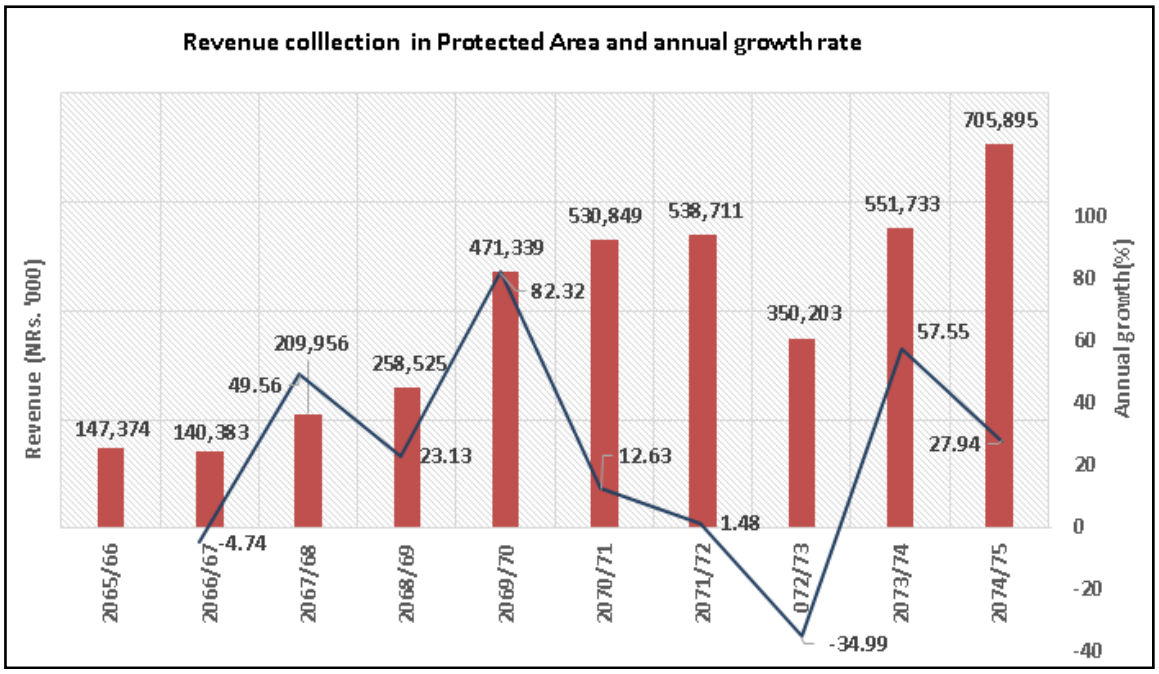

Figure 5: Revenue earned from PAs and an average annual growth rate

Data source: Department of National Parks and Wildlife Conservation, Nepal

The Figure 5depicts the last 10-year trend of the revenue benefit collected from the PAs with its annual growth and figure reveals that trend of the PAs revenue collection is fluctuating over the time with a few negative shocks, but the amount of the revenue collection grew by an average growth rate of 16.96 % annually.

4.3 CONTRIBUTION OF THE FORESTRY TO THE TOURISM SECTOR

Tourism Satellite Account (TSA) approved from the United Nations Statistical Commission (2000) is considered a basic conceptual framework for international standard in tourism statistics as it recommends methodological framework that is linked to the 1993 SNA from a functional perspective. The TSA aggregates Tourism GDP through the related indicator of the economic activities. The measures of the economic activities comprise: (a) *Sales or output* (volume of a good or service produced or sold), (ii) *Income* (money earned within the region from production and sales) and (iii) *Jobs or employment*(number of jobs generated) and (iv) Value added (sum of total income and indirect business taxes). In this regard, the economic impact of visitor spending is typically estimated by some variation of the following simple equation (Daniel J. Stynes, 1999).

$$Y = N * AS * M \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(i)}$$

Where, Y is the Economic Impact of Visitors' Spending, N stands for total number of the visitors' arrival at PAs; AS is the average spending of the visitors and M is the multiplier, which measures the multiplier effects of visitors spending to the final tourism outlay that

results from tourism activities. This equation suggests three distinct steps and corresponding measurements; (i) estimation of the change in the number and types of tourists to the PAs, (ii) estimation of the average levels of spending (often within specific market segments) of tourists in the local area, and (iii) setting of multipliers to determine the secondary effects. Generally, measurement of the economic contribution of the forestry to tourism by Pas adopting Money Generation Model for National Park tourism could include, (i) revenue and levies collected from the PAs, (ii) estimated sales benefits, and (iii) income and job benefits.

Unavailability of tourism satellite account (TSA) at PAs level is one of the majors constrains confronted during the estimation of the economic contribution of the forestry to the tourism sector. However, secondary data available from the Department of National Park and Wildlife Conservation under the Ministry of Forest and Environment and Ministry of Culture, Tourism & Civil Aviation and primary data collected from the field survey were used to comprehend the economic contribution of the PAs. These data were, (a) number of the domestic and international visitors and revenue received from the tourism activities in each PA gathered from the database of Department of the National Park and Wildlife Conservation, Ministry of Forest and Soil Conservation, (b) Number of the international visitor arrivals in each PA collected from the database of the Ministry of Culture, Tourism & Civil Aviation.

During field survey, 90 Hotels and Restaurants operating at the vicinity of the Pas and 22 line hotels and restaurants were surveyed using semi structured questionnaire. The required data were collected adopting reminiscence and consumption approach with the help of the hotel and restaurant management to estimate the direct expenditure of the visitors at hotel and restaurants. The focus group discussion and interaction with key informants accomplished for triangulation of the information. The other indirect spending of the visitors such as groceries, local fees and levies, souvenir goods, recreation and so on are estimated with the help of the key informant interviews and interaction with local shops. The travel cost and travel length of the visitors were estimated based on the: (a) information provided by the travel agency, trekking agency, hotel and restaurants, (b) expert judgement considering airfare of the direct route and local transportation cost of the vehicle, and (c) distance of the PAs from Tribhuvan International Airport(Annex FCT-1, FCT-2 andFCT-3).

Table 10: Estimated Economic Contribution of Forestry in Travel and Tourism (2019)

Descriptions	Unit	Quantity	Value (NRs.BN)	Value (USDMN)
Total International Visitors[1]	No.	11,97,191		
International Visitors in PAs[2]	No.	429,746(36%)		
Domestic Visitors in PAs[3]	No.	303,761		
Estimated Economic Contribution of			**40.322**	**358.038**

Descriptions	Unit	Quantity	Value (NRs.BN)	Value (USDMN)
forestry to Travel & Tourism				
Travel & Tourism Impact (International)[4]			37.629	334.126
Travel & Tourism Impact in PAs (domestic)[4]			1.926	17.106
Revenue collected from PAs[3]			0.765	6.796
Average length of stay at PA (International)[4]	days	13.8	-	-
Average per capita spending in PAs[4](Intl.)	NRs/USD	74,085/653.57		
Average length of stay in PAs (domestic)[4]	days	3.52	-	-
Per capita spending in PAs(domestic) [4]	NRs/USD	5,888 /52.28	-	-
Fuelwood for campfire & other use[4]	KG	289,375	**0.0012**	**0.010**
Employment in PAs from Travel & Tourism[4]	No. of days	329,216	-	-
Travel & Tourism:Other Key Indicators[1]			-	-
Travel &Tourism: Total Impact (Nepal)[1]			**231**	**2051.4**
International Visitors Impact [1]			93.9	833.8
Domestic Visitors Impact[1]			137.1	1217.6
Employment from Travel & Tourism[1]		1,034,000	-	-

Source:[1]Nepal 2020 Annual Research: Key Highlights, World Travel and Tourism Council
[2]Nepal Tourism Statistics 2019, Ministry of Culture, Tourism & Civil Aviation, Kathmandu
[3] Department of National Park and Wildlife Conservation, Ministry of Forest and Soil Conservation and Economic Survey 2019/2020, Ministry of Finance, Nepal
[4]Estimated by based on the Field Survey 2020 and secondary information

The estimated economic contribution of the Forestry sector to the travel and tourism sector is depicted in Table 10. In the year 2019, International visitors' arrivals augmented to 1.2 million in Nepal and out of total international visitors' arrivals, 36% (429,746) of the international visitors enjoyed with various protected areas. The estimated economic contribution of the forestry sector to the travel and tourism sector was NRs. 40.322 billion including both international and domestic travel and tourism activities, which is equivalent to the USD 358.038 million. The average length of the stay including travel day is 13.87 days for international visitors and 3.52 days for domestic visitors. A total of 318,561 jobs are created in the protected areas through travel and tourism activities.

4.4 CONTRIBUTION OF FOREST TO THE INDUSTRIAL SECTOR

Nepal has well-defined forestry sector policies and legal framework. These policies realize that forest could play a credible role in socio-economic development of the country to maximize forestry sector's contribution to national economy as well as to support sustainable development. The economic contribution of the forestry sector is generally measured by several economic indicators for example number of the employment generated in the sector; the value-added i.e., the contribution of the forestry sector to the national GDP; and the contribution of the forestry sector to trade balance, i.e. value of the forest products export

minus import, etc. However, the sector is lacking detailed and up-to-date information or data related to the economic activities required for accounting the economic benefits.

The forestry sector has completed several technical studies since the beginning of the planned development in Nepal. However, these studies are mainly concentrated on technical perspectives for assessing status and change of land cover overtime and biodiversity, mainly for exploration of the species distribution, composition, richness and diversity of biomass, growing stock, etc. Only a few studies are undertaken in assessing the economic importance of the forestry and its benefits and most of the literatures available in the sector are concentrated to the exploration of the societal benefits considering integrated farming system and its impact on local livelihood.

The wood products (timber and fuel wood) and non-timer wood products are key raw materials produced and sold every year and these forest products are supplied to the forest-based industries. There is no integrated data collection and management system credible for accounting purposes and information are provided in ad hoc basis. The major constraints of the forestry sector realized during the study are: (i) lack of data pool about the economic activities and their contribution, and high discrepancy in the available data by each related institutions, (ii) lack of updated inventory of the forest based industries in the country, and (iii) lack of harmonization between the forest related institutions.

The total monetary value disposed in the economy during the accounting period or year and employment generated in the same period by the supply of the forest based raw materials or products for example, log wood, fuel wood, sawn wood and NTFPs collected or harvested for NTFP based processing industries is the economic contribution of the forestry to the industrial sector. Besides, it can be argued that added value generated by the industrial use of the raw forest products to make final industrial products could also be considered as economic contribution of the forestry to the industrial sector, though it is included in the industrial sector as per the SNA for national accounting for GDP reflection.

After the introduction of community-based forest management policy, Nepal's forest cover has improved, and a large number of the forest user groups are involving in country's forest management. Currently, both forest user groups and private entrepreneurs are invested in the forest-based enterprises and most of these enterprises are small scale forest enterprise (SSFE). In this regard, this study considers several types of the forest-based enterprises or industries that use both wood and non-wood forest products for data collection to measure and establish the economic contribution of the forestry sector to the industrial sector. These enterprises are sawmill and furniture, Allo processing, bamboo and bamboo products,

handmade pulp and paper, wood carving, handicrafts, bread and bakery, veneer and plywood, herb processing industry, rosin & turpentine and so on.

It is important to note here that updated inventory of the forest-based establishment or industry operating in the country is not available and comprehensive data pool for such forest-based industries have not been prepared yet. Further, most of the forest-based enterprises are registered at the Department of Cottage and Small Industry (DoCSI). However, the data available at the Ministry of Industry, Commerce and Supplies and DoCSI were not complete and updated, considering many industries had already left after registration. Poudel *et al.* (2018) claimed that 12,561SSFE (Annex FCI- 5) were registered at the DoCSI until 2015, and in 2018, 14,708 SSFEs were in operation employing 85,000 individuals (annually), contributing to the local and national economies. As per the data available at the DoSCI, there were some 2,701 Allo producers and 150 Allo traders throughout the nation in 2018;this number may vary since Allo production is a traditional business and people may not have registered it as an enterprise (MEDEP, 2014).

The survey team found that a considerable number of these industries are not in existence today due to unavailability of the required raw materials, poor business supporting environment and profitability issues. During field survey, the survey team found that some of registered industries are not in operation and some of them have already left their industrial sites. Such cases were, moreover, noticed in Allo processing, furniture, sawmill, brick industries and handmade paper factories together with diverse types of NTFP collection and processing primarily on herbs, rosin & turpentine, Kattha (catechu),etc. Therefore, the Ministry of Forests and Environment need to take an action towards database management immediately.

4.4.1 Trend of Wood products supply and Revenue Collection

Timber and fuel wood are the major forest products supplied in the economy. Principally, timber wood is used for production of the industrial forest products such as furniture, plywood, veneer sheet, wood chips, and frame for doors and windows for building construction, pole for wooden house and so on whereas fuel wood is used as energy for various purposes including household energy for cooking.

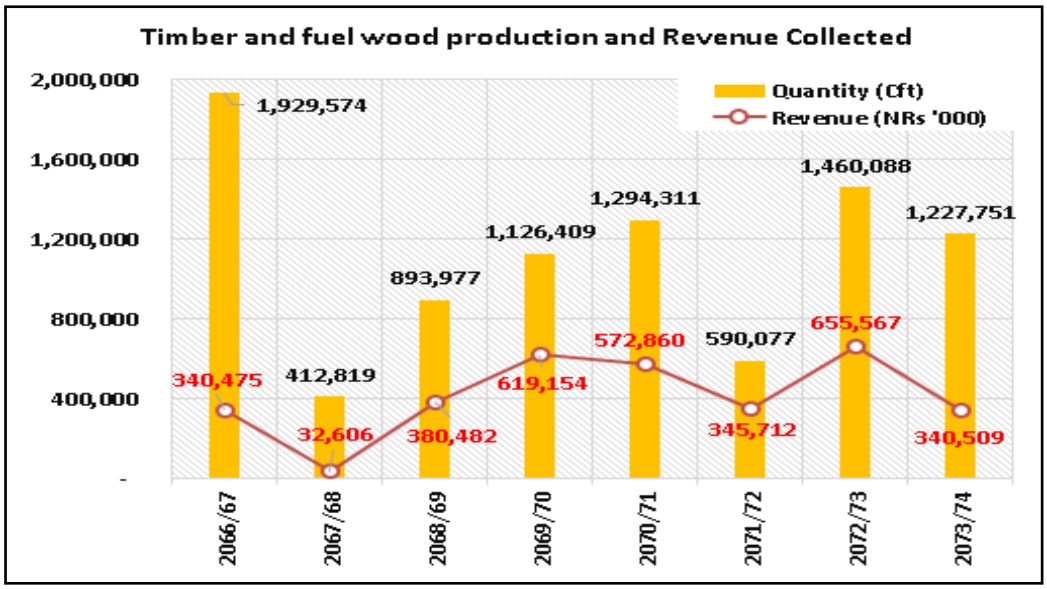

Figure 6: Supply Trend of wood Products and Revenue Collection

Data source: Department of Forest and Soil Conservation

The trend of the supply of the timber and fuel wood and revenue collected by the government is depicted in Figure 6 and it reveals that both supply of the timber and fuel wood and revenue collection are fluctuating over the last 7 years and on an average the supply wood and fuel wood has declined by 6.25% annually. In the year 2073/74, supply of timer and fuel wood was 1,227,751 cubic feet and government collected NRs. 340.5 million of revenue. The supply of wood products and revenue collection declined and grew by 6.25% and 0.001% annually respectively.

4.4.2 Trend of Micro-forest products supply and Revenue Collection

The supply trend and revenue collected from the micro- forest products (Lauth Salla, Khoto, Lokta, Argeli, Khayer, etc.) except herbal medicine between the FY 2066/067–2073/074 is depicted in Figure7.It reveals that both volume of micro-forest product supplied (30,332 MT in 2066/067 to 1,653 MT in the FY 2073/074) in the economy and revenue collection from these products declined significantly, from NRs. 49,846 in the FY 2066.67 to NRs. 3,399 in the FY 2073/074,over the last 7 years.

On an average, the supplied volume and revenue collection from the micro-forest products declined annually by 34% and 31.9%, respectively. The total revenue collection from the forest-based products in the FY 2073/074 was NRs. 452 million as against an average of over NRs. 900 million during the last three years (2070/071–2072/073). The revenue, on an average, was found to have declined by 4.16% annually during the last seven years (2066/067–2073/074)(Figure 8).

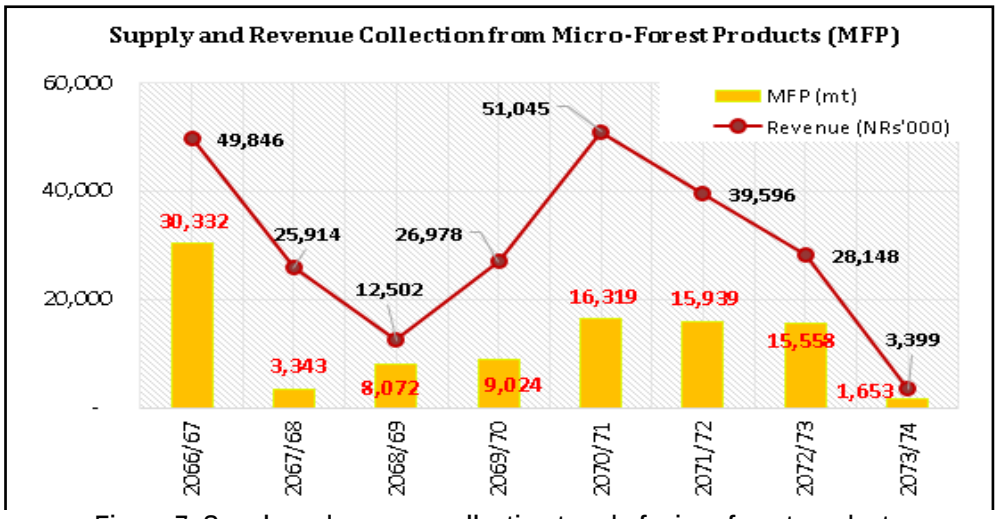

Figure 7: Supply and revenue collection trend of micro-forest products

Data Source: Department of Forest and Soil Conservation

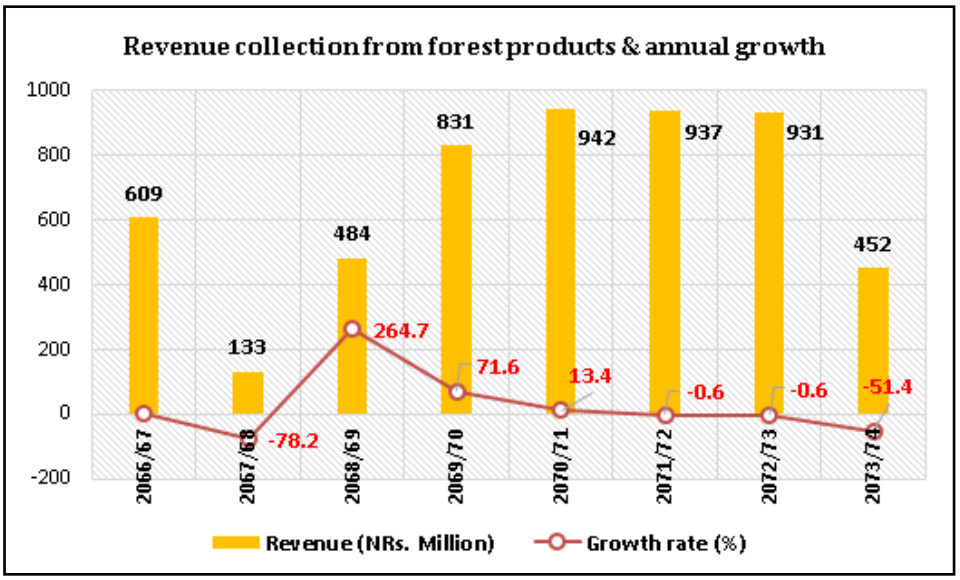

Figure 8: Revenue collection from the forest products in the FY 2073/074

Data Source: Department of Forest and Soil Conservation

4.4.3 Import and export of the Forest products

In the recent year, import of the industrial round wood and wood products has been increasing gradually and the import quantity has reached to 207,614.6cu m of round wood and 148,493.7cu m of sawn wood respectively in the FY 2075/076. Similarly, the import quantity of the plywood and particle boards was 1490,222 SQM. The total import value of the industrial wood, plywood and particle boards and wooden furniture reached to NRs. 247,5450.21 thousand. However, the total import bill of the forest-based products reached to NRs. 2,583,878.61 thousand in 2019/020(Table 11) (for detail Annex FCI-3 and FCI-4).

Table 11: Imports of the major forest products in the FY 2075/076

Description	Unit	Quantity	Imports (NRs.'000)
Round wood/Rough	cu m	207,614.6	55662.22
Sawn wood	cu m	148,493.7	989607.64
Plywood and particle boards	cu m	1490222	281690.86
Wooden furniture (various types)	pcs	389549.4	1148489.49
Subtotal			***2475450.21***
Other wooden products			108,428.40
Total			2,583,878.61

Source: Government of Nepal, Department of Customs, Kathmandu.

Table 12: Export status of the forest products, medicinal herbs, and essential oils in 2075/2076

Description	Unit	Quantity	Exports *(*NRs.'000*)*
Essential oils	KG	36308.54	340631.1
Wood pellets	KG	31327	501.23
Plywood, Veneered Panels & similar laminated wood of bamboo	SQM	3980	291.61
Plywood, veneered panels and similar laminated wood nes	SQM	23669.7	5063.3
Of bamboo(HS Code 44189100, 44219110, 44219190)	Kg	10000	1882.53
Wooden furniture	PCS	10246	295575.54
Of wood (HS code 94061000)	PCS	1517	249.72
Othervarious forest products			8384.72
Total			652579.75
Raw medicinal herbs (2018/2019)	Kg	4,510,918	1,439,852
Essential Oil (2018/2019)	Kg	50604	4,080,00

Source: Government of Nepal, Department of Customs, Kathmandu

The handmade paper prepared from the Lokta (*Daphne* plant), Allo (*Girardinia diversifolia*) fiber, medicinal herbs and essential oils are major forest products traded to the national and foreign market. In the year 2018/19, a total of 4,510,918 kg of medicinal herbs and 50604 kg of essential oil was exported, and the export value of these products was NRs. 1,847,852 thousand (MoICS). Likewise, the exported volume of the essential oil in the year 2019/2020 was 36308.54kg with export value of NRs. 340631.1 thousand. The total value earned from the forest products augmented to NRs.652579.75 thousand (Table 12**,**Annex FI-8).

4.4.4 Production or supply Economics of forest products

There are several types of the forest products for example, wood and firewood, herbal and medicinal plants, micro-forest products are harvest from the CBFMs, Government managed

forest and private land and supplied to the market as raw material for the forest based industries and for local consumption.

The trend of the forest products production, sale and stock including revenue collection in the year 2074/2075 reported by the Department of the Forest and Soil Conservation is depicted in Table 13. However, the supplied volume of the wood and fuel wood in the market as depicted in the table 10 could be underestimated considering only traded volume of the wood products in the market. The private production is also less reported as the household-level consumption that is harvested from their private land is not well captured during the reporting or perhaps, there might be the informal transaction due to oligopolistic nature of the product market. It clearly evokes the fact that there is error in database due to poor database management system at both district level institutions and CBFMs.

Table 13: Forest Products production, sale, and stock in 2074/2075

Headings	Stock (073/74)	Production (074/75)	Total Supply (074/75)	Sale (074/75)	Stock (074/75)
Round Wood (cft)	854,086	1381608.88	2235695	1,141,564	1094130.17
Fuelwood Chatta)	828	2583.3575	3410.916	1,800	1611.1355
Khair (cft)	662	3844.56	4506.42	4,386	120.5
Revenue (NRs. Million)					941.033

Source: Hamro Ban (2074/2075), Department of Forest and Soil Conservation, Kathmandu

The survey team came to know that supply of the forest products in the market is highly bureaucratic in nature and even for the private supply as claimed by most of the entrepreneurs during focus group discussion. Besides, they also appealed large volume of the wood products that is collected from the government forest is left in the ground for a long time due to lengthy decision making process and they also argued most of their enterprises are not operation in full time because of the unavailability of the required forest products, which led to rise in the price of the products and development of the nexus of the various layers in the entire product supply chain.

4.4.5 Estimated monetary value of forest products

The supply volume of the forest products in the entire market system from various types of forest regime were collected from the institutional sources. It is quite tough to estimate the monetary value of the forest products as the market layer varies for same forest products due to presence of the middleman. However, both production and consumption approach were adopted considering current market price.

Market price of the wood products varies based on the types of the species and its grade. The TCN Nepal has declared price of wood products for the year 2018 (2075) and the price

of Sal (*Shorea robusta)* round wood was NRs. 1671/cft for grade A, NRs. 1306.cftfor grade B and NRs. 981/cft for grade C. Likewise, the price for Satisal (*Dalbergia latifolia)* was NRs. 2306 per cft This price is exclusive of 13% value added tax (VAT). Further, the price of the sawn Sal wood ranges from NRs. 2195- 4158/cft without 13% VAT as per the breath and thickness of the strips. The open market price of the sawn Sal wood is considerably higher than the Nepal Ban Nigam Ltd. and it ranges from NRs. 2500-5800 or more based on the quality of the products.

In general, the study team found that price of the round wood that can be used for furniture and other purposes ranges from NRs. 525 -2,200 per cft. The price of the round wood varies as per the quality, log size and types of the species. The information asymmetry is highly prevailing in forest products value chains, from production to market disposal which creates imbalance in power of product transaction- a kind of unfair market or market failure due to adverse selection, moral hazard and monopolies of the knowledge.

Nepal produces around 1,805 tons of Allo thread each year and half of the production is consumed within Nepal and remaining half is exported (Shrestha-Joshi & Subedee, 2015). Further, Nepalese Carpet Industry consumed approximately 2, 79,312 kg of Allo thread per year (MEDEP, 2014). The average trading price of the dried bark is approximately NPR 100/kg (collectors' price) and Allo thread is traded at NPR 800-1,300 per kg (determined by the quality of spun thread), and handmade clothing at NRs. 1,000-1,200/meter (mixed with cotton or wool) (Shrestha *et al*., 2018). There is about 110,481mt. of tons of raw Lokta bark available in Nepal and of this, 800-1000mt. is collected every year (Banjara, 2007). The market price of the handmade paper varies and a collection of 200 sheets called one 'Kori' which sells from NRs. 2,500 to NRs. 5,000 in Kathmandu, depending upon the paper size, weight, and quality (Singh, 2018).

Literature argues that there are about 23 genera and 81 species of bamboo available in Nepal with an estimated bamboo coverage area of about 62,891 hectors of land in which 60% area is estimated to be in natural forests. The growing stock of the bamboo in Nepal is about 15 million cubic meters with biomass of 1060mt. and annual production of bamboo culm is 3.01 million (Poudyal, 1992 and Karki et al., 1995 cited in Jha and Dhakal, 2015) and about 3.3 million farming families are somehow involved with bamboo sub-sector either as producers or as users of bamboo- based products and around 600,000–700,000 culms of bamboo are traded over the commercial domestic market in a year (Pant, 2006).

It is found that about 65-70% of bamboo is traded from the depots and majority of them are in the cities of Nepal. The survey estimates showed that about 3.916millions of bamboo culms are produced annually and out of the total annual production nearly 2.605 million

bamboo culms consumed at household-level from the agricultural households at local level and remaining 1.310million culms are traded in the market and used for various purposes for example, urban and peri-urban agriculture activities, scaffolding for construction company, raw materials for Cane and Bamboo Furniture and other bamboo products enterprises and export for India and these depots are supplying bamboos for building and other construction purposes as scaffolding.

The Nigalo (Himalayan Bamboo) value chain also has contribution to the rural people to improve the livelihoods of the landless and poor. For example, Nigalo craft making and trade is the main source of cash income for many farmers in the Kailash Sacred Landscape of the Darchula District as the villagers make seven major types of products from the Nigalo and on average, each farmer earns NPR 20,000–25,000 per year from the sale of Nigalo products (Joshi Shrestha et al, 2015). Most of the bamboo Enterprises is small scaled and traditional bamboo products designs are classified into 86 designs, made in 293 ways to make 33 products, for example, Bamboo rack, Bamboo stool, cloth hamper, dust bin, Basket or doko, mat, kitchen mat, etc. (DFRS, 2011)

About 200 Hardware outlets in Kathmandu valley sell bamboo products like doko, thunche and broom and altogether 277 registered enterprises are involved in bamboo –crafting enterprises throughout the nation (Pokhel, 2008 cited in DFRS, 2011), but there are several local level micro-handcrafting is in operation at household-level in the rural areas among the ethnic groups such as Rais, Magar, Gurung, Danuwar and so on as a source of off-farm and part time income. According to Annual Report (2015) of Department of Cottage and Small Industries (DoCI), there were 7,225 Cane and wood furniture enterprises and 56 bamboo stool making enterprises in the country.

Table 14: Production of the wood from the various types of the Forest (2075/76)

	Wood (‘000 cft)	Firewood (chatta)	NTFPs (‘000 Kg)	Khair (‘000 cft)
Govt.	1132	13571	2570	0
CBFM	10166	21261	257	230
Private	21246	11840	123	1418
Total	32544	46672	2949	1648

Source: Various Reports of the Government of Nepal including Provincial and district level institutions.

The types of the raw forest products that were collected and supplied to the market are depicted in Table 14. More than 32,000 thousand cft of round wood, 46,00 chatta fuel wood and 4,597,249 kg of NTFP are supplied to the market from the various forest regimes.

Table 15: Value of the raw forest products and employment 2075/2076

Products	Quantity	Value (NRs. BN	Employment ('000 days)
Round Wood ('000cft)	32,544.23	24.855	10,827
Fuelwood Chatta	46,672	0.280	-
NTFP (Kg)	4597249	1.949	189
	Total	**27.084**	**11,112**

Source: Various Reports of the Government of Nepal, Ministry Forest, and Environment and its several Departments including Provincial & district level institutions.

The estimated monetary value of raw forest products is more than NRs. 27 BN excluding the forest products collected by rural households for their home consumption from both private and forestland. Besides, the number of the temporary jobs generated from this sector is 11,112 thousand persons-day (Table 15).

Table 16: Contribution of forestry sector to the various types of Industries in 2075/76

SN	Particular	Amount (NRs. BN)	Employment (person day)
1	Sawmill & furniture	7.418	31385
2	Pulp & Paper and Handicrafts	2.423	24500
3	Veneer and Plywood	0.899	92036
4	Bamboo and bamboo products	1.949	42025
5	NTFP Processing	0.387	55000
	Sub total	***13.075***	***244946***
6	Other Microenterprises		
6.1	Lapsi Candy	0.0176	2500
6.2	Beehive Production	0.2121	16650
6.3	Duna Tapari	0.02069	1000
6.4	Wood Carving	0.009	60
6.5	Incenses	0.0412	1250
6.6	Briquette	0.03416	2610
6.7	Sinsno Powder	0.00197	900
	Subtotal	***0.33724***	***24970***
	Total	**13.413**	**269916**
	*Import value of rough & sawn wood***	*1.045*	**-**
	Contribution less import	***12.368***	

****Note:** Only import value of the round and sawn wood is deducted. However, import value of the forest products used as raw materials is more than NRs. 1.823 billion as per the record of Government of Nepal, Department of Customs, Kathmandu.

Source: Estimation using information of Establishment Survey (2020) and focus group discussion

Table 16 describes the monetary contribution of the forest and employment generated by the various types of the forest products-based industries. The overall estimated contribution of the Forestry Sector to the industrial sector is NRs. 12.368 BN after the deduction of imports value of the round wood 7,330,872 cft (207,614.6 cu m) and sawn wood 5243312.547

cft(148,493.7 cu m). But import value of the forest products that could be used as raw materials is more than NRs. 1.823 BN (Table 11&12, Annex FCI-3 and FCI-4).

4.5 OTHER SECTOR AND SUBSECTORS

The SNA (2008) defined other sectors as transportation and communication (I), Financial Intermediation (J), business activities (K), Public administration and defense (L), and health and social works (N). The contribution to the transportation sector includes the total monetary value of forest products such as fuel wood used by the road department during the bitumen hot and other road-related activities. Similarly, monetary values of forest products especially poles used for telephone extension service and electrification related activities are recognized as the contribution to the communication and energy sector, respectively.

WECS (2013) estimated 0.2% fuel wood was consumed by the industrial sector (here business sectors) while 0.6% was used by the commercial and service (hotel and restaurant) sector. In 2006, the industrial sector consumed 1,949 TJ (0.48%) biomass-based energy while the commercial and service sector consumed 1,794 (0.44%) of the total energy consumed of the total consumption (408,058) (WECS, 2013, p.76). Business (industries) sectors for this study include the fuel-wooed using industries including brick factories, breweries, textile and leather, and food sectors (sugar and beverage). The contribution includes the monetary value derived from the use of forest products such as charcoal and fuel wood and income value generated by the labors working in fuel-weed related activities in these industries. For example, brick-kiln- related situation report showed around 1100 brick factories are in operation in Nepal (around 200 in Kathmandu valley). Of the total energy consumption, these factories consume around 6% biomass-based energy.

It is not easy to estimate contribution of forestry sector to the other sectors or subsectors of the economy due to diversity of the sector or subsectors and fuzzy boundary between some subsectors with its interconnections. Unavailability of the institutional data from the concerned institutions like Telephone communication, Department of Road, Corporate and other institutions is another major concern. The study team established direct visit with both district and provincial level concerned institutions during the field survey. However, required data was not available. Therefore, a very few subsectors were assessed based on the discussion with the key informants and focus group discussion and an indicative estimation has been done relying on the poorly managed official records and reports of related subsectors.

The records of the poles used for supply and extension of the electricity and communication were not available. Most of the local level institutions engaged for extension of the electricity

and communication argued that wooden poles are not currently used and replacement of the old wooden poles by metal poles or concrete poles are almost completed. However, there could be rare use of the wooden electric poles informally at local level which are not recorded, and the value of the wooden poles is very negligible.

Moreover, records of the wood &firewood and other forest products used by the Department of Road while melting bitumen for road blacktopping and other road-related activities is not available as all these works have been done by bidding and tender process and contractor is responsible to manage the energy as required. Local Institutions under the Road Department claim that currently fuel wood is rarely used for melting bitumen. But, at village or tole level, fuel wood might be used in very few cases for road renovation where fuel wood is available. Such information is not recorded. However, the survey team established an interview with some local contractors and roughly estimated the monetary value of fuel wood. But this estimate might not well capture the real situation as the expert team was not able to move Eastern and Central part of the country as the country was in complete lockdown due to pandemic disease COVID 19.

Table 17: Value of forest products utilized in various types of the other subsectors

S.N.	Subsectors/Headings	Amount (NRs. Million)	Remarks
1	Cardamom &Tea (processing and drying)	20.58	
2	Bread &Bakery	3.11	
3	Line Hotel at Highway	2.40	
4	Community and Institutional building	595.77	
5	Vehicle Body Company	8.12	
6	Mushroom Farm (bamboo and fuelwood)	11.78	
7	Rituals and Religious Activities	32.85	
8	Other (leaf collection) (11000Kg @2.5kg/HH	165.00	
9	Rural Road Construction	33.00	
10	Brick Industry	14.03	
	Total	886.63	

Source: Field survey 2020 and information provided by the Key Informants and FGD stakeholders

The fuel wood used in the religious activities and funeral ceremony by the Hindu and other community is estimated based on the, (i) annual calendar of the religious activities, (ii) proportion of the households, (iii) crude death rate, and (iv) information gathered during field survey from key informants and focus group discussion.

Currently, most of the Brick Industry that were surveyed argued that the use of the fuel wood as a source of energy is not common practice and only 250-300 cft (small trolley of the tractor) of fuel wood is used by 30-40% of the brick industry for firing of mine coal in each cycle with average production cycle of 2.5 per industry. However, supply of the fuelwood is

very limited and expensive, thus petroleum waste is also used as firing material and they also claimed that roughly about 850 industries are in operation.

Monitory value of the forest products used by various other subsectors was estimated as NRs. 886.63 million (Table 17).

4.6 CONTRIBUTION OF CBFM GROUPS TO NATIONAL ECONOMY

The decentralized and participatory forest management regime was started with the formulation of National Forest Plan 1976 (MPFS, 1989). Now, key community-based forest management (CBFMS) systems (regimes) in Nepal include community forestry, collaborative forestry, leasehold forestry, and buffer zone community forests. As highlighted by several documents and authors, these regimes have directly and indirectly contributed to the household-level income and national economy.

Initially, Nepal's CBFM groups was started with the main aim of improving local livelihoods of local communities simultaneously conservation and management of degraded forests (Ojha et al. 2009). The piece of evidence generated from several studies (such as) has highlighted the successful cases of CBFM groups practices in Nepal in achieving its initial twin objectives of conserving forests and improving livelihoods.

Nepal's CBFM system contributes to household-level livelihood through the convenient supply of forest products to household consumption. Additionally, these CBFM groups help to improve household-level income by creating employment opportunities with the involvement of local people in forest-based activities and enterprises (Dev et al., 2003, Pokharel, 2009, Adhikari and Dhamala, 2016). At the same time, there is a gradual recognition of CBFM groups' contributions to other sectors of the economy in Nepal by investing groups' income (fund) for the implementation of socio-economic activities. For example, Pokharel et al. (2009) have identified Nepal's community forests contribute to 19 major social and economic sectors including education, health, agriculture, livestock, transportation (road), drinking water and irrigation, and energy (e.g. electrification, improved cook and biogas).

A meta-analysis study of 30 years' experience of community forestry MoFSC (2013) estimated that around 30% of group fund was used for education (building, toilet construction, and teachers' salary), while 17% and 16% of the total fund were used for poverty reduction and transportation and energy respectively.

MoFSC (2013) has recognized CBFM system to transform natural capital to financial capital through human capital (labor and technology) by enhancing forests quality and productivity useful to several economic sectors. The findings of this report further identify four transfer

routes of natural capital to improved livelihoods and economy namely, household consumptions, inputs to agriculture and livestock, land asset used by poor households, and supply of forest products to other economic activities.

On his cost-benefit analysis, Bhattarai (2011) found 7 times higher economic profit from community forests as compared to the cost incurred for the management of these forests. Similar experiences were highlighted by Nuberg et al. (2019) based on their findings of a study in a Nepal's CBFMS and authors also argued role of CBFM groups is credible in securing food security and improving local livelihood at household-level while the forest resources are managed by the collective action model. As indicated earlier, CBFM system provides opportunities for local communities to mobilize their human labor to convert the natural capital into monetary profit. Similarly, Bhandari etal. (2019) argues that group funds have played a crucial role in enhancing local development.

Nevertheless, the economic contribution of Nepal's CBFM groups varies by the regimes due to the area of forests handed over to local communities, forest quality, and policy provisions of sharing forest benefits between the local forest groups and the government and among the forest user group members. For example, the community forestry system has been widely practiced across the country with a relatively higher per household forest area and user-oriented benefit sharing mechanisms.

4.6.1 Distribution of CBFM Groups in Nepal

In late 1970's, community-based forest management (CBFM) system was initiated to facilitate the participation of local communities in forest management with technical assistance from the Department of Forest. Now, more than 31,000 CBFM user groups are engaging in the form of Community Forest User Group (22,519), Collaborative Forest Management Group (31), Pro-poor Leasehold Forest Group (7,607), Buffer Zone Community Forest (956) and Religious Forest (179).

Table 18: Status of community-based forest management regimes in Nepal

Types CBFM Groups	No. of Groups	No. of Household (HH)	Area (Ha)	% of total Area	Area per HH
Community Forestry	22519	3,088,259	2,359,578	87.02	0.76
Pro-poor Leasehold Forestry	7607	74,495	44,028	1.62	0.59
Collaborative Forest	31	812,870	75,654	2.79	0.09
Buffer zone Forest	956	166,857	229,345	8.46	1.37
Religious Forest	179	-	2,809	0.10	-
Total	**31,292**	**4,142,481**	**2,711,413**	**100**	**-**

Note: Total National Forest is about 6.7 million ha. out of this over 2.7 million ha. Currently managing by CBFM regimes, which is more than 40% of the total forest area of the country.

Data Source: Government of Nepal, Ministry Forest, and Environment, 2076

Currently, over 4.1 million households are involved in the management of the forest through CBFM system and more than 22.6 million of the population is benefitting from these forest regimes. The total area under these regimes is more than 2.7 million hectors, which is more than 40% of the total Nepal's forest (6.7 million ha). Further, 87% of the forest is under community forest regime followed by Buffer zone (8.5%) and Collaborative forest (2.8%). The per capita area under each household is highest in buffer zone forest (1.37 ha. /HH) followed by Community forest (0.76 ha/HH) Table 18.

Table 19 explores that the average number of household and area under each forest regime is 132 households and 86.65 ha. The Collaborative Forest engaged largest number of the households (26, 222 HH) in each forest group followed by the Buffer Zone forest (175 HH).The average size of the forestland under each collaborative forest and buffer zone forest is 2440 ha. and 240 ha. respectively (Table 19).

Table 19: Average numbers of household and area under each CBFM Regimes

	No. of Group	No of Households/CBFMG	Area (ha)/ CBFMG
Community Forestry	22,519	137	104.78
Pro-poor Leasehold Forestry	7607	10	5.79
Collaborative Forest	31	26,222	2440.46
Buffer zone Forest	956	175	239.90
Religious Forest	179	Not applicable	15.69
Total	**31,292**	**132**	**86.65**

Data Source: Government of Nepal, Ministry Forest, and Environment,2076

4.6.2 Contribution of CBFM System to National Economy

The community-based forestry management program in Nepal is part of a worldwide trend toward forest devolution which started four decades ago and provides legal opportunities for local communities to manage and use forest resources. Initially, the CBFM concept was motivated for both conservation of the forest and to meet the people's basic needs for fuelwood, timber, fodder, and other forest products on a sustained basic, and to contribute to food production thought and effective interaction between forestry and farming practices. But later, it included many other issues such as institutional sustainability, gender mainstreaming, good governance, livelihood improvement, etc. Recently, CBFM program has also included climate change issues, payment for environmental services and managing forests across the landscape (Pathak & Bohora, 2017).

Forest resources play a crucial role in rural livelihoods in Nepal as forest resources directly fulfil forest related subsistence needs as well as the commercial needs of the people. The

contribution of the CBFM system therefore, could be realized or explained by various ways: (i) changes in natural capital, (ii) changes in infrastructure development (physical capital) at local level, (iii) generation of the financial capital through the mobilization of the saving fund, (iv) implementation of the income generating activities, (iv) number of the of employment generated through the management of the forest (plantation, thinning, extraction, etc.), (vi) contribution of the CBFM groups to the household economy and (vii) development of the social/institutional capital.

Several literatures argue that Nepal's Community Based Forestry Management Regimes have contributed a remarkable improvement in the overall forest condition(Bhattarai, 2016; Gilmour *et al*., 2014) as the CBFM groups are involved in the effective forest management in terms of protecting forests from fires, illegal tree felling, and unregulated extraction of forest products and there has also been plantation of fodder trees and some NTFP species on barren land (Gilmour *et al*., 2014). The CBFM regime is oriented towards the development of natural capital (e.g. good forest conditions), physical capital (e.g. schools, roads, temples), financial capital (e.g.CFUG fund), human capital (e.g. reoriented forestry staff, higher education of forestry staff, capable CFUG member), and social capital(e.g. building CFUG as local elected body, and FECOFUN) (Dev *et al*., 2003).

CBFM practices has increased local job opportunity, improved yield, protected habitat of endangered and keystone species of flora and fauna as well as contributed to the overall welfare of forest dependent communities (Patha and Bohora, 2017). Therefore, these capital or assets produced by CBFM system is credibly playing a vital role in rural development and development of livelihood assets in the local community. The study conducted by the Department of Forest (2011) documented that the average annual income of each CFUGs in High hills, Mid-hills and Terai was NRs. 14,712; NRs.24,194; and NRs. 98,863,respectively. Hobley (2012) found that an average of 640 person days of employment per CFUG was generated (for unskilled manual labor, cited in Gilmour *et al*., 2014).

Table 20: Summary of Annual Plan and Budget: Dhuseri CFUG, Nawalpur 16 and 17

S.N.	Planned Activities	Budget (NRs. million)
1	**Forest Development and Management Program** (Activities: Forest management, observation tour, awareness and training, Wetland management and nursery, Infrastructure Development, Fire control and technical services)	14.5 (40%)
2	**Women, Poor and deprived community Support Program** (Activities: Revolving fund – Cooperative approach, Education and scholarship, skill based training (, Deprived employment and inclusion of the differently able people, Irrigation development, Women Leadership development, Construction of house for deprived people,etc.)	12.67 (35%)
3	**Social Development Program** (Activities: Road, cannel, Road light (Solar), Community religious building,	4.53 (12.5%)
4.	**Administration and overhead**	4.53 (12.5%)
	Total	**36.24 (100%)**

Source: Annual Progress and Audit Report 2076, Dhuseri CFUG, Nawalpur

During field visit, expert team found that most of the CBFM groups are playing a credible role for improvement of the livelihood of the women and deprived community through the implementation of the targeted income generating activities such as goat-rising, vegetable farming, keeping dairy animal. Further, some of them were more innovative and involved in forest-based enterprises.

These findings are also supported by the Dhuseri Community Forestry Users Group, Devchuli Municipality-16 and 17 of Nawalpur. The Dhuseri Community Forestry Users Group has planned to expend NRs. 14.49 million for Forest Development and Management; NRs. 12.67 for Women, Poor, and Deprived Community Support Program; and NRs. 4.5 million for Social Development for the year 2076/2077 (Table 20).

While there is an increasing realization of CBFM groups contribution to the National economy, economic contribution of these groups is still not assessed at national scale. Many studies have been conducted at local area as an indicative contribution of these regimes to the national economy, mostly by using secondary information or by case-based studies. The report considers monetary value earned by selling forest products outside forest groups specially industries, enterprises as intermediate inputs (raw materials), household consumption and income generated from other sources as the contribution of CBFM system to the national economy. For this analysis, the total quantity of forest products (wood-timber, fuel wood, pole, fodder, grass, leaf litter, edible wild fruits, nuts, and other non-timber forest products) collected by the forest group in each regime in FY 2075/76 was collected.

The monetary value of per ha forest product of each regime and simulation of the per capita consumption was done using current farm gate prices of each products. Other contribution made by the forest groups of each regime was also calculated per ha basis. Total per ha contribution of forest regime was calculated by adding per ha contribution to all sources. The total (national level) contribution of each regime then was estimated considering both per capita consumption and per unit area of the forest. Table 21depicts the various types of forest products extracted from the community-based forest management system in both total quantity and ratio per hector.

Table 21: Extraction of the various forest products by types of CBFM Groups

(Sample size =274)

Forest Products	Unit	Community Forest (N=207, Area-21689.8ha.)		Leasehold Forest (N=36; A: 208.1ha.)		Collaborative Forest (N=9; A: 21960 ha.)		Buffer Zone Forest (N=17- A: 4097 ha)		Religious Forest (N=5; A: 80ha)		Total (N=274) Area: 48035ha.	
		Quantity	Per Ha.	Quantity	Per Ha.	Quantity	Per Ha.	Quantity	Per Ha.	Quantity	Per Ha.	Quantity	Per Ha.
Timber	cft	215,146	7.53	803	3.86	54,432	2.48	5,451	1.33	28	0.35	275,859	5.74
Fuelwood *	cft	71,372	2.5	1940	9.32	6,796	0.31	884	0.22	40	0.5	81,032	1.69
Fuelwood (Religious)	Bhari	424,093	14.85	1386	6.66	13,570	0.62	30,702	7.49	720	9	470,471	9.79
Plough	No	8,715	0.31	405	1.95	2,194	0.1	578	0.14	-	-	11,892	0.25
Haris	No	2,040	0.07	370	1.78	-	-	112	0.03	-	-	2,522	0.05
Ana Juwa	No	1,677	0.06	381	1.83	44	0	124	0.03	-	-	2,226	0.05
Agri tool (Spade, Sickle)	No	25,816	0.9	1018	4.89	1,780	0.08	445	0.11	-	-	29,059	0.6
Spices - herbs	Kg	2,465	0.09	5326	25.59	-	-	1,500	0.37	2	0.03	9,293	0.19
Thatch Grass (2)	Bhari	59,398	2.08	4791	23.02	23,600	1.07	2,145	0.52	30	0.38	89,964	1.87
Charcoal	Kg	30,315	1.06	262	1.26	-	-	9,010	2.2	-	-	39,587	0.82
Jungle Fruits	Kg	207,041	7.25	5136	24.68	858	0.04	4,265	1.04	1560	19.5	218,860	4.56
Kandamool	Kg	32,012	1.12	1613	7.75	-	-	1,000	0.24	-	-	34,625	0.72
Bamboo	No	61,719	2.16	2249	10.81	152	0.01	3,050	0.74	-	-	67,170	1.4
Bamboo Shoot	Kg	19,158	0.67	-	-	-	-	-	-	-	-	19,158	0.4
Leaves for Compost	Bhari	294,682	10.32	18302	87.94	154,000	7.01	20,700	5.05	-	-	487,684	10.15
Poles for agriculture	Nos	109,547	3.83	2525	12.13	8,050	0.37	2,685	0.66	-	-	122,807	2.56
Broom Grass (green)	KG	122,904	4.3	14418	69.28	3,705	0.17	1,800	0.44	7	0.09	142,834	2.97
Ground Grass	Kg	664,552	23.26	4005	19.24	-	-	80,730	19.7	800	10	750,087	15.62
Fodder	Kg	563,938	19.74	11525	55.38	52,250	2.38	17,780	4.34	300	3.75	645,793	13.44
Lokta	Kg	2,160	0.08	-	-	-	-	-	-	-	-	2,160	0.04
Herbs	Kg	16,535	0.58	-	-	317	0.01	1,425	0.35	152	1.9	18,429	0.38
Essential Oil	Kg	6,881	0.24	-	-	-	-	10,000	2.44	-	-	16,881	0.35
Hosiery (Allo cloths)	mt.	195	0.01	-	-	-	-	-	-	-	-	195	0
Rosin & Turpentine	kg	65,910	2.31	-	-	-	-	-	-	-	-	65,910	1.37
Plywood timber	cft	4,938	0.17	-	-	93	0	-	-	-	-	5,031.67	0.10

Source: CBFMusers' Group Survey 2020

The monitory value of the various types of forest products at farm gate price extracted by different types of the forest management system is presented in Table 22.

Table 22: Monitory value of the forest products by different types of CBFM Groups

Types of the CBFM Groups	Sample Size	Area (Hector)	Value of forest products (NRs. per ha)
Community Forestry	207	21689.87	7064.89
Pro-poor Leasehold Forestry	36	208.1	16,099.52
Collaborative Forest	9	21960	2104.89
Buffer zone Forest	17	4097	2847.69
Religious Forest	5	80	1470.56
Total	**274**	**48035**	**5478.80**

Source: Estimated using farm gate price and information gathered in field survey 2020

The estimated value of the forest products supplied from the various types of the CBFM regimes was NRs. 17.322BN. This constitutes over 91.6% from CFUG, 4%from Collaborative forest and 3.5% from BZCF (Table 23). Details of the forest products produced by the various kinds of CBFM are placed in Annex CBFM-1.

Table 23: Economic Contribution of CBFM Groups to the National Economy**

S.N.	Types of CBFM Groups	Amount (NRs. BN)	Percent
1	Community Forest Users Group (CFUG)	15.868	91.61
2	Leasehold Forest (LHF)	0.700	4.04
3	Collaborative Forest (CFM)	0.152	0.87
4	Buffer Zone Community Forest (BZCF)	0.598	3.45
5	Religious Forest (RF)	0.004	0.02
	Total	17.322	100.00

**Note: This information is not aggregated with overall contribution of the forestry as all forest products are already accounted in Forest production sector and related other sections. This is prepared as a case study to explain the importance of the CBFM groups in Nepalese forest regimes.

CHAPTER 5: PROVINCIAL LEVEL DISCUSSION

5.1 DISTRIBUTION OF FOREST COVER BY PROVINCE

After the implementation of the Nepal's Constitution 2015 (B.S. 2072), the country became a federal democratic republic of Nepal with the provisions of the three tiers of government, namely local, provincial, and federal. The country has restructured into seven provinces and 753 local bodies. The new units of the federal government include 6 metropolitan cities, 11 sub-metropolitan cities, 276 municipals and 460 rural municipalities. The Constitution 2072 has promulgated various roles of each category of local government and functioning of these local governments is a significant step towards the implementation of the federal structures and paradigm shift in the development intervention in the country.

In this perspective, the powers relevant to forests and natural resources management are delegated to each of those local levels as well as concurrent powers to State and Federations. Federal power relevant to the forest and natural resources includes national and international environment management, national parks, wildlife reserves and wetlands, national forest policies, carbon services. Jurisdiction of the State Government includes the use of forests and water as well as management of environment within it (DFRS, 2018). Therefore, the strength of the forest resources and its sustainable management is the key to resource pool for the implementation of the development activities at local level not only for prosperity of the local residence but also from the view of the environmental issues and climate change.

Table 24: Distribution of forest land by Province

Provinces	Total Area (ha.)	Forest land (ha,)	Percent of Total forest	Percent of Provincial Area
Province 1	2,589,283	1,122,126	18.01	43.34
Province 2	886,771	202,202	3.25	22.80
Bagmati	1,905,308	982,165	15.76	51.55
Gandaki	2,134,732	794,945	12.76	37.24
Province 5	1,778,451	868,297	13.94	48.82
Karnali	3,061,752	1,177,033	18.89	38.44
Sudoorpashchim	1,906,270	1,083,769	17.39	56.85
	14,262,567	6,230,537	100.00	

Source: DFRS, 2018. Forest Cover Maps of Local Levels (753) of Nepal. Department of Forest Research and Survey (DFRS), Kathmandu, Nepal.

Distribution of the country's forestland by various provinces is presented in Table 24 and it reveals that Province 2 comprises only 3.25% of the total forestland of the country, which is nearly 23% of the Provincial land cover. Karnali province occupies largest share of the forest,

i.e.18.9% of the total forestland of the country. This is 38.4% of the total land cover of the province. The Sudurpaschim province shares 17.4% of the total forestland in the country, which is nearly 57% of the provincial land cover.

5.2 FOREST PRODUCTS PRODUCTION AND CONSUMPTION

5.2.1 Supply of Forest Products at Provincial Level

Supply of the various types primary forest products such as round wood and fuelwood; NTFP in the year 2075/76 and estimated monitory value of these forest based products and other micro-forestry products including government tax and vat receipts and number of the estimated temporary jobs generated through the forest production sector is depicted Table 25 and Table 26.

Table 25: Supply of forest products by each Province in 2075/2076
(Except household-level private consumption)

Provinces	Round Wood ('000 cft)	Percent	Fuelwood (Chatta)	Percent	NTFP & other	Percent
Province 1	12236.10	37.60	3582.00	7.67	2057.75	44.76
Province 2	6311.47	19.39	6197.07	13.28	NA	-
Bagmati	1352.84	4.16	4429.05	9.49	NA	-
Gandaki	1103.95	3.39	2320.65	4.97	113.84	2.48
Province 5	731.53	2.25	4964.23	10.64	7.00	0.15
Karnali	355.79	1.09	24374.00	52.22	2378.66	51.74
Sudurpaschim	10452.57	32.12	805.00	1.72	40.00	0.87
Nepal	**32,544.23**	**100**	**46,672.00**	**100**	**4597.25**	**100**

Source: Various Published Documents (Annual and periodical reports) and Database of both Provincial and Federal Government. NA= Not available

Table 25 depicts that nearly 38% of the round wood or industrial wood is supplied by the Province 1 followed by Sudurpaschim (>32%) and Province 2 (19.4%) in 2075/2076. Likewise, more than 52% of fuel wood is produced in Karnali province 2 (13.3%) and Province 5 (nearly 11%) in the same accounting period. Similarly, almost 52% of the NTFP is supplied from the Karnali Province followed by the Province 1(44.7%) and Gandaki Province (nearly 3%).

Table 26: Estimated monetary value of forest products in 2075/2076 by province
(Except household-level private production for own use)

Provinces	Round Wood (NRs. BN)	Fuelwood (NRs. BN)	NTFP (NRs. BN)	Total (NRs. BN)	Percent of Total
Province 1	9.2720	0.0215	0.3276	9.6211	35.52
Province 2	4.7739	0.0372	NA	4.8111	17.76
Bagmati	1.0893	0.0266	NA	1.1159	4.12
Gandaki	0.9740	0.0139	0.0740	1.0619	3.92

Province 5	0.5530	0.0298	0.0046	0.5873	2.17
Karnali	0.2735	0.1462	1.5461	1.9659	7.26
Sudurrpaschim	7.9153	0.0048	0.0009	7.9210	29.25
Nepal	**24.8510**	**0.2800**	**1.9532**	**27.0843**	**100**

Source: Estimated using secondary and Field Survey (2020) information
NA= Not available

The estimated monetary contribution of the forest to the provincial economy through the supply of various types of the raw forest products in farm gate price is NRs. 9.62 billion for Province 1, which is which 35.5% of the total value of the raw forest products in the country. Likewise, Sudrpaschim Province contributed NRs. 7.92 BN (29.3%) followed by Province 2 (17.8%), Karnali (7.3%)

5.2.2Contribution of Forestry Sector to Agriculture Sector by Province

The economic contribution of the forestry sector to the agriculture sector and quantity of the forest products used by agricultural household is depicted in Table 27 and Table 28.

Table 27: Estimated monetary value of forest products in 2075/2076 by province

Region	Timber & Fuel Wood (NRS. BN)	Agriculture (NRS. BN)	Consumable Goods (NRS. BN)	Total (NRS. BN)	Percent of total (NRS. BN)
Province 1	4.494	2.591	0.022	7.106	19.69
Province 2	3.921	2.292	0.008	6.221	17.24
Bagmati	3.815	1.615	0.020	5.450	15.10
Gandaki	2.813	2.008	0.025	4.846	13.43
Province 5	3.993	2.606	0.022	6.621	18.35
Karnali	1.502	0.934	0.014	2.450	6.79
Sudurpaschim	2.207	1.171	0.012	3.390	9.39
Nepal	**22.7443**	**13.218**	**0.124**	**36.086**	**100**

Source: Field Survey (2020)

Table 28: Provincial level consumption of forest products by agriculture households in 2075/2076

S.N.	Forest Products	Unit	Nepal	Province one	Province Two	Bagmati	Gandaki	Province Five	Karnali	Sudurpaschim
1	Wood & firewood									
1.1	Round Wood	cft ('000)	3,572.9	714.1	720.0	577.6	397.1	649.1	192.6	322.3
1.2	Sawn Wood	cft ('000)	44.9	8.9	6.8	8.0	5.7	7.5	3.4	4.7
1.3	Fuelwood	Chatta ('000)	168.7	33.1	26.8	25.3	23.9	30.6	12.5	16.4
2	Agriculture Production									
2.1	Animal Shed &farm tools	cft ('000)	5,420.0	1,271.4	1,774.5	514.0	244.2	1,073.7	64.8	477.3
2.2	Pole for Vegetable	cft ('000)	4,133.1	808.5	684.2	531.9	628.9	798.5	303.5	377.6
2.4	Ground and thatch grass	Bhari ('000)	44,913.6	8,677.2	7,371.2	5,402.6	7,237.9	8,947.9	3,347.9	3,928.9
2.5	Fodder	Bhari('000)	42,567.5	8,075.1	6,351.9	5,270.6	7,263.7	8,449.4	3,412.7	3,744.1
2.6	Bedding Materials	Bhari ('000)	5,748.9	971.0	386.3	792.1	1,312.5	1,141.6	640.8	504.7
2.7	Spade &sickle handle	No. ('000)	2,755.7	542.0	432.5	413.3	391.4	498.8	206.9	270.8
2.8	Fuelwood for animal feed cooking	Bhari('000)	11,236.8	1,998.9	1,148.8	1,483.8	2,285.4	2,228.5	1,102.3	989.3
2.9	Bamboo (farming, mat basket & storage)	No. ('000)	2,605.7	458.7	259.0	364.7	528.1	511.6	255.4	228.1
2.1	Fibber Materials	Kg ('000)	18.6	4.0	4.7	1.9	1.8	3.7	0.7	1.6
2.11	Grazing	days ('000)	200.0	46.1	61.4	20.2	11.2	39.1	4.0	18.0
3	Consumable goods									
3.1	Honey	Kg ('000)	18.4	3.2	1.7	2.4	3.9	3.7	1.9	1.6
3.2	Bamboo Shoot and Tusa	Kg ('000)	1,131.5	172.3	0.8	169.1	310.5	224.3	154.8	99.6
3.3	Mushroom and wild vegetables	Kg ('000)	84.8	16.2	11.6	12.6	13.5	15.5	7.1	8.3
3.4	Medicinal herbs & NTFP for local use	Kg ('000)	95.1	16.2	1.3	20.2	19.6	14.6	12.1	11.1
3.5	Wild fruits and nuts	Kg ('000)	133.4	24.9	15.5	20.4	23.1	24.4	12.1	13.0

Source: Field Survey (2020)

5.2.3Contribution of Forestry Sector to the Industry by Province

Up to date number of different types of the forest based industries that are in operation by each province is not available and the survey team found that a considerable number of these industries are not in existence today due to unavailability of the required raw materials, poor business supporting environment and profitability issues. Such cases are mostly found in Allo processing, furniture, sawmill, brick industry and handmade paper and diverse types of the NTFP collection and processing primarily on herbs, rosin, and turpentine, Kattha, etc.

The issue about the inventory of the forest-based industries in the country is already mentioned in Section 3.4 (para 7). Therefore, this section only provides contribution of the forestry sector to the Sawmill and Furniture industry and Veneer and plywood industry by provinces (Table 29, and Table 30).

Table 29: Contribution of the forestry to Sawmill and furniture industry by province

Provinces	No. of Industry	Round Wood ('000cft)	Sawn Wood ('000cft)	Output (NRs. Million)	Employment (Persons day)
Province 1	565	1712.97	904.50	891.76	2951
Province 2	1327	1954.67	2567.25	1570.23	7104
Bagmati	1361	1628.90	2713.50	1515.21	7318
Gandaki	1516	1355.66	3120.75	1571.52	8190
Province 5	540	1681.44	855.00	863.52	2817
Karnali	307	861.74	506.25	467.05	1609
Sudurpaschim	274	1250.57	348.75	538.86	1396
Total	**5,890**	**10,445.95**	**11,016.00**	**7,418.15**	**31,385**

Source: Establishment Survey (2020)

Table 30: Contribution of the forestry to Veneer and plywood industry by province

Provinces	No. of industry	Wood used (cft'000)	Output (NRs. Million)	Employment (Persons day)
Province 1	33	917.80	390.32	39963
Province 2	11	305.93	130.11	13321
Bagmati	2	55.62	23.66	2422
Gandaki	4	111.25	47.31	4844
Province 5	25	695.30	295.70	30275
Karnali	1	27812.00	11.83	1211
Sudurpaschim	0	0.00	0.00	0
Total	**76**	**29897.90**	**898.93**	**92036**

Source: Establishment Survey (2020)

5.3 COMMUNITY BASED FOREST INSTITUTIONS BY PROVINCES

Last three decades have viewed a wave of devolution of forest rights to communities living in and around the forests in Nepal. The devolution process in Nepal was initiated during late

1970'sas per the National Forestry Plan 1976, which established a policy foundation to facilitate the participation of local communities in forest management. The Master Plan for Forestry Sector (MPFS1989) was the successive and an extensive strategy of the government of Nepal that helped to accelerate the participation of the community in the forestry sector. This forest tenure reform has been driven by observed shortcomings in centralized natural resource governance in terms of effectiveness and equity, and increasing recognition of the rights of forest adjacent people as part of a broader introduction of human rights concerns and rights-based approaches to natural resource governance around the world (Rantala et al, 2012). The major shortcomings realized in Nepal were deterioration of forests, accelerated forest encroachment, illegal logging, and continued deforestation in the hills of Nepal. Depletion of the Terai forest is triggered by resettlement and migration of the people after the eradication of the Malaria and gradually increasing demand of the timber products including encroachment and illegal logging. Therefore, Community Based Forest Management system has been initiated with the aim to protect forest and to meet the local needs through establishing user rights with credible participation of the local people for forest resources management and to improve their livelihood.

Table 31: Number of CBFM Groups by Province (2076/77)

Province	Community Forest	Leasehold Forest	Collaborative forest	Buffer Zone Forest	Religious Forest	Total	Percent of Total
Province 1	3,683	969	4	146	30	4,832	15.44
Province 2	522	49	16	21	9	617	1.97
Bagmati	4,491	3,301	-	286	35	8,113	25.93
Gandaki	3,925	1,118	1	26	33	5,103	16.31
Province 5	3,996	376	8	178	26	4,584	14.65
Karnali	2,718	796	-	75	9	3,598	11.50
Sudurpaschim	3,184	998	2	224	37	4,445	14.20
Total	22,519	7,607	31	956	179	31,292	100
Percent	71.96	24.31	0.10	3.06	0.57	100	

Source: Ministry of Forest and Environment, 2076

Today, Nepal appears to be at the forefront of participatory CBFM system in the world and six different modalities of CBFM systems are in practice for the management of about 6.7 million ha. of forestland. Now, more than 31,292 users' groups and 4.14 million of households covering over 22 million of the population are engaged for forest management. The distribution of the CBFM types, number of the groups involved and forest area under each type of the forest regime is explained in Table 31 and Table 32.

Table 31 reveals that almost 26% of CBFM groups belong to Bagmati province, followed by Gandaki (16.3%), Province 1(15.4%) and Province 5 (14.6%). There are less than 2% of CBFM users' in Province 2. Further, over 20% of the forest area under the CBFM system is

in Province 1, followed by Province 5 (18.4%); Bagmati (17.6%) and Sudurpaschim (15%). The Province 2 has shred only 4.6% of forest area under the CBFM system (Table 32).

Table 32: Forest Area under various types of CBFM groups by Provinces (2076/77-2019/2020)

Province	Area in hector					Total	Percent of Total
	Community Forest	Leasehold Forest	Collaborative forest	Buffer Zone Forest	Religious Forest		
Province 1	436,442	4,038	7,263	103,622	427	551,791	20.35
Province 2	79,157	236	41,412	4,711	82	125,599	4.63
Bagmati	400,904	16,641	-	61,082	540	479,168	17.67
Gandaki	258,876	5,338	673	5,035	329	270,251	9.97
Province 5	454,106	2,156	21,962	20,413	948	499,585	18.43
Karnali	354,025	8,225	-	13,788	44	376,082	13.87
Sudurpaschim	376,066	7,394	4,345	20,693	439	408,937	15.08
Total	2,359,578	44,028	75,654	229,345	2,809	2,711,413	100
Percent	87.02	1.62	2.79	8.46	0.10	100	

Source: Ministry of Forest and Environment, 2076

Table 33 provides the estimated economic contribution of the CBFM groups by province and it reveals that almost 19% of the contribution to the national contribution of the CBFM groups is shared by Province. The lowest contribution is received from the Province 2 (3.7%). Both Bagmati province and Province 5 share 18% to the national economic contribution of the CBFM groups.

Table 33: Estimated Economic Contribution of CBFM Groups by Province

Province	Value in NRs. BN.					Total	Percent
	Community Forest	Leasehold Forest	Collaborative forest	Buffer Zone Forest	Religious Forest		
Province 1	2.935	0.064	0.015	0.270	0.001	3.285	18.96
Province 2	0.532	0.004	0.083	0.012	0.000	0.631	3.65
Bagmati	2.696	0.264	0.000	0.159	0.001	3.121	18.02
Gandaki	1.741	0.085	0.001	0.013	0.000	1.841	10.63
Province 5	3.054	0.034	0.044	0.053	0.001	3.187	18.40
Karnali	2.381	0.131	0.000	0.036	0.000	2.548	14.71
Sudurpaschim	2.529	0.117	0.009	0.054	0.001	2.710	15.64
Total	15.868	0.700	0.152	0.598	0.004	17.322	18.96
Percent	91.61	4.04	0.87	3.45	0.02	100	100

Source: Estimated using information gathered from the CBFM group Survey 2020

CHAPTER 6: CONCLUSION AND RECOMMENDATION

6.1 CONCLUSION

This study is not concentrated to account the contribution of the forestry sector to the national gross domestic products. The aim of the study is to quantify the credible contribution of the forestry to the national economy through various economic subsectors of the economy disjointedly and to forward the forest development agenda in the national economic development paradigm. Natural resources, in particular land mass, forests, water, and scenic landscape are foundation for economic development and agriculture, livestock, forest, and environment are the primary assets within the broader framework of Nepal's economic development. The transition to federalism is a witness to Nepal's desire to accelerate its pace of development to achieve ambitious goal for prosperity.

It is widely understood that forestry sector has credible contribution to the national economy mostly in the countries with agrarian economy like Nepal where forests are one of the major lands covers. However, the result of the previous global and national assessment of the forestry sector's contribution to the national economy seems to be underestimated. There is a contentious concern why the forestry sector's contribution is less in the national economy and it is argued that existing GDP accounting system does not cover all the benefits received from the forestry sector. Therefore, this exercise attempts to explore the overall contribution of the forestry sector to the: (i) Industrial Sector, (ii) Travel and Tourism sector; (iii) Agriculture sector, and (iv) Other economic sub-sectors rather GDP estimation.

The study credibly followed the accounting procedures of the SNA and ISIC/NSIC as far as practicable to identify the variables and monetary valuation of the forest products, adopting production and consumption approaches to make compatible and comparable to the global and national accounting system. Methodologically, the study covered entire Nepal representing urban and rural areas, all seven provinces and three ecological zones, Mountain, Hills and Terai. Seventeen eco-provincial regions suggested and included by the CBS for population census and other national level survey were chosen as the sampling strata to ensure representation of all diverse ecological regions and make a homogenous unit. Both primary and secondary data are utilized to quantify the economic contribution of the forestry in the national economy. The survey covered 2,228 households, 356 diverse types of establishments, 112 hotels and restaurants (including 22 line hotels) and 274 Community-based Forest Management groups for the assessment of the disintegrated contribution of CBFM groups to the national economies.

The survey results showed more than 19 types of the forest products are being collected and used by rural households who entirely depend on the integrated agricultural farming system. For example, on an average 50 cft of timber, 1485 kg of fuel wood, 193.75 Bhari green and dry leaves (grass, fodder, and bedding materials) and 5 kg of the NTFP products are collected by each household every year. Likewise, 3.5 cft of poles, 1.3kg of fruits is also collected from the forest. The estimated total monetary value of the forest goods utilized in year 2075/2076 is NRs36.086 BN, which constitutes NRs. 22.77BN for timber and fuelwood, 13.218BN for farming activities as an inputs/resources and 0.123BN for consumable goods collected from the forest with 11112 thousand days of jobs.

The protected areas contribute NRs. 40.322BN to the tourism sector including 329,216 jobs from both international and domestic travel and tourism activities.

The estimated monetary value of raw forest products in the year 2075/2076 is nearly NRs.27.084 BN except the forest products collected by rural households for their home consumption from both private and forest land. The value of the household-level consumption is accounted in agriculture sector as most of the forest products is used as raw material for field crops and livestock farming. Besides, the number of the temporary jobs generated from this sector is 11,112thousand persons-day.

In the year 2075/76, the estimated supply of timber and fuelwood in the market excluding household consumption was 45,118,416.99 cft including 12574184.07 cft of imported industrial wood. In the recent year, import value of the industrial wood, plywood and particle boards and wooden furniture has reached to NRs. 247,5450.21 thousand. Moreover, the total import bill of the forest-based products has reached to NRs. 2,583,878.61 thousand in 2019/2020.

The estimated overall economic contribution of the forestry sector to the forest-based industries was NRs.13.413 BN, which constitutes 7.418 BN for Sawmill & furniture, 2.423BN for Pulp & Paper and Handicrafts, 0.899 BN for Veneer, Plywood, 1.949 BN for Bamboo and bamboo products, 0.387BN for NTFP processing and 0.337 BN for Micro-enterprises. Further, the value of the forestry products utilized by the other subsectors is NRs.0.889BN. However, the import bill of the industrial wood was NRs.1.045 BN. Hence, the total economic contribution of the forestry becomes NRs.12.368 BN.

Nepal's CBFM groups contribute to household-level livelihood through the convenient supply of forest products to household consumption. Additionally, CBFM system improves household-level income by creating employment opportunities with the involvement of local people in forest-based activities and enterprises. At the same time, there is a gradual

recognition of CBFMS' contribution in other sectors of the economy in Nepal by investing groups' income (fund) for the implementation of socio-economic activities. For example, Nepal's community forests contribute to 19 major social and economic sectors including education, health, agriculture, livestock, transportation (road), drinking water and irrigation, and energy (e.g. electrification, improved cook, and biogas). A meta-analysis study of 30 years' experience of community forestry by MoFSC (2013) estimated around 30% of group fund was used for education (building, toilet construction, and teachers' salary), while 17% and 16% of the total fund were used for poverty reduction and transportation and energy.

The estimated value of the forest products supplied from the various types of the CBFM regimes was NRs.17.32 BN. This constitutes91.6% from CFUG, 4% from LHS and 3.5% from BZCF.

6.2 RECOMMENDATIONS

The study on Economic contribution of the forestry on various sectors of the economy is a very important theme to foster the overall planning process in the entire forest management regime and harness maximum benefits from the forest for economic development. The study on the broader perspective only provides holistic scenarios. Therefore, the study team has cited following recommendations.

a. **Database Management System**: There are several discrepancies in the available data by each related institution and none of the institution had a good data management system. Therefore, the study team strongly recommends preparing the strong data management system linking all the provinces, districts, and all forest management regimes in the country to appraise the real economic contribution of the forestry in the country. The Data Management System can also be extended at Local Government Level to capture the data from CBFM, Private land and local level forest entrepreneurs including quantity of forest products used by local community at household-level.

b. **Detail study on Economic Contribution of the Forestry**: The economic contribution of the forestry in the several economic subsectors is very important theme. This study only provides broader level assessment results of the economic contribution of the forestry in each sector or subsector of the economy as mentioned of the ToR. Therefore, the study team realized that further study on economic contribution of the forestry should be done taking account of the:

    i. **Provincial Level Study**- The survey team realized that there is considerable gap in database management system considering forest products production

(supply and demand), consumption trends of diverse forest products, industrial utilization of forest products, and forest based products distribution system at provincial level. These information including economic contribution of the forestry as a whole are very crucial and need to be updated every year to boost up overall planning process of the province for sustainable forest development and management for biodiversity conservation and to combat with impact of climate change at local level to harness the benefit of the forestry sector for employment generation and overall provincial economic growth of the province. Therefore, we strongly recommend to conduct provincial level in depth study on economic contribution of the forestry as a whole.

ii. **Sectoral Independent study**: This study only provides overall glimpse of the economic contribution of the forestry sector to the other sectors or subsectors of the economy because term of the reference and scope of the study was limited to: (a) small size of samples for household's survey, forest based establishment survey considering diverse nature of the establishment based on the use of raw forest products; and types of the hotel, and restaurant to be included; (b) difficulties to avoid fuzziness of the geographical boundary under the catchment of tourist-flow with the aim of nature based recreation and holiday activities. Therefore, the study team strongly recommends sectoral level separate study on economic contribution of the forestry sector to the Agriculture, Industry, tourism, other sector and CBFM groups to realize the in-depth economic impact of the forestry sector as a whole.

c. **Preparation of the inventory of the Forest based Industries/Enterprises:** The data available from the Ministry of Industry, Commerce and Supplies and Department of Cottage and Small Industries is not complete and updated and fails to consider the industries that left after registration. However, a total of 12,561 (Annex FCI- 5) small scale forest enterprises (SSFE) are registered in the Department of Cottage and Small Industries as of 2015 and at present, a total of 14,708 SSFEs exist in Nepal.But a considerable number of these industries are not in existence today. During field survey, the survey team noticed that some of registered industries are not in operation and some of them have already left the industry site. Such cases are found in Allo processing, furniture, sawmill and NTFP processing. Therefore, the study team highly recommends collecting and managing inventory of the forest-based industries with the mobilization of the district level institutions.

d. **Conduct study on valuation of the ecological services of the forestry-** This study is not accounted the value of ecological services such as the role of forest to increase productivity of the crop and livestock farming system, enhancement of soil fertility, water purification, protecting infrastructure such as road, irrigation canals from flooding and landslides and carbon sequestration. Therefore, these aspects also need to consider for accounting to explore the broader level of economic contribution of the forestry sector as a whole.

ANNEXES

Annex FPC 1: Forest products production and revenue collection in 2074/2075 by Province

S. N.	Headings	Nepal	Province 1	Province 2	Bagmati	Gandaki	Province 3	Karnali	Sudurpaschim
1	**Stock (073/74)**								
	Wood (cft)	854,086	113098.9	120846.7	133786.2	72773.56	177721.6	26513.5	209345.3
	Firewood (Chatta)	828	43.05	50.258	121.72	80.08	312.06	12.89	207.5
	Khair (cft)	662	31.92	99.86	0	0	0	0	530.08
2	**Production (074/75)**								
	Wood (cft)	1,381,609	616315	95460	89598	102660	287489	47752	142335
	Firewood (Chatta)	2,583	1083	211	50	224	874	18	124
	Khair (cft)	3,845	21	0	0	0	0	0	3824
3	**Total Supply (074/75)**								
	Wood (cft)	2,235,695	729414	216306	223384	175434	465210	74266	351681
	Firewood (Chatta)	3,411	1126	261	172	304	1186	30	331
	Khair (cft)	4,506	52	100	0	0	0	0	4354
4	**Sale (074/75)**								
	Wood (cft)	1,141,564	377859	91343	117966	81801	303489	42423	126683
	Firewood (Chatta)	1,800	635	66	63	419	472	26	119
	Khair (cft)	4,386	32	0	0	0	0	0	4354
5	**Stock (074/75)**								
	Wood (cft)	1,094,130	351,555	124,963	105,418	93,633	161,721	31,843	224,997
	Firewood (Chatta)	1,611	491	195	108	- 115	714	5	213
	Khair (cft)	121	21	100	-	-	-	-	0
6	**Revenue (074/75) (NRs. Million)**	941.033	150.265	87.361	77.929	1.446	292.082	25.197	306.752

Source: Hamro Ban (2074/2075), Government of Nepal, Ministry of Forest and Environment, Department of Forest, and Soil Conservation

Annex FCA 1: Annual forest products consumption and proportion of agriculture households by region

S.N	Heads	Unit	Eco-zones			Average	Proportion of the households			
			Mountain	Hills	Terai		Mountain	Hills	Kathmandu Valley	Terai
1	**Timber and Fuelwood**									
1.1	Building Construction	Cft	34.04	34.04	34.04	34.04	2.1%	3.1%	4.0%	3.5%
1.2	House maintenance	Cft	2.23	2.23	2.23	2.23	2.7%	3.8%	1.0%	4.4%
1.3	Furniture athousehold-level	Cft	2.40	2.40	2.40	2.40	1.2%	0.7%	0.4%	0.5%
1.4	Fuelwood	Bhari	49.50	49.50	49.50	49.50	50.0%	60.0%	10.0%	40.0%
2	**Agriculture**									
2.1	Wood for Animal Shed	Cft	10.40	10.40	10.40	10.40	1.5%	1.4%	0.9%	6.8%
2.2	Pole for Vegetable	Cft	3.50	5.50	4.50	4.50	15.8%	18.0%	0.3%	27.0%
2.3	Wood for Farm tools	Cft	1.04	1.04	1.04	1.04	9.6%	8.0%	0.0%	3.0%
2.4	Ground and thatch grass	Bhari	103.80	129.30	119.80	117.63	0.1%	9.0%	0.1%	11.3%
2.5	Grass and fodder	Bhari	72.20	82.40	75.20	76.60	1.0%	33.7%	0.1%	15.0%
2.6	Bedding Materials	Bhari	11.80	16.80	9.80	12.80	0.1%	13.0%	0.1%	7.0%
2.7	Spade &sickle handle	No.	1.60	1.60	1.60	1.60	65.0%	51.0%	8.0%	48.0%
2.8	Fuelwood for animal feed cooking	Bhari	12.00	12.00	12.00	12.00	1.3%	33.5%	0.1%	17.0%
2.9	Bamboo for vegetable farming	No.	5.00	7.00	6.00	6.00	1.0%	12.0%	2.1%	4.0%
2.1	Bamboo for Agri-storage/ mat	No.	4.50	5.50	5.50	5.17	0.1%	15.0%	1.1%	4.0%
2.11	Fibber Materials	Kg	0.70	0.70	0.70	0.70	0.0%	0.7%	0.0%	1.2%
2.12	Grazing	Days	16.90	12.90	10.90	13.57	0.1%	0.2%	0.0%	1.0%
3	**Consumable and other goods**									
3.1	Honey	Kg	0.30	0.30	0.30	0.30	0.0%	4.1%	0.0%	1.0%
3.2	Bamboo Shoot and Tusa	Kg	0.50	3.50	1.50	1.83	0.2%	29.0%	0.0%	0.1%
3.3	Mushroom	Kg	0.50	0.50	0.50	0.50	1.3%	0.2%	0.0%	1.0%
3.4	Medicinal herbs & NTFP for local use	Kg	2.30	2.30	2.30	2.30	4.0%	2.7%	0.1%	0.1%
3.5	Wild fruits and nuts	Kg	2.30	2.30	2.30	2.30	2.0%	3.1%	0.1%	1.2%
3.6	Vegetables including yam	Kg	1.10	1.30	1.30	1.23	2.0%	3.1%	0.1%	1.2%

Note: This table is generated through the forest products Consumption Survey based on the 2228 sample households and Focus group discussion between Expert Team and local residence of the Sample Districts.

Annex FCA 2: Value of annual forest products consumption by agriculture households 2075/076

S. N	Forest Products	NRs. in Billion							
		Nepal	Province 1	Province 2	Bagmati	Gandaki	Province 5	Karnali	Sudurpaschim
1	**Wood Products**	**22.744**	**4.494**	**3.921**	**3.815**	**2.813**	**3.993**	**1.502**	**2.207**
1.1	Timber	3.959	0.757	0.810	0.889	0.340	0.653	0.170	0.341
1.2	Firewood	18.786	3.737	3.111	2.926	2.473	3.340	1.333	1.866
2	**Agriculture**	**13.218**	**2.591**	**2.292**	**1.615**	**2.008**	**2.606**	**0.934**	**1.171**
2.1	Animal Shed	3.327	0.241	0.335	0.108	0.043	0.200	0.012	0.092
2.2	Poles vegetable farming & agriculture tools	1.744	0.216	0.247	0.122	0.085	0.186	0.040	0.094
2.3	Bamboo, fibre, packaging& storage material	0.290	0.050	0.040	0.037	0.044	0.052	0.021	0.023
2.4	Thatch grass, forage &fodder, and grazing	6.204	1.816	1.459	1.173	1.600	1.892	0.750	0.838
2.5	Fuelwood for animal feed	1.653	0.268	0.213	0.175	0.236	0.277	0.111	0.124
3	**Consumable Goods**	**0.124**	**0.022**	**0.008**	**0.020**	**0.025**	**0.022**	**0.014**	**0.012**
3.1	Bamboo shoot, Tusa and wild fruits and nut	0.076	0.013	0.004	0.011	0.018	0.015	0.009	0.007
3.2	Mushroom, vegetables including Yam	0.007	0.001	0.001	0.001	0.001	0.001	0.001	0.001
3.3	Honey, medicinal Herbs and other	0.041	0.008	0.004	0.008	0.006	0.006	0.004	0.005
	Total	**36.086**	**7.106**	**6.221**	**5.450**	**4.846**	**6.621**	**2.450**	**3.390**

Source: Estimation using information of field survey 2020

Annex FCA 3: Quantity of annual forest products consumption by agriculture households in 2075/076

Forest Products	Unit	Quantity							
		Nepal	Province 1	Province 2	Bagmati	Gandaki	Province 5	Karnali	Sudurpaschim
Wood products									
Round Wood	cft	3,572,872	714,142	720,046	577,608	397,139	649,092	192,561	322,284
Sawn Wood	cft	44,903	8,867	6,757	8,015	5,708	7,474	3,360	4,721
Fuelwood	Chatta	168,667	33,113	26,759	25,321	23,899	30,646	12,516	16,412
Agriculture Activities									
Animal Shed and farm tools	cft	5,243,898	1,238,641	1,756,916	484,340	214,062	1,043,254	47,792	458,892
Pole for Vegetable	cft	4,133,130	808,523	684,184	531,917	628,879	798,452	303,537	377,639
Wood for Farm tools	cft	176,130	32,777	17,569	29,701	30,185	30,441	17,041	18,417
Ground and thatch grass	Bhari	44,913,557	8,677,199	7,371,163	5,402,568	7,237,903	8,947,942	3,347,858	3,928,924
Fodder	Bhari	42,567,545	8,075,123	6,351,926	5,270,639	7,263,721	8,449,424	3,412,651	3,744,061
Bedding Materials	Bhari	5,748,946	970,951	386,296	792,063	1,312,533	1,141,611	640,793	504,699
Spade &sickle handle	No.	2,755,679	541,970	432,472	413,270	391,372	498,820	206,936	270,839
Fuelwood for animal feed cooking	Bhari	11,236,832	1,998,923	1,148,753	1,483,768	2,285,383	2,228,485	1,102,265	989,256
Bamboo for vegetable farming	No.	1,336,605	235,597	135,147	191,678	266,802	260,618	129,479	117,285
Bamboo for agri-storage/ mat	No.	1,269,071	223,146	123,885	172,997	261,272	251,027	125,931	110,814
Fibber Materials	Kg	18,591	4,012	4,730	1,924	1,838	3,719	747	1,619
Grazing	days	200,023	46,149	61,379	20,242	11,179	39,079	3,953	18,041
Consumable and other goods									
Honey	Kg	18,373	3,217	1,689	2,442	3,884	3,655	1,876	1,611
Bamboo Shoot and Tusa	Kg	1,131,467	172,285	845	169,118	310,548	224,277	154,807	99,586
Mushroom	Kg	10,279	2,372	2,816	1,453	481	1,758	310	1,089
Medicinal herbs & NTFP (local use)	Kg	95,067	16,210	1,295	20,214	19,569	14,568	12,125	11,086
Wild fruits and nuts	Kg	133,415	24,879	15,542	20,356	23,061	24,392	12,148	13,037
Vegetables and wild yam	Kg	74,478	13,857	8,785	11,104	13,023	13,787	6,755	7,168

Source: Estimated using information of field survey 2020

Annex FCT 1: Number of Visitors Arrivals in Protected Areas in 2075/76

National Park	International			Domestic	Grand Total
	Other than SARC	SARC	Total		
Annapurna Conservation Area	132180	49566	181746	1577	183323
Chitwan National Park	117707	24779	142486	44623	187109
Sagarmatha National Park	54515	2774	57289	741	58030
Shivapuri Nagarjun National Park	11814	682	12496	156338	168834
Langtang National Park	11814	318	12132	5559	17691
Bardiya National Park	7455	805	8260	16298	24558
Manaslu Conservation Area	7589	66	7655	0	7655
Gaurishankar Conservation Area	2477	51	2528	0	2528
Makalu Barun National Park	1993	64	2057	301	2358
Kanchanjunga Conservation Area	764	42	806	0	806
Shey Phoksundo National Park	574	4	578	1511	2089
Dhorpatan Hunting Reserve	103	1	104	319	423
Rara National Park	366	55	421	11659	12080
Koshi Tappu Wildlife Reserve	352	36	388	18358	18746
Shukla Phata Wildlife Reserve	175	154	329	5740	6069
Khaptad National Park	49	18	67	3653	3720
Apinappa Conservation Area	38	0	38	10	48
Krishnasar Conservation Area	28	9	37	9490	9527
Parsa Wildlife Reserve	7	8	15	379	394
Banke National Park	1	11	12	148	160
Total	**350001**	**79443**	**429444**	**276704**	**706148**

Source: Annual Report 2075/2076, Department of National Park and Wildlife Conservation, Ministry of Forest and Environment, Government of Nepal

Annex FCT 2: Number of domestic and international visitors and outbound days

Name of Protected Area	Day visitors (N=90)		Stayed at hotel (N=90)		Estimated outbound days	
	Domestic	International	Domestic	International	Domestic	International
Annapurna CA	1300	0	3193	7283	14562	182075
Chitwn NP	7242	2853	18398	24091	55194	187702
Langtang NP	300	100	1097	4137	5485	37233
Makalu Barun NP	1297	2396	398	6607	4990	165175
Shivapuri Nagarjun NP	1500	1200	0	1400	980	31414
Total	11639	6549	23086	43518	81211	603599
Length of stay(days)	-	-	-	-	3.5	13.87

Source: Field Survey with Hotel and Restaurant, Key informant survey and travel and trekking agencies. The outbound days includes the travel days

Annex FCT 3: Expenditure of domestic and international visitors

Cost Items	Day Visitors (NRs. million)		Stated at hotel (NRs. million)		Total (NRs. million)	
	Domestic	International	Domestic	International	Domestic	International
Lodging	0.00	0.00	67.36	1457.72	67.36	1457.72
Food & beverage	7.81	12.08	46.01	1115.20	53.82	1127.29
Groceries	2.74	3.27	11.20	93.17	13.93	96.45
Souvenir shop	7.19	13.60	15.70	145.67	22.90	159.27
Recreation	8.30	14.06	5.43	129.84	13.72	143.90
Transportation	7.15	20.96	17.66	557.03	24.81	577.99
Other	1.59	11.26	6.33	133.99	7.93	145.25
Total	34.78	75.23	169.68	3632.63	204.47	3707.87
Other Indicators						
Induced impact ratio*		18.23%				
Spending	NRs.	USD	Per capita per day			
Domestic	5,888.20	52.28	NRs. 1,672.78/USD. 14.85			
International	74,085.09	657.59	NRs. 5539.74/USD. 47.41			

*The induced impact ratio calculated considering direct spending (food and beverages, accommodation, and transportation) and indirect spending (groceries, recreation, Souvenir goods and other cost)

Annex FCI 1: Sawmill and Furniture Industry: Output Table by Province (2075/76)

	Nepal	Province 1	Province 2	Bagmati	Gandaki	Province 5	Karnali	Sudurpaschim
No. Sawmill and Furniture	5890	565	1327	1361	1516	540	307	274
Round wood	6689620	1096990	1251780	1043150	868170	1076800	551860	800870
Sawn wood	11016000	904500	2567250	2713500	3120750	855000	506250	348750
Final Products								
Sawn wood (50%)	3344810.00	548495	625890	521575	434085	538400	275930	400435
By products (chips 28%)	2006886.00	329097	375534	312945	260451	323040	165558	240261
Other products (fuelwood, etc. 17%)	1137235.40	186488	212803	177336	147589	183056	93816	136148
Final Products from Sawn wood	1137235.40	186488	212803	177336	147589	183056	93816	136148
Other products	1137235.40	186488	212803	177336	147589	183056	93816	136148
Output generated (NRs. Million)	7417.60	892	1570	1515	1571	863	467	539
Employment (day)	31385	2951	7104	7318	8190	2817	1609	1396
Output (NRs. Billion)	7.418	0.892	1.570	1.515	1.571	0.863	0.467	0.539

Source: Estimated based on the FGD and Establishment Survey (2020)

Annex FCI 2: Veneer and Plywood: Output table by Province (2075/76)

	Nepal	Province 1	Province 2	Bagmati	Gandaki	Province 5	Karnali	Sudurpaschim
Plywood & Veneer	76	33	11	2	4	25	1	-
Purchase quantity (cft)	1619560	703230	234410	42620	85240	532750	21310	0.0
Processed main product (SQF)	25912960	11251680	3750560	681920	1363840	8524000	340960	0.0
By products (chips in SQF)	19175590	8326243	2775414	504621	1009242	6307760	252310	0.0
Other products (fuelwood,etc.)	113369	49226.1	16408.7	2983	5966.8	37292.5	1491.7	0.0
Output Generated (NRs. million)	898.74	390.243	130.081	23.651	47.302	295.639	11.826	0.0
Employment	92036	39963	13321	2422	4844	30275	1211	0
Source: Estimated based on the FGD and Establishment Survey (2020)								

Annex FCI 3: Import quantity and value of various types of forest products in 2075/2076(2019-2020)

HS Code	Description	Unit	Quantity	Imports (NRs.'000)	Imports Revenue (NRs.'000)
38070000	Wood tar; wood tar oils; wood creosote; wood naphtha, vegetable pitch, etc.	KG	7574	498.29	95.58
44013100	Wood pellets	KG	1874	65.89	12.35
44021000	Wood charcoal whether agglomerated of bamboo	KG	587	76.6	11.49
44031000	Wood in the rough, treated with paint, creosote, etc.	cu m	26	6.7	1.51
44039910	Wood, not elsewhere specified (nes) in the rough, (excluding treated ones)	cu m	758.87	53079.91	9900.06
44039990	Wood, nes in the rough, (excluding treated ones)	cu m	206829.7	2575.61	491.34
44050000	Wood wool; wood flour	KG	103545	1243.88	234.3
44079900	Wood, nes sawn or chipped lengthwise, sliced or peeled, >6mm thick	cu m	148493.7	989607.64	184574.58
44101100	Particle board of wood	SQM	897528.9	208970.21	45436.4
44121000	Plywood, Veneered Panels, and similar laminated wood of bamboo	SQM	268438.2	29011.62	8592.96
44129900	Plywood, veneered Panels, and similar laminated wood nes	SQM	324254.5	43709.03	10624.64
44140000	Wooden frames for paintings, photographs, mirrors, or similar objects	KG	208754.9	38674.34	9700.6
44209000	Wood marquetry, inlaid wood; caskets &cases for jewelries a similar article of	KG	46349.34	6898.36	2233.06
44219010	Wooden spools, bobbins, reels, and the like.	KG	36585.67	4338.95	809.21
44219030	Wooden toothpicks	KG	67895.16	12617.78	4407.71
47050000	Wood pulp obtained by a combination of mechanical & chemical pulping process	KG	10941.11	3122.69	582.51
73181200	Wood screws (excl coach screws) of iron or steel Wood pulp obtained by a combination of mech	KG	312093.9	40891.62	10758.83
94033000	Wooden furniture of a kind used in offices (excl seats)	PCS	134952.2	284858.73	127184.62
94034000	Wooden furniture of a kind used in the kit hen (excl seats)	PCS	25641.28	65318.95	24289.54
94035000	Wooden furniture of a kind used in the bedroom (excl seats)	PCS	47359.11	226537.29	61215.54
94036000	Wooden furniture, nes	PCS	181596.8	571774.52	221282.59
	Total			2,583,878.61	722439.42

Source: DoC (2020), Government of Nepal, Department Customs, Kathmandu.

Annex FCI 4: Export quantity and value of various types of forest products in 2075/2076(2019-2020)

HS Code	Description	Unit	Quantity	Exports *(Rs.'000)*
33011200	Essential oils of orange (incl concretes and absolutes)	KG	102	997.8
33011300	Essential oils of lemon (incl concretes ann absolutes).	KG	3	9.45
33011900	Essential oils of citrus fruit (including concentrates and absolutes), nes	KG	360	4964.54
33012900	Essential oils (incl concretes and absolutes), nes.	KG	35844	334659.31
44013100	Wood pellets	KG	31327	501.23
44021000	Wood charcoal or not agglomerated f bamboo	KG	160	20.16
44121000	Plywood, Veneered Panels, and similar laminated wood of bamboo	SQM	3980	291.61
44129900	Plywood, veneered panels, and similar lamented wood nes	SQM	23670	5063.3
44140000	Wooden frames for paintings, photographs, mirrors, or similar objects	KG	863	339.39
44181000	Windows, French-windows and their frames, f wood	KG	1940	1357.02
44209000	Wood marquetry, inlaid wood; caskets & case for jewelry a similar article of	KG	10450	4099.12
44219010	Wooden spools, bobbins, reels, and the like.	KG	6085	2399.32
44219110	Of bamboo	KG	100	64.6
44219190	Of bamboo	KG	9900	1817.93
94033000	Wooden furniture of a kind used in offices (excl seats)	PCS	458	281040.91
94034000	Wooden furniture of a kind used in the kit hen (excl seats)	PCS	2	10.59
94035000	Wooden furniture of a kind used in the bedroom (excl seats)	PCS	20	249.22
94036000	Wooden furniture, nes	PCS	9766	14274.82
94039000	Parts of furniture	KG	123	169.71
94061000	Of wood	PCS	1517	249.72
	Total Value			652579.75

Source: DoC (2020), Government of Nepal, Department Customs, Kathmandu

Annex FCI 5: List of Registered Small-Scale Forest Enterprise

S. N.	Industry	Cumulative Number Until 2014/2015
1	Cane and wood furniture	7225
2	Herb collection/ processing	304
3	Sawmill	1690
4	Hand paper and copy	528
5	Allo processing	72
6	Incense	779
7	Wood carving	12
8	Rosin and paints	135
9	Allo cloth	174
10	Plywood/ Sun mica	69
11	Nettle powder	2
12	Veneer	30
13	Furniture	1411
14	Catechu	50
15	Sajiwan (*Jatropha* species) Oil	2
16	Duna Tapari (Leaf-plates)	14
17	Broom, Nanglo (a flat round woven tray made up of bamboo), Mudha (a stool)	56
18	Lapsi (Hog plum) Candy	8
	Total	**12,561**

Source: DoC(2015) annexed in Paudel *et al.* (2018).

Annex FCI 6: List of the Forest Enterprises

S.N.	Types of Enterprises	No.
1	Sawmill	994
2	Furniture	4896
3	Pulp & Paper and Handicrafts Related	
3.1	Hand Made paper and Handicrafts	600
3.2	Allo processing and Yarn	1079
3.3	Allo Cloth and handicrafts	72
4	Veneer and Plywood	76
5	Bamboo and bamboo products	
5.1	Designer and Rattan Firm	277
5.2	Cane and wood furniture	7225
5.4	Broom, Nanglo and Mudha	305
6	Wood Carving	12
7	Incense	300
8	Lapsi Candy	8
9	Duna Tapari	14
10	Briquette	20
11	Nettle Powder	20
12	Beehive and tool enterprises (29 registered at Department of Agriculture)	43
13	Rosin and turpentine	4
14	NTFP Processing (herb Collection and processing)	304
15	Catechu (Kattha mill)	4
16	Brick Industry	800
17	Very small Nigalo-based household-level handicrafts (not registered)	4700
18	Vary small Household-level bamboo Handicrafts (not registered)	5700

Source: Prepared with the help of wide range of literature, Annual Report of Department of Cottage and Small Industries (DoCSI), Focus Group Discussion and Key informant of each sector and producers' associations

Annex FCI 7: Wood Price of Nepal Ban Nigam (2075)

द टिम्बर कर्पोरेशन अफ नेपाल लि.
(नेपाल सरकारको पूर्ण स्वामित्व भएको)
(नेपाल कम्पनी ऐन बमोजिम स्थापित [illegible])

फोन नं. [illegible]
फ्याक्स नं. [illegible]

पत्र संख्या च.नि.न.प. ४०१ ०७४/०७५ GEO

मिति: २०७५।०३।०८

विषय : गोलिया काठ तथा साल चिरान काठको बिक्री मूल्य सम्बन्धमा ।

कर्पोरेशन संचालक समितिको मिति २०७५।०३।०७ मा बसेको १६५५ औं बैठकबाट कर्पोरेशनले बिक्री गर्ने गोलिया तथा चिरान काठको बिक्री मूल्य तपसिल अनुसार निर्धारण भएको व्यहोरा सबैको जानकारीको लागी यो सूचना प्रकाशित गरीएको छ ।

तपसिल

१.गोलिया काठको न्यूनतम बिक्री मूल्य

क.स.	जात	ग्रेड	मूल्य रु प्रति क्यु. फि. (मू.अ.क. बाहेक)	कैफियत
क.	साल	ए	१६७१/-	
		बि	१३०६/-	
		सि	९८१/-	
ख.	सतिसाल	-	२३०६/-	
ग.	साजर	-	१५००/-	

२. साल चिरान काठको बिक्री मूल्य

क्षेत्र (स्थान) तथा काठको साइज	वर्ग १ (स्ट्रीप)	वर्ग २	वर्ग ३	वर्ग ४	कैफियत
	चौडाई: १½" र मोटाई: ३" देखि४" सम्म	स्ट्रीप बाहेक: लम्बाई २½ देखि ४ फिट सम्म	स्ट्रीप बाहेक: लम्बाई ४ देखि १० फिट सम्म	स्ट्रीप बाहेक (लम्बाई १० फिट भन्दामाथी)	माग अनुसार विशेष साइजको काठ चिरान गरी आपूर्ति गर्नुपर्दा सबै वर्गीकरणको उल्लेखित मूल्यमा १५ प्रतिशत थप हुनेछ ।
काठमाण्डौ, पोखरा, लगायतका पहाडी जिल्लाहरुको मूल्य (रु.)	२२९५/-	२६७०/-	३४६५/-	वर्ग ३ भन्दा २० प्रतिशत बढि	
तराई तथा भित्री मधेशका जिल्लाहरुको मूल्य (रु.)	२१९५/-	२५७०/-	३३६५/-	वर्ग ३ भन्दा २० प्रतिशत बढि।	

साथै भुकम्प पीडितहरुको लागि काठ उत्पादन, आपूर्ति र व्यवस्थापन निर्देशिका, २०७२ बमोजिम बिक्री वितरण गरिने सबै साइजका साल चिरान काठको बिक्री मूल्य प्रति क्यु.फि. रु.२७६०/- मू.अ.कर बाहेक ।

रामचन्द्र भट्ट 2075।3।8
विभागिय प्रमुख
योजना तथा आपूर्ति विभाग

Annex CBFM 1: Value (Forest Products Supplied by the various types of the CBFM Regimes (NRs.'000)

Description	Unit	Community Forest (N=207, A: 21689.9)		Leasehold Forest (N=36, A:208.1)		Collaborative forest (N=9, A:21960)		Buffer Zone Forest (N=17; A:4097)		Religious Forest (N=5, A:80)		Total CBFM (N=274; A:48035)	
Number of households		28566		352		235998		3026		5		267942	
Average area (ha)		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Forest Products												0	
Timber	Cft	215,146	115,103.0	803	429.6	54,432	29,120.9	5,451	2,916.3	28	15.0	275,859	147,584.7
Fuelwood *	Cft	71,372	1,427.4	1,940	38.8	6,796	135.9	884	17.7	40	0.8	81,032	1,620.6
Fuelwood (Religious/Funeral)	Bhari	424,093	12,722.8	1,386	41.6	13,570	407.1	30,702	921.1	720	21.6	470,471	14,114.1
Plough	No	8,715	697.2	405	32.4	2,194	175.5	578	46.2	-	-	11,892	951.4
Haris	No	2,040	163.2	370	29.6	-	-	112	9.0	-	-	2,522	201.8
Ana Juwa	No	1,677	134.2	381	30.5	44	3.5	124	9.9	-	-	2,226	178.1
Agritool (Spade, Sickle)	No	25,816	645.4	1,018	25.5	1,780	44.5	445	11.1	-	-	29,059	726.5
Spices - herbs	Kg	2,465	61.6	5,326	133.2	-	-	1,500	37.5	2	0.1	9,293	232.3
Thatch Grass(2)	Bhari	59,398	4,454.9	4,791	359.3	23,600	1,770.0	2,145	160.9	30	2.3	89,964	6,747.3
Charcoal	Kg	30,315	606.3	262	5.2	-	-	9,010	180.2	-	-	39,587	791.7
Jungle Fruits	Kg	207,041	7,246.4	5,136	179.8	858	30.0	4,265	149.3	1,560	54.6	218,860	7,660.1
Kandamool	Kg	32,012	960.4	1,613	48.4	-	-	1,000	30.0	-	-	34,625	1,038.8
Bamboo	No	61,719	4,937.5	2,249	179.9	152	12.2	3,050	244.0	-	-	67,170	5,373.6
Bamboo Shoot	Kg	19,158	766.3	-	-	-	-	-	-	-	-	19,158	766.3
Leaves for Compost	Bhari	294,682	22,101.2	18,302	1,372.7	154,000	11,550.0	20,700	1,552.5	-	-	487,684	36,576.3
Poles for agriculture farming	Nos	109,547	5,477.4	2,525	126.3	8,050	402.5	2,685	134.3	-	-	122,807	6,140.4
Broom Grass (green)	KG	122,904	1,843.6	14,418	216.3	3,705	55.6	1,800	27.0	7	0.1	142,834	2,142.5
Ground Grass	Kg	664,552	1,993.7	4,005	12.0	-	-	80,730	242.2	800	2.4	750,087	2,250.3
Fodder	Kg	563,938	2,255.8	11,525	46.1	52,250	209.0	17,780	71.1	300	1.2	645,793	2,583.2
Lokta	Kg	2,160	194.4	-	-	-	-	-	-	-	-	2,160	194.4
Herbs	Kg	16,535	1,984.2	-	-	317	38.0	1,425	171.0	152	18.2	18,429	2,211.5
Essential Oil	Kg	6,881	2,580.4	-	-	-	-	10,000	3,750.0	-	-	16,881	6,330.4
Hosiyari (Allo cloths)	Meter	195	97.5	-	-	-	-	-	-	-	-	195	97.5
Rosin & Turpentine	kg	65,910	1,581.8	-	-	-	-	-	-	-	-	65,910	1,581.8
Plywood timber	Cft	4,938	2,074.1	-	-	93	39.2	-	-	-	-	5,032	2,113.3
			192,110.4		3,307.0		43,993.9	2607.0735	10,681.2	1452.813	116.2	5208.9	250,208.7

Source: CBFM Groups survey 2020

Annex CBFM 2: Average Farm Gate Price of the forest Products

Forest Products	Unit	Average Farm gate Price
Timber	Cft	535.00
Fuelwood *	Cft	20.00
Fuelwood (Religious/Funeral/Other)	Bhari	30.00
Plough	No	80.00
Haris	No	80.00
Ana Juwa	No	80.00
Agritool (Spade, Sickle)	No	25.00
Spices - herbs	Kg	25.00
Thatch Grass (2)	Bhari	75.00
Charcoal	Kg	20.00
Jungle Fruits	Kg	35.00
Kandamool	Kg	30.00
Bamboo	No	80.00
Bamboo Shoot	Kg	40.00
Leaves for Compost	Bhari	75.00
Poles for agriculture farming	Nos	50.00
Broom Grass (green)	KG	15.00
Ground Grass	Kg	3.00
Fodder	Kg	4.00
Lokta	Kg	90.00
Herbs	Kg	120.00
Essential Oil	Kg	375.00
Hosiery (Allo cloths)- Firm gate price	Meter	500.00
Rosin & Turpentine	Kg	24.00
Plywood timber	Cft	420.00

Source: CBFM Field Survey 2020, interaction with stakeholder, Focus group Discussion

1. CONCEPTUAL FRAMEWORK

a. In any economy, the flow of forest products and money is circular in nature. Households and the firms (establishments or industries) generally use parts of forest products derived from the production units (Government forest and private forest) (Figure 1).

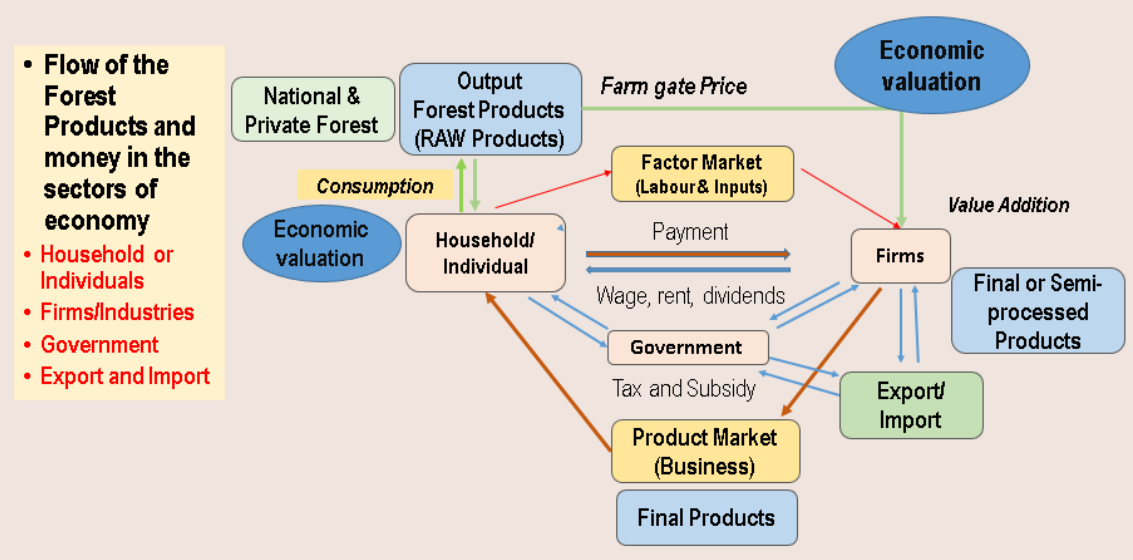

Figure 1: Circular flow of the products and money

b. Forest based establishments or industries use or consume raw forests products and produce value added products in both semi- processed and final processed products (using intermediate consumption) through the mobilization of land, human resources, capitals, and technologies. The final products of the establishments are supplied to the national market and export market, while semi-processed products further travel to secondary processing units or product markets, which are eventually consumed by the individuals or households.

c. The government generally functions as a regulating institution in the entire production and market flow system through regulatory mechanisms including taxes and subsidies.

d. This study is largely underpinned by the conceptual framework as shown in Figure 1. This signifies that the total contribution of the forestry to the national economies is the function of the contribution of the forestry sector to the forestry-based and supported economic sectors and their sub-sectors. Therefore, as per the study objectives, contribution of the forestry to the various sectors of the economy is individually comprehended in following functions:

   i. $Cot\ A = f(Ai\ variable)$..... *(i)* and the function can be simplified as: $Y_t = \sum_1^n PaAi$,where, *Cot A*= Contribution of the forestry sector to the Agriculture, *Yt* = disposable monitory value at time t, A_i = i^{th} accounting variables ranging from *1…..n;* and*Pa* = base price of the respective variables.

   ii. $Cot\ I = f(Zi\ variable)$and $Y_t = \sum_1^n PzZi$ .....*(ii), where, Cot I* = Contribution of the forestry sector to Industry sector, *Yt* = disposable monitory

value at time *t, Z_i = i^{th}* accounting variables ranging from *1…..n; and Pz* = base price of the respective variables.

iii. $Cot\ T = f(Ti\ variable)$And $Y_t = \sum_1^n PtTi$ ……*(iii),* where, *Cot T* = Contribution of the forestry sector to Tourism sector, *Yt* = disposable monitory value at time *t, T_i = i^{th}* accounting variables ranging from *1…..n;* and *Pt* = base price of the respective variables.

iv. $Cot\ O = f(Oi\ variable)$and $Y_t = \sum_1^n PoOi$ ……*(iv),*where,*Cot O* = Contribution of the forestry sector to Other Sectors, *Yt* = disposable monitory value at time *t, Z_i = i^{th}* accounting variables ranging from*1…..n;* and *Pz* = base price of the respective variables.

v. $Cot\ CBFM = f(Ri\ variable)$and $Y_t = \sum_1^n PrRi$ ……*(v),*where,*Cot CBFM* = Contribution of CBFM , *Yt* = disposable monitory value at time *t, R_i = i^{th}* accounting variables ranging from *1…..n;* and *Pr* = farm gate price of the respective variables.

This study considered a basic assumption that an aggregate demand equals aggregate supply in the economy. Ina closed economy; an aggregate supply of forest products in the national economy is the productions of the forest products in the accounting period plus stock of the previous years (if any). However, in an open economy, export and import of forest products also exist. Therefore, it can be comprehended as$\mathrm{ASFP} = \mathrm{NP} + \mathrm{Stock} + (\mathrm{X} - \mathrm{M})$ ……(vi), where, ASFP = Aggregate supply of forest products in the economy at accounting period, NP = National Production of the various types of the forest products, Stock = Stock of the Previous Year (if any), export (X) and import (M).

2. VALUATION APPROACH

This study considered several approaches for the economic valuation of the forest products. These are: (i) Production Approach- most of the data are received form the secondary sources; (ii) Consumption approach – Agricultural household-level consumption and firm level consumption survey, (iii) Estimation of the value addition after processing of the raw products sales of the establishments- gross margin estimation through establishment survey.

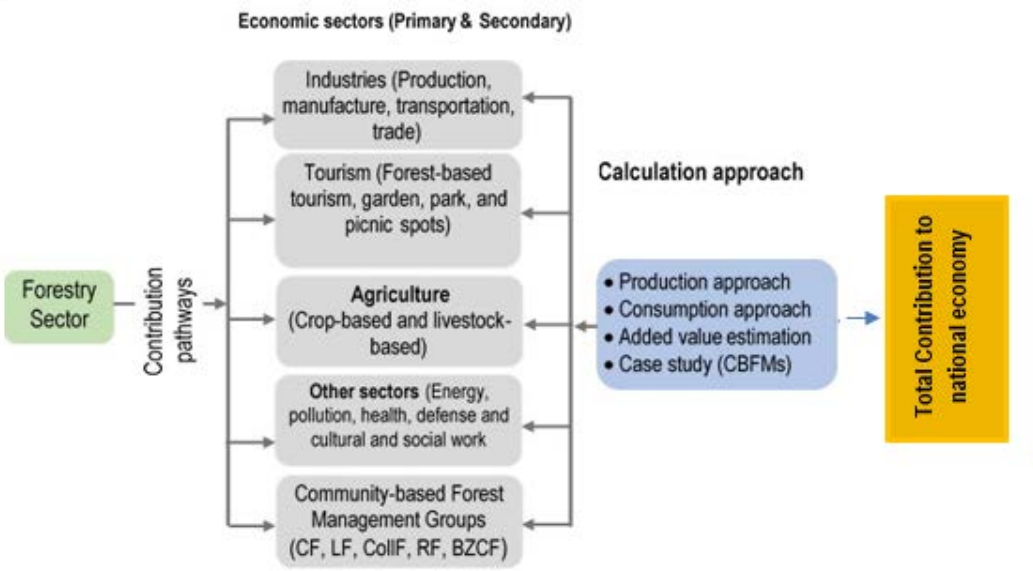

Figure 2: Conceptual Framework based on the study objectives and valuation approach

This study credibly followed the accounting procedures of the SNA and ISIC/NSIC to identify the variables and monetary valuation of the forest products as far as practicable, adopting production, consumption and added value estimation approaches to avoid double accounting. Economic contribution of the forestry is assessed in terms of monetary income and employment.

In production or output approach, gross value addition (GVA) equals the gross output (GO) less the intermediate consumption (IC) as $GVA = GO - IC$ ……. (vi); where, GO = Value of goods/services sold + changes in inventory + Industrial and non-industrial service done for others; and IC = Intermediate Consumption (Materials and surplus material input + materials used from Inventory + Industrial and Non-Industrial Service done for others + research and experimental development).

3. CONTRIBUTION OF THE FORESTRY TO OTHER SECTOR OF THE ECONOMY

The study only covered the economic sectors as clearly specified in the objective of the ToR prepared by the client. These include agriculture, industry, tourism, and other sectors including energy, social and cultural works. The study assessed only the primary contribution of the forestry sector to the identified economic sectors.

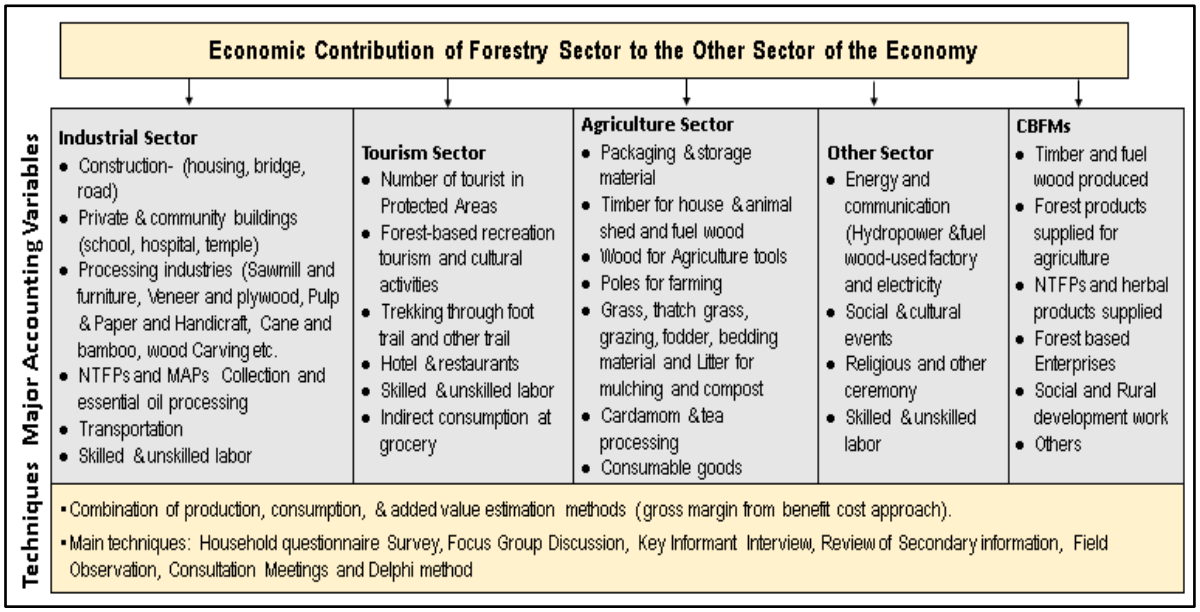

Figure 3: Accounting variables and study Approach

Summary of Major Accounting Variables

a. Agriculture Sector: (i) Timber used for building, furniture and maintenance, and fuelwood used for energy (ii) Forest products for farming and livestock (wood other non-wood products for animal shed; wood for agriculture tools; poles used for field crop farming; bamboo and other products used for storage and packaging; grass and fodder, thatch grass, litter and bedding materials, grazing in hours/day and consumable goods (honey, vegetables and bamboo shoot, MAPS and herbal medicine, etc.).

b. Tourism Sector - Number of the visitors' arrivals; Revenue generated; forest-based recreation activities (cultural show, elephant riding, museum etc.), Expenditure on Hotel and restaurant (lodging and food & beverage, etc.; trekking, etc.)

c. Forest products Production-Timber and fuel wood; Bamboo and cane; NTFPs and medicinal herbs, Khair (catechu), Khoto, labour used, etc.

d. Forest-based Industry: Wood used by wood processing industry, Forest products used by pulp & paper and Handicrafts, Cane and bamboo used by Rattan and bamboo enterprises, NTFP and herbal products used by processing industries, leaves, etc.

e. CBFM Groups- Timber and fuel wood produced; forest products supplied for agriculture, NTFPs and herbal products supplied, forest-based Enterprises; Social and rural development activities and others.

4. DATA COLLECTION METHODS

Multiple methods were used for data collection. These methods were Iterative review of the secondary information; administration of questionnaires survey; focus group discussion; key informant interview and bilateral meetings. The details of data collection methods placed in Annex M-2.

4.1 Literature Review

An extensive review was done to explore the relevant available literature related to the economic contribution of the forestry sector to the other sector of the economy and national economy. The review specifically focused on the approaches, methodologies, and boundaries of assets as suggested by the SNA (2008) and the scale of assessment of the contribution of the forestry sector to other economic sectors. For example, SNA 2008, International Standards Industry Classification (ISIC), Rev.4, and 3 FAO's global study reports on Forestry Sector Contribution to the national economies, FAO's report on Contribution of the Forestry Sector to the National Economies 1990-2011, and Forestry Contribution to National Economy and Trade in Ethiopia, Kenya, and Uganda, (FAO, 2016), etc.

Further, a number of specific literatures of Nepal were also reviewed, for example, National Economic Census (CBS, 2018), Study on the Assessment of Forestry Sector's Contribution in National Economy and Environmental Conservation in Nepal (MoFE), Industry Statistics (DoI), Forest policy-related literatures (Forest Act 2076, Environment Protection Act and regulation) and Economic Review (various issues) including several journal articles related to Nepal's forestry sector.

4.2 Consultation meetings and feedback workshop

The consultations meetings organized with relevant stakeholders accompanied with feedback workshop on study methodology with the presence of the wide range relevant stakeholders, for example, FRTC, DoFE, MoFE, DNPWC, MoALD, I/NGOs, FECOFUN, Commodity Associations and received feedback was accommodated to enrich the methodology. The consultation meeting was further extended to data collection with the Provincial Ministry of Industry, Tourism, Forest and Environment during field survey including other district level institution such as Division Forest Office, District Office of the Nepal Telecom and District Office of the Nepal Electricity Authority, etc.

4.3 Focus Group Discussion and Key Informants Survey

Focus group discussion (FGD) exercise is widely used participatory research and action tool, usually yields both qualitative and observational data and provides an opportunity to understand in-depth and interactive discussion on the specific research topic through the opinion and experiences of the participants. Extensive focus group discussion was carried out at survey site to collect and triangulate the information using checklist about the consumption behavior of the forest products and local price; use of the fuelwood for religious and funeral activities; local level informal micro – enterprises, and role played by the CBFM group to community development. The participants of the FGD were local stakeholders like politicians, entrepreneurs, member of District Chamber of Commerce and industries, and representative of CBFM groups. The bilateral meeting and key informant survey was also done with industry personnel and government staff working at Protected Areas and Provincial Government and local government, and knowledgeable person about CBFM groups' activities, For example Sawmill and furniture Owners, NTFP processing industries, Brick industries, Chitwan National Park, previous executive Member of the CBFM groups and other private sectors.

4.4 Survey

A survey is a most common and dominant research tool used for collecting primary data from a predefined group of respondents to gain information and insights into various topics of interest. Therefore, most of the primary data for this study were collected adopting questionnaire survey approach. Household-level survey was administered using detail semi-structure questionnaire to collect the quantity of the various types of the forest products consumed by each household in the year 2075/2076. The establishment or industry level survey was also carried out using a set of questionnaires to collect the primary data about the consumption of the forest products and its sources, skilled and unskilled labor used, sale of the processed products, etc. to know the gross margin of the establishment and estimate the added value of the products after processing. Questionnaire Survey method was also extended to CBFM groups level to gather data about the different kind of forest products extracted from the CBFM regimes and to explore their role in the community and social development including contribution to the national economy. The study generally considers a need-based approach for data collection whereby four major approaches namely, questionnaires/checklist, direct informal interviews, and focus group discussion were adopted(Annex M-3).

5. SAMPLING DESIGN AND SAMPLE SIZE

The scope of the study on “Assessment of the Economic Contribution of the Forestry Sector to the other Sectors of National Economy” envisaged to cover entire Nepal representing urban and rural areas, all seven provinces and three ecological zones, namely Mountain, Hills and Terai. Therefore, this study has adopted various types of the sampling approaches considering population of each sampling frame prepared based on each study objectives as specified in Chapter 1, Section 1.3.

Broadly, the study was accomplished in three stages: (i) *Preparatory phase*– iterative review of the literature and exploration of the secondary data; sampling and sample size determination; development of the survey questionnaires and check list for focus group discussion and key informant survey; and submission of the inception report; (ii) *Data collection and survey phase*- execution of the field survey, consultation meetings and secondary data mining; and (iii) *Data analysis and reporting phase*- data entry and summarization; preparation of the draft report and final report.

The sampling design for the study was combined with the sampling design adopted by the Central Bureau Statistic (CBS) during population census and other national level survey as far as practicable to make geographical homogenous units to ensure representative sample. Hence, sampling strata for the study were 17 eco-provincial regions as suggested and adopted by the CBS to ensure representation of the all diverse ecological regions of the country and to make a homogenous unit. The study adopted three stage sampling procedures because: (i) straight simple random sampling is not practical, (ii) it is time and cost effective, (iii) it still ensures coverage of all key domains of interest, and (iii) within each enumeration area (EA), each household has a known and similar chance of being selected in the survey. Besides, the study has also adopted systematic random sampling method and purposive or expert judgement approach because of the diverse nature of the products and diversity in the nature of the establishment under the forestry sector. The unit of enumeration for the survey was, (i) the household, (ii) forest-based establishment, (iii) hotel and restaurants, and (iv) CBFM group.

For household survey sampling was performed in three stages: (a) first stage- 20 districts were selected randomly from 17 strata (at least one district in each eco-provincial strata). Then, 51 local bodies were selected (at least 2 in each selected districts) adopting expert judgement approach considering forest cover criteria (> 50%, 25-50%, &<25% of the total land cover) and distance to forests from the dominant settlement of the local body; (b) second stage- The digital administrative boundary of the Ward of previous Village Development Committee overplayed on the administrative map of the current local government and enumeration area (EAs) or primary sampling units (PSUs) were identified, ensuring at least one EA in each selected local government and 4-6 EAs in districts to make 102 EAs. (c) In the third stage- voter list of the previous Ward collected and list of the household block of the settlement from the entrance point of the wards were identified and 22 households in each EA were selected adopting systemic random sampling method for questionnaire survey (Table 1).The overall aim of the sampling was to ensure and select representative sample from the population.

5.1 The Household/ Agriculture Sector Survey

A diverse type of the forest products is being collected by rural households in their agricultural activities as well for their livelihood sustenance for example, wood, fuel wood, poles, grass and fodder, consumable goods and so on. Therefore, economic contribution of the forestry to the agriculture sector could easily be transferred and reflected through the analysis of the household-level consumption pattern of the forest products and valuation of these products in monetary value. Hence, household survey was conducted to gather the primary data of the forest products consumed by the agricultural households. The ToR for the study had clearly stated for inclusion of 2,213 households for survey. Therefore, the sample size for each EA was 22 households (2213/102=21.67~22) (Table 1). It was reasonable to select 15–20 households from each EA to capture the general consumption pattern of forest products. The survey targeted to interview with 2,244 households (Table 1);however, only 2,228 households (as against 2,213 households as specified in the ToR) were covered.

The required data for the agriculture sector was collected through the household-level forest product consumption survey from each EA. The proportion of the agriculture households in each ecological zone that is High Mountain, Hill and Terai who are using various types of the forest products derived from the household survey and these ratios are used for simulation of the contribution of the forestry to the agriculture sector at national level using local price of the products in each zones.

Table 1: Eco-provincial zones, district and local governments selected for household survey (agriculture)

Province	Physiographic zone	District	No. of Palika	No. of Enumeration Area	Local Bodies			Total Sample HH
Province 1	Terai	Sunsari	3	6	Dharan,	Dewanganj	Gadhi	132
Province 1	Hills	Terhathum	2	4	Myanglung	Phedap		88
Province 1	Mountain	Sankhuwasabha	2	4	Chichila	-	Khandbari	88
Province 2	Terai	Saptari	3	6	Agmisair Krin Savaran	Dakneshwari	Rajbiraj	132
Province 2	Terai	Bara	3	6	Nijgadh	Kalaiya Sub-metropolitan city	Parwanipur	132
Province 2	Terai	Mahottari	3	6	Bardibas	Matihani	Aurahi	132
Bagmati	Terai	Chitwan	3	6	Ichhakamana	Bharatpur	Khairahani	132
Bagmati	Hills	Kathmandu	4	6	Dakshinkali	Budhanilkanth	Tokha	132
				2	Kageshwari manohara	-	-	44
Bagmati	Mountain	Dolakha	2	4	Bhimeshwor	Sailung	-	88
Gandaki	Terai	Nawalpur	3	6	Gaindakot	Madhyabindu	Boinayatiwari	132
Gandaki	Hills	Lamjung	2	4	Beshishahar	Sundarbazar		88
Gandaki	Mountain	Manang	2	4	Chame	-	Manang Ngishyang	88
Province 5	Terai	Rupandehi	3	6	Sainamaina	Samarimai	Mayadevi	132
Province 5	Hills	Palpa	2	4	Tinau	Tansen	-	88
Province 5	Hills	Dang	3	6	Lamahi	Dangisharan	Gorahi	132
Karnali	Hills	Dailekha	2	4	Dallu	Narayan	-	88
Karnali	Mountain	Dolpa	2	4	Tripurasundari	Thulibheri	-	88
Sudur Pashchim	Terai	Kailali	3	6	Lamkichuwa	Bhajani	Janaki	132
Sudurpashchim	Hills	Doti	2	4	-	Dipayal	Adarsha	88
Sudurpashchim	Mountain	Darchula	2	4	Shailyashikhar	Lekam	-	88
Total		**20**	**51**	**102**	**-**	**-**	**-**	**2,244**

5.2 Forest based tourism sector

Mostly, secondary information was used for accounting purposes. However, to verify the existing situation sample survey was also accomplished. The population for tourism includes: (i) all the protected area and National Parks. (ii) All the hotel and restaurants (Hotels in city and rural area) operating in the forests-based tourism sites. This study identifies three categories of data for the contribution of the forestry sector to the tourism sector. These were (i) number of tourists visited in the forest-supported sector i.e. protected areas – national park, conservation area, and wildlife reserve, hotels who serve the tourists and recreational activities; and (iii) hotel and restaurants.

Purposiveor Expert Judgement sampling approach was adopted to identify the protected area (PA) based on the set of the criterion to make reprehensive sample to ensure representation of the all types of PAs taking account of flow of the Tourists in the respective protected area, representation of physiographic region and proximity – accessibility to ensure better estimation of the economic contribution received from the tourism sector. The survey also covered Hotel and Restaurants operating in the PAs. Therefore, list of the all the protected areas and National Parks obtained from Department of the National Park and Wildlife Conservation under the Ministry of Forests and Environment and list of the hotel and restaurants *(Hotels in city and rural area)* operating in the forests based tourism sites are the sampling frame for survey. Then, sample for hotel and restaurants were selected using systematic random sampling approach.

The required data for the tourism sector particularly, number of visitor arrivals in the protected area and revenue collected from the tourism activities in the PAs were taken from the DNPWC and Tourism Statistics of Nepal 2019 gathered from the Nepal Tourism Board.

Selected sample PAs for the survey were Chitwan National Park; Shivapuri-Nagarjun National Park; Annapurna Conservation Area, Langtang National Park and Makalu Barun National Park.

Average days of stay, average expenditure, and other national figure were taken from the secondary sources for triangulation purpose. A total of 112 Hotels and Restaurants (90 hotel and restaurants operating at the vicinity the PAs and 22 line hotels) were surveyed using semi structured questionnaire. The required data about the expenditure of the visitors was collected adopting reminiscence and consumption approach with the help of the hotel and restaurant management. The focus group discussion and interaction with key informants were accomplished for triangulation of the information. The other indirect spending of the visitors such as groceries, local fees and levies, souvenir goods, recreation and so on are estimated with the help of the key informant interviews and interaction with local shops. The travel cost and travel length of the visitors were estimated based on the: (a) information provided by the travel agency, trekking agency, hotel and restaurants, (b) expert judgement considering airfare of the direct route and local transportation cost of the vehicle, and (c) distance of the PAs from Tribhuvan International Airport.

5.3 Industry sector or establishment Survey

The secondary source of forest-based industries data for this study was referred to the data available from the Industrial Statistic of the Department of the Industry. Altogether, the survey

covered 356 establishments. The sub-sector of industries for this study was categorized based on the nature of the establishment as per the database of the Department of Industry (DoI). Diversity of the establishment is maintained. A total of 22 types of industries were identified and surveyed for the collection of primary data.

The establishment survey was conducted adopting "Purposive or Expert Judgement" sampling approach after categorization of industries based on raw materials used and determination of number of each category. The set of criteria are: (a) If number of the establishment under the specific category is less than 10, a complete enumeration and If more than 10 establishments under each category of the consideration, then sampling was done by purposive and expert Judgement to make representative. The sampling frame was derived from the Industrial Statistic of the Department of the Industry and 22 types of industries considered for survey (Table 2).

Table 2: Number of forest-based Industries in the country

SN	Type of industries based on the raw materials used	Total no. of industries in Nepal (formally registered)	No. of industries considered for survey
1	Sawmills	2150	107 (5%)
2	Wood Carving	12	10
3	Rosin and Turpentine	137	10
4	Katha	78	10
5	Allo	89	10
6	Allo-clothes	190	10
7	Cardamomprocessing	8	8
8	Veneer	85	10
9	Plywood Sun-mica	69	10
10	Furniture	1694	100 (6%)
11	Sisno (common nettle) powder	40	10
12	Bread and Bakery	612	10
13	Hand paper (Lokta)	563	5
14	Medicinal plant-based enterprise	427	20
15	Handicraft (Bamboo/Rattan	7759	100
16	Fire work furniture	110	10
17	Sajiwan Oil	13	5
18	Duna Tapari (Leaf-plate)	83	10
19	Lapsi ko Mada (Pickle)	8	5
20	Domestic Hastakala (handicrafts)	314	10
21	Brick and Tile Factory	1577	15
22	Briquette	NA	-

Source: Industrial Statistics of Nepal, Department of Industry (2018), Page 34- Table 6.

During field survey, it was found that the list of the forest-based industries as depicted in the Table 2 was not updated considering the operational status, many of these industries had already left after registration. There are many forests based rural level micro enterprises in operation which are not registered to get formal recognition. This is a major limitation faced by survey during establishment survey. The establishment survey was done in each selected district. The establishment survey covered only 356 establishments as it was hampered by complete lockdown of the country due to pandemic COVID 19 disease. Contribution of the forestry sector to the industrial sector was estimated based on the average forest products

consumption rate and sale of the final products including value of the stock and gross margin approach to avoid double accounting.

5.4 Other sectors

This study also considered the other sectors as indicated in SNA 2008. The study includes hotels and restaurants (H) (it comes in Tourism), transportation, storage, and communication (I), Financial Intermediation (J), Public administration and defense (L), and health and social works (N). The data required for accounting subsectors under the other sectors were collected through, (i) focus group discussion carried out at each EAs during household survey, (ii) key informant of the concerned industry and institutions, and (iii) focus group discussion carried out during CBFM group survey.

The consultation meeting and key informants' interview was organized with Government of Nepal, Department of Road, and Nepal Electricity Corporation to acquire the data about Fuel wood consumed for bitumen heating and wooden electric poles, respectively.

The financial activities supported by the forest derived income and sources accounted through the official records of CBFM group, focus group discussion and key informant interviews of their members of the identified CBFM groups for survey. Some CBFM groups are involving in saving fund mobilization. Similarly, fuelwood used for business activities, for example, brick factory and local breweries. Estimated through the consultation of the Federation of Nepal Brick Industries, Key informant interview and bilateral dialogue with industry owner or manager with expert. The fuel wood and other forest products such as leaves, poles used for religious and social function and fuel wood used in dead body cremation was estimated through the focus group discussion and key informant interview.

5.5 Community-based Forest Management Groups

These institutions were surveyed for the assessment of the disintegrated contribution of CBFM groups to the national economies. The Total quantity of forest products (wood-timber, fuel wood, pole, fodder, grass, leaf litter, edible wild fruits, nuts, and other non-timber forest products) extracted in FY 2073/74 and 2074/75 was collected from the official records of the CBFM groups within the identified LGs for the household survey. Altogether, 274 CBFM groups were covered for the survey. FGD and KII with knowledgeable persons including current and immediate-past executive committee members were organized for the triangulation of the data.

The list of the all types of the CBFM groups was the sampling frame for CBFM group survey. At least five CBFM groups were chosen from each local government selected for household survey adopting systematic random sampling methods preparing list of the CBFMs. An adjoining Palika was chosen for survey of CBFMs, if required number of the CBFM groups did not exist in the in Local Government with Enumeration Areas selected for household survey. Expert Judgement approach was adopted to ensure the representation of the special CBFM groups such as Buffer Zone Community Forest, Collaborative Forests, Religious Forest, and Leasehold Forests. Since, total population of the CBFM groups is finite, therefore sample size of CBFM group survey determined by using following expression:

$$n = \frac{Z^2 pqN}{e^2(N-1)+Z^2\, pq} \quad \text{..... (ix)}$$

Where, n = Sample size, Z = Z score (e.g. 1.96 for 95% confidence level), p = percentage of picking a choice or proportion of the population, expressed as decimal (20% = 0.2 used for sample size needed), e = margin of the error and N is the total number of the population. That mean, at 95% of confidence interval the error margin expressed as 0.05 or 5%. In this regard, the population of the CBFM group is 22,600, therefore sufficient sample size to make representative sample with 20-25% of picking a choice for 95% of confidence interval is ranges between 244-285. Hence, considering total sample size 285, proportionate sample selection approach was adopted in each survey districts while conducting CBFM survey. The survey covered only 274 CBFM due to complete lockdown of the country because of pandemic disease COVID 19.

Total quantity of forest products (wood-timber, fuel wood, pole, fodder, grass, leaf litter, edible wild fruits, nuts, and other non-timber forest products) extracted in fiscal year 2075/76 collected from the official records of the forest groups through the questionnaire and checklist. Focus group discussion and key informant interview with knowledgeable persons was also organized. The appropriate way for the projection of the provincial and national level economic contribution of the CBFM groups could be average value of the forest products extracted from the per unit area of the forest land. Therefore, monetary value of the forest products extracted from each CBFM group was estimated based on the average farm gate price of each product. Required secondary information was collected from the Division Forest Office of each selected districts for household survey. The economic contribution of the CBFM groups was not summed with total contribution of the forestry sector to avoid double accounting as household-level consumption and market disposed products accounted through household survey and production economics.

5.6 Training and fielding of Survey Team

Competent and well experienced mid-level enumerators were hired and trained for field survey concentrating on the overall objective of the study, nature and the sources of data required to accomplished the study, and procedure for the questionnaire survey and use of the focus group discussion and key informant survey. The sets of questionnaire prepared household survey, establishment survey and CBFM group survey including check list prepared for FGD and KII were used for training exercise. These survey tools were pre-tested and revised before the mobilization of the team.

Supervisors were assigned for seven provincial clusters to supervise, monitor, and oversee the enumerators' progress and activities to avoid potential measurements errors from the enumerators.

5.7 Data entry and Analysis

Both secondary data and primary data and information collected from the survey are tabulated and cleaned and summarized to avoid errors and duplication before the analysis and generation of the accounting tables. Descriptive and ratio analysis tools were used for data analysis. The average ratio of the concerned variable derived from the sample was used for simulation and generalization of the results at national level. The result for this study is presented in the form of point estimation for the accounting period i.e. FY 2075/76. The results are interpreted by using appropriate visual charts and summary tables.

Annex M 2: Data Collection Methods

Forest–based economic Sector	Subsector as per the SNA (2008)	Variables	Data Sources	Data collection techniques				
				Survey	FGD	Key informant interview	Official records	Observation
Production Sector	Production Unit	Round wood, Fuelwood, Bamboo, NTFPs, etc.	DoFS, PMITFE, DFO, MOEF, CBFM	-	-	-	√	-
Industry	Construction (Road, Poles, Buildings, animal shed)	Railway sleepers/ Wooden bridge and poles	Concerned office			√	√	
		Corporate building	Corporate Office			√	√	
		Household buildings and cow-shed)	Household	√		√		
		Community buildings	FECOFUN/Local government/School, Hospital				√	
	Manufacture industries (Wood processing)	Sawn wood &furniture	Industries and enterprise	√	√	√	√	
		Essential oil		√	√	√	√	
		Veneer & ply		√	√	√	√	
	Non-timber forest products Processing	Allo/Lokta (hand-made paper)	Processing Enterprises/literature	√			√	
		Medicinal and Aromatic Plans (MAPs)- primary	JAWAN, NEPHA	√	√	√	√	
		Rosin& turpentine	Processing Enterprise	√		√	√	
		Sisnu-powder making enterprise		√		√	√	
		Kattha (catechu)		√	√	√	√	
	Transportation	Vehicle body					√	
Tourism	Forest-based Tourism Activities	Visitors arrivals	Protected areas office			√	√	
		Visitors expenditure	Hotels and Restaurants	√	√	√	√	
Agriculture	Crop-based and livestock *(Only primary goods)*	Annual use of timber and fuelwood	Household	√				
		Wood for animal shed and farm tools		√	√			
		Grass and fodder, grazing, thatch grass and leaves	Household	√	√	√		

Forest–based economic Sector	Subsector as per the SNA (2008)	Variables	Data Sources	Data collection techniques				
				Survey	FGD	Key informant interview	Official records	Observation
		Broom Grass						
		Forest products used for storage house & Packaging	Household	√	√	√		
		bamboo products		√	√	√		
		Consumable goods collected	Households	√	√	√		
		Forest products used for field farming and mushroom production	Household/ Entrepreneurs	√	√	√	√	
		Cardamom and tea processing	Household	√		√		
		Wood used for beehive		√		√	√	√
CBFMS		Area No. of members Extraction of various products Group Consumption Product Sale outside the group Fund generation and mobilization Rural development Activities	CBFMG Annual Report and database, Discussion CBFMG Operational Plan	√		√	√	
Other sector	Energy (Reservoir-based, semi-reservoir -based Hydropower, Brick factory, Road Construction- Bitumen melting)	Fuelwood and timber used	Concerned Office			√	√	
	Religious and funeral activities	Wood and Fuelwood used	Household	√	√	√		
	Energy (black smith)	fuelwood for informal char col used	Black smith	√				
	Traditional healthcare practitioners	Medicinal herbs collected	DFO/ healthcare practitioners		√	√		

Annex M 3: Sampling Strata for Household Survey as per CBS Economic zones

Province	Mountain	Hill	Terai	Total Strata
1	x	x	x	3
2			x	1
3	x	x	x	3
4	x	x	x	3
5		x	x	2
6	x	x		2
7	x	x	x	3
Total	5	6	6	17

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