THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF NATURAL RESOURCES AND TOURISM

FORESTRY AND BEEKEEPING DIVISION

THE CONTRIBUTION OF FOREST SECTOR TO THE NATIONAL ECONOMY

JUNE, 2021

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EXECUTIVE SUMMARY

Background

This study was conducted from October 2019 to December, 2020. Prior to it, a number of studies have been conducted to assess contribution of forest sector to the national economy and all these studies show different findings. As such, the main focus of this study was to estimate a realistic contribution of the forest sector to GDP basing on empirical data, and determine/establish potential areas that if well-developed/utilized can increase contribution of the forest sector to GDP.

Methodology

The methodology involved collection of primary and secondary data in 10 regions of Tanzania mainland. Data collected were used for estimation of Gross Value Added (GVA) by economic activities undertaken in the forest sector. The GVA represents the value (in Tanzania Shillings -TZS) for the amount of goods and services produced in an economy after deducting the cost of inputs and raw materials that have gone into the production of those goods and services. GDP which essentially measures a country's domestic contribution to its final goods and services in a given time period, is equal to the total GVA of all domestic industries. Hence, a sector's GVA naturally becomes the basic measure of its contribution to GDP.

Gross value - added by economic activities in the forest sector

The total GVA by the forest sector was estimated to be approximately TZS 4.65 trillion. The estimation was based on a number of forest products in the sector which included charcoal, firewood, logs, poles, honey and bee-wax, wild fruits, gums and resins, withies, seeds and seedlings production. Description on contribution of each product is summarizedas follows:

i. Main actors considered in charcoal production included producers, transporters, wholesalers, retailers and government. Charcoal production was estimated to be 1,895,248 tonnes/year making a total

GVA of TZS 2,056,771,556,434 equivalent to 44.22% of the forest sector contribution.

ii. Firewood consumption in rural and urban areas was estimated to be 69 and 34.5 headloads per household per year respectively. The estimated GVA for this product was TZS 457,167,612,172 equivalent to 9.83% of the forest sector contribution.

iii. Logs were harvested from woodlots, plantations and natural forests. The combined GVA for logs from the three sources was TZS 189,541,323,923equivalent to 4.08 % of the forest sector contribution.

iv. Poles were important forest products for construction and transmission. Pole production involved smallholder tree growers, forest plantationscompanies, Central Government plantations and natural forests. GVA for poles from smallholder tree growers was TZS 20,164,209,402 (0.43% of the sector contribution), GVA generated by poles from forest plantations companies was included in establishments, GVA made by production of poles from Central Government plantations was included in logs and GVA created by poles from natural forests was TZS 781,323,994,552 equivalent to 16.80% of the forest sector contribution.

v. Although there were other products that could be harvested from beehives, only honey (46,657,547 kg) and beeswax (3,110,503.14 kg) were collected and traded giving total GVA of TZS 112,142,054,049 for honey and TZS 31,105,031,400 for beeswaxequivalent to 3.08% of the beekeeping contribution. Also, wild fruits quantities harvested and traded was estimated to contribute a GVA of TZS 8,969,846,100 (contributing 0.19%).

vi. Gums, resins and withies were also found to be harvested in some areas of Tanzania. However, resin tapping was only done in Sao Hill Forest Plantation. GVA by withies harvesting was found to be TZS 7,163,591,012, while GVA by gums and resins was combined with GVA of otherestablishments in the forest sector making a total GVA from

establishments of TZS 940,190,852,050equivalent to 20.21% of the forest sector contribution.

Conclusions, recommendations and way forward

It is concluded that the estimated sector contribution to GDP is still low (3.3%) as found by this study and other previous studies reviewed. The observed low contribution is partly due to under declaration of income earnings and over declaration of costs of production by establishments in the sector. The contribution of forest sector to GDP could be increased if the ecosystem and environmental services were included in the estimation. Compared to existing national statistics in the sector, this study has improved data estimate for some forest products such as charcoal, logs, poles, wild fruits, honey, beeswax, withies, gums and resins.

Also, according to respondents involved in tree growing and establishments, forest economic related activities have gone down in recent years such as sales of sawn timber in the domestic and export markets. This is likely to have impacted the sector contribution to GDP in 2019. Therefore, to increase contribution of the forest sector to GDP, it is recommended that more efforts be directed to increase establishments (high quality technologies) especially medium/large and small and medium enterprises; presence of many establishments using poor technologies contributes to little value added.Also, there is a need to examine taxes, fees and cost structure of establishments so as to increase the GVA because gross profit margin of many establishments is fairly small which is a disincentive to investments and willingness to pay taxes.Direct efforts to exploreinvestment in beekeeping are needed as the sub-sector has potential yet to be adequately tapped (contributing only about 3% of the forest sector's GDP).

It is also recommended that efforts to strengthen mechanisms for revenue collection from charcoal should be intensified for the charcoal sub-sector, because although the sector has large contribution (44%) to the forest sector GDP, its contribution to Government revenue is meagre.In addition, there is need to promote affordable energy mix sources, explore

possibility for sustainable commercial plantation for charcoal and improve management of natural forests in order to sustain them. Furthermore, the study recommends streamlining and formalizing data availability from all stakeholders in the forest sector and beekeeping sub-sectors, and inclusion of ecosystem and environmental services in the estimation of the sector contribution to GDP. As a way forward, the Ministry should take a leading role to ensure that NBSis provided with this data and uses to improvefuture estimation of forestry sector contribution to GDP especially for products which are currently not captured. In addition, the Ministry should facilitate initiation of green accounting, investments in beekeeping and take deliberate efforts to streamline the charcoal industry for improved revenue collection.

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ACRONYMS AND ABBREVIATIONS

CPI	Consumer Price Index
DFOs	District Forest Officers
EFTA	European Free Trade Association
EU	European Union
EUROSTAT	European Statistical Office
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	Food and Agriculture Organization Corporate Statistical Database
FBD	Forestry and Beekeeping Division
FDT	Forest Development Trust
FREMIS	Forest Resource Management Information System
FGD	Focus Group Discussion
GDP	Gross Domestic Product
GVA	Gross Value Added
HBS	Household Budget Survey
IC	Intermediate Consumption
ISIC	International Standard Industrial Classification of All Economic Activities
ITTO	The International Tropical Timber Organization
JFSQ	Joint Forest Sector Questionnaire
LGAs	Local Government Authorities

MCDI	Mpingo Conservation Development Initiatives
MFP	Ministry of Finance and Planning
MNRT	Ministry of Natural Resources and Tourism
NAFAC	National Forestry Advisory Committee
NAFORMA	National Forest Resources Monitoring and Assessment
NBS	National Bureau of Statistics
NGOs	Non-Governmental Organizations
NRAs	Natural Resources Advisors
NWFPs	Non-Wood Forest Products
PFP	Private Forestry Programme
SNA	The System of National Accounts
TaFF	Tanzania Forest Fund
TF	Task Force
TFS	Tanzania Forest Services Agency
TNBC FWG	The Tanzania National Business Council- Forest Working Group
TRA	Tanzania Revenue Authority
TZS	Tanzanian Shillings
UNECE	United Nations Economic Commission for Europe

PREFACE

Forest sector has a great potential to contribute to development of the national economy and livelihood of the people including employment creation to the majority of Tanzanians and revenue collection. For the first time in history, the Ministry of Natural Resources and Tourism found it prudent to establish her own estimate of the forest sector contribution to national economy particularly Gross Domestic Product (GDP). GDP estimation is important because it gives information about the size of various sectors' contribution to the economy and how the sectors economies are performing. The growth rate of real GDP is often used as an indicator of the general strength of the economy. In broad terms, an increase in real GDP is interpreted as a sign that the sector economy is doing well. Therefore, under reporting the actual figure has a negative impact to the forest sector and gives wrong signal.

Prior to this report, a number of studies reported mixed findings on the sector contribution to the national economy, with some reporting underestimation and others overestimation of the actual contribution. In addition, private forestry, beekeeping and engineered wood industry activities have increased significantly in the country. However, primary production remains largely unaccounted for, meaning that its contribution to the economy or the potential to increase this contribution also remains largely unknown. Underscoring these facts, The Ministry of Natural Resources and Tourism commissioned a Task Force made up of members from key institutions namely Sokoine University of Agriculture, University of Dar Salaam, National Bureau of Statistics, Tanzania Forestry Research Institute, Bank of Tanzania, Tanzania Forest Service Agency and Tanzania Revenue Authority to undertake this noble task of estimating the sector contribution to national GDP. The study aimed at estimating contribution

of the forest sector (forest products and services) to the national economy, particularly the GDP for Tanzania mainland.

GDP estimation was done based on methodology as applied by NBS and an alternative approach with the view to identify gaps. Also, the estimation integrates products and services currently not included by NBS.

Therefore, this report emanated from in-depth study of the forest and beekeeping economy and is “first-of-its-kind”. The Ministry is happy to have its own report derived by national experts. Readers of this document will be able to understand the sector’ producers, products, productivity, value chain development, industries exports and imports, governances and challenges. Important statistics are also provided. The report is an important reference to various stakeholders in the forest sector including the Government, primary producers, industries, processors and academia found within and outside the country. It is a document which shows opportune areas for investment and areas which the government can improve strategies for management of forest resources in the country and increase revenue collection.

Dr. Allan J. H. Kijazi

Permanent Secretary

Ministry of Natural Resources and Tourism

ACKNOWLEDGEMENT

Forestry and Beekeeping Division (FBD) is grateful to the Ministry's leadership for allowing and supporting this study from its start to its completion. The study which took about one year to be completed (since October, 2019 to December, 2020) was undertaken by a group of experts led by Prof. Yonika M. Ngaga from Sokoine University of Agriculture, Department of Forest and Environmental Economics. Other members of the team were: Prof Jumanne M. Abdallah and Dr. Beatus J. Temu all working with Sokoine University of Agriculture, Department of Forest and Environmental Economics; Dr. Joel S. Lincoln and Dr. Wilhelm Ngasamiaku working with University of Dar es Salaam, School of Economics; Mr. Ernest Mshana from National Bureau of Statistics; Dr. Consolata Kapinga from Tanzania Forestry Research Institute; Dr.Aloyce Mbujilo from Bank of Tanzania; Mr. John Madohora from Tanzania Forest Service Agency and Ms. Cesilia Kagoma from Tanzania Revenue Authority. We are grateful for commitment and expertise shown by members of the team which led to the successful completion of this study.

The Forestry and Beekeeping Division is also grateful to many stakeholders who were involved in provision of useful information and data, and their willingness to share ideas on many aspects of this study with the Task Force team. Some of these include Government Ministries, Departments and Agencies, Private Companies, Local Government Authorities, Businesspersons, Communities and Non Governmental Organizations. Their contributions were critical for the success of this study. All institutions and persons involved in the whole process are gratefully acknowledged for making important contributions to this assignment. Special thanks are extended to the National Forestry Advisory Committee (NAFAC) led by Prof. Shaban A. O. Chamshama for their constant guidance provided during the course of undertaking this study.

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Dr. Ezekiel E. Mwakalukwa

Director of Forestry and Beekeeping Division

Ministry of Natural Resources and Tourism

CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 Background

Forest sector has great potential to contribute to development of the national economy. Despite the immense potential, the contribution of forestry and beekeeping to GDP is estimated to be low (3 to 4%). A number of studies have been conducted to assess contribution of forest sector to the national economy. Surprisingly, all of these studies have different findings. For instance, the National Forestry Programme (2001-2010) showed contribution of forest sector to the GDP to range from 2% to 3% and its contribution to paid employment as 3%. Other studies on contribution of forest sector to GDP include: Sharma (1992) 13.9%, Mushi (1999) reported a share of 2%, Milledge and Elibariki (2005) 3-3.4 %, World Bank (2005)2-3%and Abdallah (2014) 3-4%. With exception of Sharma's (1992)GDP estimate whichwas difficult to ascertain how it was generated, the rest were estimated using short-term studies, small samples and limited data sources with under-estimation of forest products and services. According to NBS (2019), on average the forest sector contribution to the National GDP between 2010 and 2017 was about 2.2%and 4% at the current prices respectively.

According to reviews of various studies, the mixed findings of the contribution of the forest sector to the national economy is due to the following factors:

i. Lack of consistent and comprehensive data and the related economic variables in almost all sources of forest statistics;

ii. Forest activities under informal sector e.g., non-wood forest products (NWFPs) are not included in the estimations. Therefore, inclusion of these products in the estimations, will likely make the GDP to be higher;

iii. Some of the forest products e.g., charcoal are inadequately accounted for in the national accounting system; and

iv. Some forest products and services for example freely collected firewood, poles and medicinal plants lack market pricetherefore calculations are based on estimations.

In addition, private forestry and engineered wood industry activities have increased in the country in recent years. However, primary production remains largely unaccounted for, meaning that their contribution to the economy or the potential to increase this contribution also remains largely unknown. Advanced processing of engineered wood products is considered in manufacturing and or construction sectors, that means the data is included in another category of International Standard Industrial Classification (ISIC) i.e., manufacturing in particular. Moreover, environmental costs and benefits of the forest sector have not been included in the current practices of estimating GDP. These circumstances could also be among factors underlying the under-estimation of the sector's contribution to the economy.

Therefore, this study intended to improveupon issues that were usually not included in the estimation of forest sector contribution to GDP.

1.2 Rationale of the assignment

Estimation of the sector's GDP is not for rhetoric purposes, rather it has practical importance. If GDP increases over years, it shows that the sector (i.e forest and beekeeping) performance is heading towards prosperity and if it is waning, it indicates that the sector economy is declining. In addition, the GDP estimated by this study will help the Government to have informed

decision making, National Forest Policy revision and undertaking short- and long-term planning.

Compared to the past, the current availability of forest statistics databases (e.g. Tanzania Revenue Authority - TRA, National Forest Resource Monitoring and Assessment – NAFORMA, MNRT Portal and FREMIS) improve the sector's contribution to the GDP. Thus, this study incorporatedinformal forest activities on production, consumption and trade.

GDP estimation follows the System of National Accounts (SNA) procedure which is internationally recognized. The current SNAdoes not capture environment assets and the changes in stocks of those assets which constitutes a large part of the forest sector, therefore there is a need to undertake green accounting to determine total contribution of the sector to the national economy.

1.3 Objectives of the study

1.3.1 General objective

To estimate contribution of the forest sector to GDP and its potential areas for improvement.

1.3.2 Specific objectives

i. To estimate a realistic contribution of the forest sector to GDP; and

ii. To determine/establish potential areas that if well-developed/utilized can increase contributions of the forest sector to GDP.

1.4 Scope and limitations of the study

1.4.1 The Scope of study

The study aims at estimating contribution of the forest sector to the national economy (GDP) in Tanzania mainland. GDP estimation is done based on methodology as applied by NBS and alternative approach with the view to identify gaps. Also, estimation integrates products and services currently not included by the NBS approach.

This study isdivided into two phases:phase I involvesestimation of forestsector GDP and identification of potential areas for improvement. (i.e., Objectives 1 and 2), While phase 2 focuseson estimating green accounting of the forest sector. The phased approach is adopted for the following reasons: first, to be able to explore main issues in green accounting and understanding of the methodologies and principles;second, to understand the current methodology used by NBS to estimate contribution of forest sector to GDP, its limitations and gaps so as feed into green accounting estimation;thirdly, to conduct detailed literature review in the areas related to estimation of contribution of forest sector to GDP.

1.4.2 Limitations of the study

i. Estimation of forest sector to GDPrequired large data set countrywide. However, ten selected regions of Tanzania mainland were undertaken to maximize time and financial resources;

ii. Collection of data from establishments in the forest sector was difficult as owners were hesitant to release income and costs data of their businesses, which caused delay in accessing the data, but also under declaration of incomes or over declaration of costs in order to show that an establishment is not making profit. The situation demanded making several contacts with responsible people in the respective es-

tablishments to get necessary data for the assignment, and triangulation using sources of raw materials for example volumes harvested from plantations;

iii. It was not easy to access information about number of tree growers from District Forest Offices (DFOs) as there was no adequate records of tree growers at the DFOs which necessitated TF members to make own efforts to reach tree growers through village's offices to get data necessary for the assignment;

iv. Data collection was also affected by poor record keeping at households' level and by individual wood traders;

v. Inadequate availability of secondary data because it is scattered and kept by different sources and users. It is difficult to know who did what, where and when; and

vi. Lack of formal system for accessing information from private sector on production of the forest sector posed a huge challenge in data collection for the assignment.

1.5 The Task Force

The MNRT through FBD in collaboration with the Forest Working Group (FWG) established under the Tanzania National Business Council (TNBC) envisaged to establish the current data on the actual economic contribution of the forest sector to the national economy. In view of that, The Permanent Secretary of MNRT appointed a TFon 5th August 2019to undertake this study.The names and institutions of TF members are indicated in the Acknowledgement.

The TF undertook the following tasks:

i. Performed desk study review to document 'state of the art' GDP estimation methodologies;

ii. Performed desk study review to compare the United Nations SNA with NBS methodology;

iii. Submitted an Inception Report (describing understanding of the assignment, detailed methodology, tools, work plan and financial proposal;

iv. Conducted scooping visit to the field;

v. Undertook extensive field work;

vi. Estimated forest GDP as applied by NBS and identified gaps;

vii. Estimated the forest GDP by integrating products and services currently not included by NBS;

viii. Presented key findings and recommendations to the stakeholders and Ministry for validation and awareness raising; and

ix. Worked closely with MNRT/FBD as well as priority private sector actors particularly those currently involved in TNBC FWG throughout the study, with regular interactions and updates on progress.

1.6 Organization of the report

The report is organized into six chapters: Chapter 1 provides introduction and background of the study; Chapter 2 gives an overview of forest and bee resources in Tanzania; Chapter 3 provides a theoretical review of the study while methodology is provided in Chapter 4. Key findings are delt with and presented in Chapter 5. Finally, Chapter 6 presents conclusions and recommendations.

CHAPTER TWO

OVERVIEW OF THE FOREST AND BEE SECTOR

Forest resources are estimated to cover about 48.1 million (mil) hectares (ha) which is equivalent to 55% of total surface land area of Tanzania mainland (88.6 mil ha). About 44.7 mil ha (93%) of the forestland are classified as woodlands and the remaining 3.4 mil ha (7%) are classified as catchment forests, mangroves, coastal forests and government forest plantations. The total forest cover can be divided into protected and productive forests. Protected areas cover approximately 28 mil ha (58.2%) found in national forest reserves and wildlife-protected areas, while production forests (where regulated harvesting is legally allowed) take up 20.1 mil ha (41.8%).

The distribution of forests in terms of ownership/management includes 21.97 mil ha (45.7%) under Village Governments; 16.6 mil ha (34.5%) under the Central Government; 3.10 mil ha (6.5%) under LGAs; 3.50 mil ha (7.3%) under private sector; 2.88 mil ha (6%) as unreserved forests in general lands.

Further analysis shows that the total forest plantation area is estimated to be 582 729 ha whereas the largest area (210 000-250 000 ha) being in the southernhighlands (Asiad, 2016). Out of this, the government plantations cover 105 625 ha, large private plantation companies own about 54 708 ha while individual woodlots occupy about 422 396 ha.

Honey production potential in Tanzania is estimated to be 138,000 tons of honey and 9,200 tons of beeswax per annum. However, production stands at about 30,393 and 1,843 tonnes of honey and beeswax respectively

from 9.2 million honeybee colonies, which is about 22% and 20% of the potential respectively.

Forests as wood, NWFPs and ecosystem services contribute significantly to livelihood and national economy. Wood products include firewood, charcoal, round wood and sawn wood. For example, forests provide about 85% of all the energy consumed in the country. Charcoal is one of the largest forest producein Tanzania, providing substantial employment and supplying dependable energy.

NWFPs consist of fruits, roots, mushrooms fungi, nuts, game meat, medicinal plants, fodder, latex, bark, beverages, dyes, fibres, gums, resins, oils, bee products and services, tannins, aromatics and toxins. Through use and sale of these products, communities improve their nutrition and livelihoods. Further, in periods of famine, NWFPs serve as a safety net.

At the national level, the contribution of forests to GDP through wood products is estimated as 3.5%. However, this is below the actual value, as non-marketable outputs are not captured. The sector is estimated to provide about three million person-years of employment. Ecosystem services that accrue from the forests include watershed functions, wildlife habitat, soil conservation, biodiversity conservation, Carbon dioxide sequestration, climate amelioration, sustaining cultural values and eco-tourism. These services meet regional and international obligations and support other sectors like tourism, agriculture, livestock and energy. For example, about 90% of Tanzania's hydro-electricity produced at major hydropower stations is fed by water supply from catchment areas within the Eastern Arc Mountains.Given the foregoing importance of forests, it is essential that they be properly accounted for in order to reflect their true value and contribution to GDP.

CHAPTER THREE

THEORETICAL AND CONCEPTUAL FRAMEWORK

3.1 Theoretical Framework

Traditionally, the estimation of the national economy relies on neoclassical theory which is based on the theory of economic growth and development. The problem of economic growth raises the question of the driving forces that determine growth and economic development. Neoclassical economics identified three factors of economic growth; land, capital and labour. Economists argued that, this was enough to explain the causes of economic growth as the more these factors were utilized, the greater was the economic growth (Pietak, 2014).

Based on the neoclassical economic theory, the country's economic growth is closely linked to its performance, usually measured by the GDP. GDP is the most quoted indicator in national accounts that is widely used to measure the performance of an economy (Rajkarnikar*et al*., 2019). There are three approaches to measure country's economic performance (GDP); these are the production approach, which sums the outputs of every class of enterprise to arrive at the total. The approach estimates the gross value of domestic output of various economic activities in the value chain; determines the intermediate consumption such as the cost of material, supplies and services used to produce final goods/services and then deducts intermediate consumption from gross value to obtain the GVA.

Similarly, the expenditure approach works on the principle that all of the product must be bought by somebody, therefore the value of the total product must be equal to society's total expenditures in buying the items. Meanwhile, the income approach works on the principle that the incomes of the producers must be equal to the value of their product and determines

GDP by finding the sum of all producers' incomes. Principally, all the three ways of measurements give the same result. Thus, GDP is the product of a vast patchwork of statistics and a complex set of processes carried out on the raw data to fit them to the conceptual framework. Accordingly, GDP measureisbased on estimates and survey data maintained in a country's SNA(Costanza *et al.,* 2009).Conceptually, GDP measures a country's domestic contribution to its final goods and services in a given time period. As the domestic content is equal to the total GVA[1] of all industries, a sector's GVA naturally becomes the basic measure of its contribution to GDP.Equation 1 which is the sum of production for domestic, export and forest services' charges by the forest sector from 2019 to 2020, was used to estimate GDP:

$$\text{GVA} = \sum_{i=1}^{n}(X_i P_i) - \sum_{i=1}^{n}(IC_i) \quad \text{..... (1)}$$

Where,

$X_i P_i$= Production output (Monetary value of charcoal, logs, timber, poles, bee products, gums and resins, export products, services rendered in forest sector, etc).

X_i=Quantities of each product

P_i= Prices of each product

IC_i = Intermediate consumption

The SNA is the internationally agreed standard set of recommendations on how to compile measures of economic activity in accordance with strict accounting conventions based on economic principles. The recommendations are expressed in terms of a set of concepts, definitions, classifications and accounting rules that comprise the internationally agreed standard for measuring GDP. The system started in 1953, since then it went into several revisions reflecting development of science and technology

1 Gross Value Added (GVA) provides the value in TZS for the amount of goods and services produced in an economy after deducting the cost of inputs and raw materials that have gone into the production of those goods and services.

as such, the last updated version of SNA adopted by most countries was that of 1993 reflecting evolving needs of users, new developments in the economic environment and research and development (NBS, 2019). In essence, international organizations have benefited from applying this framework to gather information from countries in different regions such as European Union (EU) and countries under European Free Trade Association (EFTA) administered by EUROSTAT, other countries in Europe which are non-EU and non-EFTA but also Central Asia and Northern America (Canada and USA) are administered by the United Nations Economic Commission for Europe (UNECE), tropical countries and Japan administered by the International Tropical Timber Organization (ITTO) while other countries in the world are administered by FAO which employs FAOSTAT database to disseminate information to the world (FAO,2018).

Again, the SNA draws heavily on economic theory and principles as well as business accounting practices such as the concepts of production, consumption and capital formation. Further, the system follows the internationally agreed standard set of recommendations on how to compile measures of economic activity in accordance with strict accounting conventions based on economic principles. In this assignmentalso the same economic principles were applied to re-estimate forest sector contributions to the economy.

Traditionally, the activity of measuring the economic value of forest in natural or planted forests includes the production of round wood for the forest-based manufacturing industries as well as the extraction and gathering of wild growing NWFPs. Besides the production of timber, forestry activities result in products that undergo little processing, such as firewood, charcoal, wood chips and round wood used in an unprocessed form (e.g. pit-props, pulpwood etc.) (NBS,2019). However, NBS usually uses logs, charcoal and firewood only, while the forest sector has more than these products.

This indicator of measuring economic performance is widely accepted and used internationally. However, it has some limitations which include the following: exclusion of non-market transactions, failure to account for

degree of income inequality in society and failure to indicate whether the nation's rate of growth is sustainable or not.

3.2 Conceptual Framework

In Tanzania, the forest can be categorized into natural forests and forest plantations, they both provide a variety of products such astimber and non-timber as presented in Figure 1. It should be noted that timber, charcoal, firewood, logs, poles, honey and wax as well as wild fruits are products while eco-system services and the benefits from education activities and eco-tourism activities are services, however, services were not quantified in this estimation exercise due to time and financial resource limitations, therefore this will be quantified in phase II to estimate green account. In addition, forest products establishments (furniture marts, timber yards, timber transportation, sawmills, logs, bee-products industries, handcraft, charcoal briquettes, plywood, marine and fibre boards, black wattle as well as resin) were used in the computation of the forest contribution to the GDP.

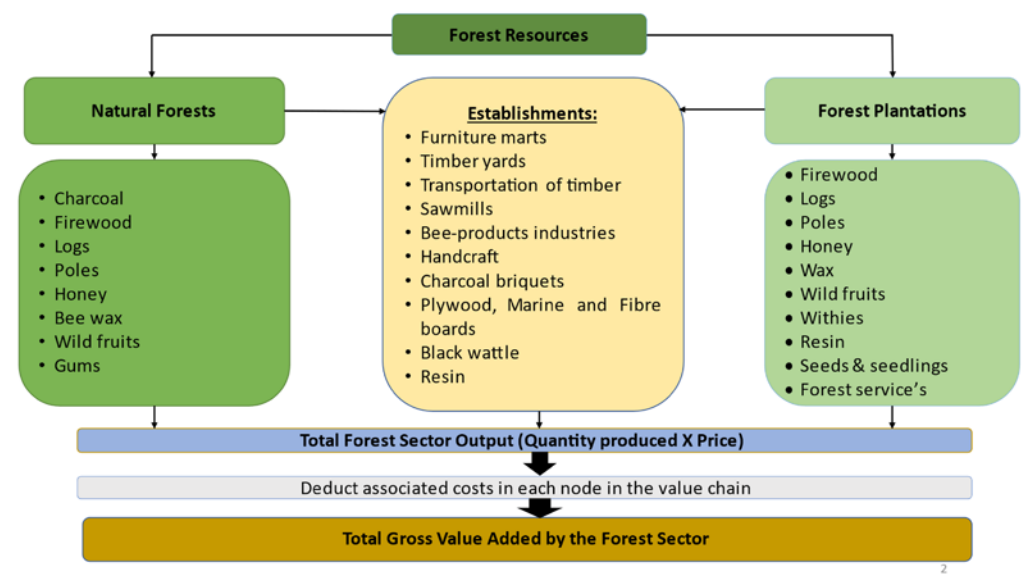

Figure 1. The Conceptual Framework

Source:Developed from Literature Review (2020)

CHAPTER FOUR

STUDY APPROACH AND METHODOLOGY

4.1 Approach

4.1.1 TF Orientation and familiarization with the study

The first step in undertaking this study was to orient the TF about the study objectives and the focus of the assignment in order to create a common understanding. Orientation for the TFcovered remarks from the Permanent Secretary MNRT, Director of FBD, presentations on the commercial forestry sub-sector contribution to the Tanzania GDP;input-output modelling of Tanzania forest sector: a case of timber from forest plantations and woodlots; introduction to approaches of GDP computation and GDP compilation, from forest sector. The orientation not only helped the TF to develop knowledge on the forest sector but also facilitated the study process to achieve the stated objectives.

4.1.2 Literature review

Different literature were reviewed to develop a general idea on forest sector and its contribution to the national economy. For example, literature on forestry contribution including current practices of GDP estimation used by NBS, employment in the forest sector, value added i.e. sector's contribution to GDP and value of forest products exports and imports (sector's contribution to trade balances) were explored.

4.2 Methodology

4.2.1 Data collection and sources

Primary and secondary data were collected. Primary data wereobtained through field survey. Secondary data werecollected from documents such as household budget survey (HBS) (for information related to charcoal and firewood), TRA (Import and export data), Government Ministries, Departments and Agencies, private companies and LGAs.

4.2.2 Field survey

4.2.2.1 Scooping visit to the field areas

In undertaking field survey**,** the first step involved providing a practical orientation of the TF with the field reality. The outcome of this exercise helped the TF to collect some preliminary information/data about forestry sub sectors (such as forestry, wood industry and pulp and paper industry). The TF spent some few days in sampled areas (Dar es Salaam and Iringa) so as to test data collection tools and gather necessary information about the forest sector. This was achieved by meeting key informants (DFOs and Conservators, Village Executive Officers and NGOs involved in the forest sector),andconducting informal Focus Group Discussions (FGDs) in sampled villages.

4.2.2.2 Data requirements

Identification of data needed for determination of forest sector contribution requires a clear understanding of products produced by the sector itself. As such, in order to meet this important requirement, a list of products to be studied was developed based on Joint Forest Sector Questionnaire (JFSQ) framework (Appendix 1). This framework serves as an instrument that facilitatedconsistent gathering of aggregate statistics across countries in the world based on common product aggregations, coding and definitions to enable international comparability (FAO,2018). Through this framework,

data were collected to include quantities for production and removals and quantities and value for imports and exports (FAO,2018).

4.3 Sampling

The sampling of this study was based onTFS workingzones.The TF agreed to select zones ideally based on a number of assumptions. Key among them, zones were selected based on those that are central areas for government revenue collection. In addition, the following issues were taken into consideration:

i. Zones with significant forest production (in natural and/or in plantation forests) and trade;
ii. Significant consumption of forest products;
iii. Visit NGOs/Private sector with many stakeholders' working with the forest sector;
iv. Boarders with significant volume of forest products trade -Arusha, Kilimanjaro, Tanga, Katavi, Kigoma, Dar es Salaam, and Kagera;
v. Zones with specific products of significant national contribution; and
vi. Zones with significant number of timber-based industries.

Basing on the above criteria, Tanzania mainland was divided into zones and ranked as indicated in Table 1.

Table 1. Ranking of zones based on sampling criteria

S/No	Zones	Reasons for selection	Ranking
1	**NZ** - Tanga, Arusha, Kilimanjaro,	Meets all criteria except cr no. 5	3
2	**CZ,** Dodoma, Manyara & Singida	Meets cr no. 2 and 5	6
3	**WZ,**Tabora, Katavi, Kigoma & Shinyanga	Meets cr. no. 1, 4 and 5	5
4	**SZ,** Lindi, Mtwara& Ruvuma	Meets all except cr. no. 2 and 6	4
5	**LZ,** Mwanza, Geita, Simiyu, Mara &Kagera	Meets cr. no. 1, 2 and 4	5
6	**EZ,** Dar es Salaam, Pwani & Morogoro	Meets all except cr. no 5	2
7	**SHZ,** Iringa, Njombe, Mbeya, Songwe & Rukwa	Meets all criteria	1

After ranking as indicated in Table 1, three potential options were considered in selectingTFS workingzonesfor the assignment:

i. Visiting all zones;
ii. Selecting representative zones; and
iii. Combination where all zones are visited but only some representative regions are assessed.

Furthermore, other considerations in the choice of sampling zones included the following:

i. Visit all zones but also use secondary data to get information from some regions;
ii. Select zones but for some zones select regions based on the criteria and potentials available in those regions;
iii. Concentrate on southern highland zone and add selected regions for each zone based specific potentials available in those regions;

iv. Select zones which meet most of the criteria but also select regions with specific potentials available in those regions; and

v. Consider inclusion of forest plantations and natural forests, but concentrate on capturing information from natural forests not usually captured by NBS existing approaches.

4.3.1 Final decision of the working zones

Based on the sampling considerations made, six zones were selected (Southern Highland Zone-SHZ, Eastern Zone-EZ, Northern Zone-NZ, Southern Zone-SZ, Lake Zone-LZ and Western Zone-WZ). Finally, two regions were selected from each zone, except for LZ and WZ whereby only one region was selected to increase coverage as indicated in Table 2.

Table 2. Selected study zones

S/no	Selected zone	Selected regions
1	SHZ	Iringa and Njombe
2	EZ	Dar es Salaam and Morogoro
3	NZ	Arusha and Tanga
4	SZ	Lindi and Ruvuma
5	LZ and WZ	Mwanza and Tabora

4.3.2 Households and establishments interviewed

Two stages were involved in selection of respondents. First, purposive sampling was used toselect tree growers and beekeepersin study regions. Second, simple random sampling approach was used toselecthouseholds for interview.A total of 351 households were interviewed using structured questionnaire (Appendix 2).In addition, statistics of total number of households involved in forest and beekeeping activities in the area were collected andlater used in estimation of total production.

Selected establishments included furniture marts; sawmillers; timber yards; transporters; Plywood, marine and fibreboard; black wattle; handcrafts and resin dealers. Simple random sampling approach was used to selectrespondents for interview. A total of 454 establishmentswere interviewed using a checklist (Appendix 3). In addition, statistics of total number establishmentsinvolved in forest and beekeeping related activities were collected andlater used in estimation of total production.

4.4 Field survey

Field survey was conducted after identification of regions and districts to be visited and determination of the sample size for households and establishments. During field work, stakeholdersand Key Informants Interviews were used for data collection. The TFmetevery evening for debriefing and sharing experiences.

***Stakeholders interview*:** Stakeholders were identified and interviewswere undertaken using checklists (Appendices4 and 5). The following stakeholderswere interviewed:Natural Resources Advisors/Regional Forest Officers (NRAs/RFOs), District Conservators, DFOs, Treegrowers (farmers), NGOs, and service providers both private and public. Using Key Informants Interview, information required for this assignment was collected. TFS management informed Zonal and Districts Conservators to identify villages and establishments in their respective areasand coordinate field activities.

4.5 Data processing and analysis

Statistical Package for Social Sciences and Micro Soft Excel (MS-Excel) computer software were used for data processing and analysis. Data analysis entailed calculations of various statistical values such as sums, mean, frequency, percentage and cross tabulations. Qualitative data gathered from key informants and FGDs wasalso carefully transcribed.

Furthermore, the analysis of secondary data involved estimation of the key economic indicators (employment generated, value addition and trade balance). Further analysis was done with the view to assess and track sectoral linkages between forest sector and other sectors such as manufacturing, construction, tourism etc. This analysis helped the TFtoshow forest sector contribution to the growth of other sectors.

4.5.1 Conventional approach: Forestry and logging - As used by NBS

The NBS uses both production and expenditure approaches in computing the GVA of sectors to GDP. The concepts and methods used by NBS to analyse and assess the contribution of forest sector in the national economy is consistent with the established literature on ecosystem valuation and with the standards for national economic and environmental accounting set out by the United Nations in the SNA 2008 with the caveat that it limits itself to charcoal, firewood and logs. This activity includes the production ofroundwood for the forest-based manufacturing industries as well as the extraction and gathering of wild growing NWFPs. Besides the production of timber, forestry activities result in products that undergo little processing, such as firewood, charcoal, wood chips and roundwood used in an unprocessed form (e.g. pit-props, pulpwood etc.) and most of these activities can be carried out in natural or planted forests.

4.5.2 Compilation of gross value -added

Gross output for forestry and logging at constant prices was derived by extrapolating Benchmark values using 2019 as base year, with combined volume index derived from the number of households using charcoal, firewood and logs from the HBS 2017/18 (NBS and MFP, 2019). Gross output at current prices was derived by reflating constant prices gross output with consumer price index (CPI) for timber. Intermediate consumption (IC) at constant prices is derived by using fixed Input Output (IO) ratios. IC at current prices is derived by reflation using weighted CPI for packing materials, fuel

(diesel), maintenance and repair of personal transport equipment; and CPI for services.

4.6 Alternative approaches

4.6.1 Justification for the alternative approaches

Tanzania has adopted International standards of national accounting including the SNA(SNA, 2008) and ISICrevision 4 (ISIC, 2008). According to SNA and ISIC standards, the following data are required to estimate forest sector GDP and its contribution to the national economy: logs in cubic meter;charcoal in tons; fuel wood in cubic meter; NWFPs (e.g., fruits, mushrooms, medicinal plants); forest services; wood industries, and,pulp and paper industries. However, SNA and ISIC standards have some limitations. For example, the SNA does not provide sufficient description of environmental assets and stock changes, as such; cultivated and natural forests are treated as different types of assets. This type of information will be required to provide adequate accounting of the forest sector GDP.

Apart from the limitations of the standards, data for GDP calculation are not sufficiently captured by the national accounting systems in the country. For example, data on NWFPs are not included at all in the Tanzanian GDP calculation; data on log production is not readily available as a result volume of timber output from manufacturing industry is applied as a proxy for estimation of production in forests. This assessment takes into consideration capturing this type of data not usually captured in the national accounting systems.

Apart from that, the national accounting system of Tanzania (currently practiced by NBS) uses expenditure approach to capture data on charcoal and fuel/firewood for determination of GDP, however, this type of information was captured through production approach because expenditure approach

tends to underestimate value of charcoal and fuel/firewood in GDP calculation. Also, HBS only covers information at household level.

In addition, sawn-timber is used as a proxy for logs production without conversion to roundwood equivalent which tends to underestimate volume of logs produced but overestimate value of the logs. This requires establishment of costs, quantities and price in order to use production approach.

4.6.2 Approach and variables used to compute GVA

According to the SNA (2008) the preferred method of valuation of output is at basic prices, although producers' prices may be used when valuation at basic prices is not feasible. The distinction between the two sets of prices is related to the treatment of taxes and subsidies on products. Basic prices are prices before taxes on products are added and subsidies on products are subtracted. Producers' prices include, in addition to basic prices, taxes less subsidies on products other than value added type taxes. In practice, GDP derives from the concept of value added. By definition, GVAis the difference between output and IC. This report has embraced this concept in its computation of the forestry subsector contribution to GDP. Unlike conventional approach used by NBS that uses only charcoal, firewood and logs (timber forest products), in this study both timber and no timber forest products were used as much as data were available. In addition, market prices were used as basic reference for valuation just like in the SNA. In the absence of market prices/transactions, valuation is made according to costs incurred (for example, non-market services produced by government) or by reference to market prices for analogous goods or services (for example, services of owner-occupied dwellings).

CHAPTER FIVE

KEY FINDINGS AND DISCUSSION

Forest products assessed and used in this study to estimate forest sector GDP are charcoal, firewood, logs, poles, honey and bee-wax, wild fruits, gums and resin, withies, seeds and seedlings. The following subsections provide results on quantification of the forests products.

5.1 Charcoal

Charcoal production and consumption were important activities in the forest sector and involve many actors along the value chain. The main actors considered include producers, transporters, wholesalers, retailers and the Government.

Charcoal producers

In addition to the field data, information from literature was used to estimate charcoal consumption at the national level. CHAPOSA (2001) estimated that about 96 kg of charcoal was consumed per household per month (Table 3). As CHAPOSA (2001) was an intensive country study, this reference was considered key in this study.

Table 3. Charcoal consumption in some regions in Tanzania

Region	Kg/hh / month
Mbeya	79.6
Mwanza	102
Arusha	123
Dodoma	88.7
Dar es Salaam	86.9
Average	**96.04**

Source: CHAPOSA (2001)

However, there are various efforts and initiatives that promoted use of alternative energy sources (Doggart *et al*., 2020). Consequently, a report by MNRT (2019) on household energy mix shows that charcoal consumption is about 50% of total energy use (other energy use include liquid petroleum gas, firewood, electricity and kerosine). Therefore, in this study household charcoal consumption of 48.25 kg/month (which is 50% of 96.04 kg/month) was confidently used. This is comparable to 45.5 kg/hh/month reported by MNRT (2019). Moreover, a bag of charcoal was assumed to weigh 50 kg. Therefore, it is likely that charcoal consumption is about 1,895,248 tonnes/year almost similar to 1,816,000 tonnes/year reported by Nyamoga (2019). A bag of charcoal was sold at a price of TZS 7,500. This is equivalent 284,287,234,050(Table 4).

Table 4. Charcoal gross value-added estimation at producer node

Location	House holds (NBS and MFP, 2019)	consumption kg / month /hh	kg / month	Bags / year	Price / bag (TZS)	Gross Value - Added (TZS)
Rural	844,118					
Urban	1,674,469		157,937,352			
Dares salaam	754,726					
Total	3,273,313					
Tonnes/year		48.25	1,895, 248.23	37,904,965	7,500	**284,287,234,050**

Other actors along the charcoal value chain

Currently,most of the charcoal is transported and traded by motorcycles (*bodaboda*). This mode can transport charcoal to wholesalers, retailers or straight to households. Therefore, this mode transports about 50% of charcoal, the rest is transported by bicycles (20%) and vehicles (30%). Bicycles are used mainly in regions in the western part of Tanzania. About 90% of charcoal transported reached wholesalers and retailers, the remaining 10% was transported and sold directly to consumers. The percentages were used to estimate the number of bags and income for each node. Table 5 shows charcoal gross value estimation at each node and the aggregate (TZS 2,056,771,556,434) along the chain is provided in Table 6.

Table 5. Charcoal gross value-added estimation at the main nodes along the value chain

Actors	Transport means	Proportion	Bags	Income (TZS)	Costs (TZS)	GVA (TZS)
Trans-porters/ traders	Motorcycles (*Bodaboda*)	50%	18,952,482	379,049,640,000	210,372,550,200	168,677,089,800
	Bicycles	20%	7,580,992.80	151,619,856,000	84,149,020,080	67,470,835,920
	Vehicles	30%	11,371,489.20	227,429,784,000	126,223,530,120	101,206,253,880
	Total		**37,904,964**	**758,099,280,000**	**420,745,100,400**	**337,354,179,600**
Whole-salers and retailers			3,790,496	132,667,375,890	79,600,424,454	1,425,226,667,784
Government royalty for charcoal from general land and central govern-ment (TFS, 2019)						9,903,475,000

Table 6. Aggregate gross value-added of charcoal along chain

S/no	Charcoal value chain node	GVA (TZS)
1	Producers	284,287,234,050
2	Transporters/traders	337,354,179,600
3	Wholesalers/retailers	1,425,226,667,784
4	Government royalty for charcoal from general land and central government (TFS, 2019)	9,903,475,000
	Total chain value added (TZS)	**2,056,771,556,434**

5.2 Firewood

The HBS of 2017/2018 (NBS and MFP, 2019) and field data were used to quantify the amount of firewood utilized. The HBS estimated that total number of households using firewood were6,914,337 and results by rural and urban categories are presented in Table 7.

Table 7. Households consuming firewood in Tanzania

Location	HHs consuming firewood
Rural	6,216,235
Urban	622,940
Dares salaam	75,162
Total	**6,914,337**

According to Preston (2012), 1,653 kg of firewood is consumed by a household per year. Since one headload is 24 kg (Preston, 2012), therefore the 1,653 kg is equivalent to 69 headloads of firewood per household per year. It is assumed that in urban areas, firewood consumed is 50% of quantities used in rural areas (MNRT, 2019). Therefore, firewood consumption in urban areas is about 34.5 headloads per household per year. On average, as observed by the TF in the field, one headload of firewood was sold at a

price of TZS 881 in rural areas and TZS 3,000 and TZS 6,000 in urban and Dar es Salaam respectively. Therefore, by using expenditure approach the estimated GVA is TZS 457,167,612,172 (Table 8).

Table 8. Firewood gross value - added

Location	HHs consuming firewood	Bundles consumption / hh/yr	Total bundles/year	Price firewood TZS / bundle	Gross Value Added (TZS)
Rural	6,216,235	69	428,143,186	881	377,279,775,173
Urban	622,940	34	21,452,496	3,000	64,357,488,750
Dares salaam	75,162	34	2,588,391	6,000	15,530,348,250
Total TZS	**6,914,337**	**138**	**452,184,073**		**457,167,612,173**

5.3 Logs from woodlots, plantations and natural forests

Logs were harvested from tree growers' plantations/woodlots, government forest plantations and natural forests of individuals and government. Data on logs harvested and traded from these sources were obtained and used to estimate GVAs of logs as provided in sections 5.3.1 to 5.3.3.

5.3.1 Logs from small-holder tree growers

According to Kijazi(2020), Southern highland regions with 80% of forest plantations and woodlots have 60,000 tree growers' households. This implies that the rest of the forest plantations in Tanzania which constitute 20% would have 15,000 households (Table 9).

Table 9. Households of tree growers in Tanzania

Region	Tree Growers (hh)
Southern highlands regions	60,000
Other regions	15,000
Total households	**75,000**

Source: Kijazi (2020)

Information in Table 10 were among variables used to estimate GVA (TZS 59,097,735,683) for logs produced from smallholders' plantations/ woodlots as presented in Table 10.

Table 10. Logs gross value - added by smallholder tree growers

Variables	TZS	n	TZS per hh	Gross value - added (TZS)
Sales	342,113,136	351	974,681	
Costs	65,535,733	351	187,711	
Gross value - added	276,577,403	351	787,970	
Tree growing households			75,000	**59,097,735,683**

5.3.2 Logs from Central Government plantations

Data on volume produced, price and costs were obtained from TFS and used to estimate GVA for logs produced by the Central Government. Costs were for supervision during harvesting and forest protection. Table 11 shows that GVA for logs produced by the Central Government was TZS 39,475,913,775.

Table 11. Gross value - added for logs from central Government plantations

Product	Quantity (m^3)	Price/ m^3	Output (TZS)	Costs (TZS)	Gross value added (TZS)
Logs	1,022,123	42,000	42,929,166,000	3,453,252,225	39,475,913,775

Source: TFS (2020)

5.3.3 Logs from natural forests

About 500,000 m^3 to 600,000 m^3 of wood was sourced from natural forests (TFS, 2020), similar data (457,000 m^3) were reported by PFP (2018). Annual cost for natural forest protection from TFS was TZS 6,532,325,535 (TFS, 2020). Average price of wood from natural forests is TZS 195,000 per m^3. Therefore, GVA for logs from the natural forests was TZS 90,967,674,465 (Table 12).

Table 12. Gross value - added for logs from natural forests

Product	Quantity (m^3)	Price/ m^3	Output (TZS)	Costs (TZS)	Gross value added (TZS)
Logs - natural forests	500,000	195,000	97,500,000,000	6,532,325,535	90,967,674,465

5.4 Poles

Poles are important forest products harvested from woodlots of smallholders and from natural forests. Some of the poles were used for construction and electric transmission. Poles from smallholders' woodlots were estimated to contribute 18% of value added along poles value chain (Temu*et al*., 2021). As such,value added by poles from Central Government plantations were included in logs, and value added by poles from forest companies were included in the establishments involved in poles treatments.

5.4.1 Poles from smallholders' forests

As reported in Table 10, there were about 75,000 tree growers' households in Tanzania. Households'average sales, costs and total households engaged in tree growing were used to estimate gross added values. Therefore, the estimated GVA for poles was TZS 20,164,209,402 (Table 13).

Table 13. Poles from plantations

Variables	TZS	n	TZS/House-hold	Gross Value - Added in Tanza-nia (TZS)
Sales	132,246,000	351	376,769	
Costs	37,877,500	351	107,913	
Gross value added	94,368,500	351	268,856	
Tree growing households		75,000		**20,164,209,402**

5.4.2 Poles from natural forests

Ten out of 351 households (2.8%) harvested and traded poles from natural forests. Assuming about 70% (8,257,742 households) of 11,796,774 total households were in rural areas, therefore it is likely that about 235,345 rural households were engaging in poles harvesting. Households' average sales, costs and total households engaged in pole harvesting were used to estimate gross added values. It is estimated that the GVA for poles from natural forest was TZS 781,323,994,551 (Table 14).

Table 14. Gross value - added for poles from natural forests

Variables	TZS	n	TZS per household	Gross value-added (TZS)
Sales	40,400,000	10	4,040,000	
Costs	7,201,000	10	720,100	
Gross value added	33,199,000	10	3,319,900	
Rural households harvesting poles (%)	2.85			
Rural households harvesting poles (#)	235,345			**781,323,994,551**

5.5 Honey and beeswax

About 6% of rural households (i.e., 495,465) are engaged in honey production (Makonda and Abdallah, 2020). In addition, TF survey data showed that production of honey per household was about 65 litres. Therefore, 32,401,074 litres of honey were produced in Tanzania. However, since 1 litre equals 1.44 kg of honey then the total honey produced was 46,657,547 kg, equal to 46,657.54 tonnes (Makonda and Abdallah, 2020).

Also, for every 15 kg of honey produced there is 1 kg of wax is harvested. Therefore, total wax collected was 3,110,503.14 kg (i.e., 3,110.50 tonnes). Price of bee wax was averaged to TZS 10,000 per kg (Table 15). Total gross value added for both honey (TZS 112,142,054,049) and bee-wax (TZS 31,105,031,400) were TZS 143,247,085,449 (Table 15).

Table 15. Gross value - added from bee products

Product	Variables	TZS	n	TZS per Household	Gross value-added (TZS)
Honey	Income	12,105,000	43	281,511.63	112,142,054,049
	Costs	2,372,500	43	55,174.42	
	Gross Value Added	9,732,500	43	226,337.21	
	Rural households engaged in beekeeping (%)	6			
	Rural households engaged in beekeeping (#)	495,464.51			
Bee-wax	Amount (kg)	Price (TZS)			
	3,110,503.14	10,000			31,105,031,400
Total (TZS)					**143,247,085,449**

Honey traders are excluded in this estimation due to unavailability of data.

5.6 Wild fruits

Wild fruits collection was not among the main economic activities, however about 2.85% households were engaged in collection and trade of wild fruits especially in districts located in woodland areas. However, some wild fruits were collected from forest plantations such as wild passion. Other fruits include *Vitexmombassae (Msasati), Tamarindusindica, Parinaricuratellifolia (Msawula), berries, Tamarindus (ukwaju), baobab*fruits (ubuyu) etc. Some of these fruits were collected by women and children while doing other activities in forests such as firewood collection. Field data collected on wild fruits were summarised into income, costs and GVA calculated totalled to TZS 8,969,846,100 (Table 16).

Table 16. Gross value - added for wild fruits

Variable	TZS	n	TZS per house-hold	Gross value - added
Income	1,004,135	10	100,414	**8,969,846,100**
Costs	623,000	10	62,300	
Gross value added	381,135	10	38,114	
Rural households engaged in wild fruits (%)	2.85			
Rural households har-vested and traded wild fruits	235,346			

5.7 Gum

The key actors of gums value chain are collectors, traders, merchants and exporters. There are also service providers of TRA, TFS and LGAs.According to Makondaand Abdallah (2020) the price of Acacia gum obtained at a level

of collectors ranged from TZS 300 to 350 kg^{-1} (averaging to TZS 325 per kg). Cess usually ranged 1 to 5% and royalty was at TZS 750 per kg (royalty was reduced to TZS 300 per kg in 2020). Therefore, it was estimated that gum earned GVA of TZS 1,350,968,162 (Table 17).

Table 17. Gross value - added for gums

Variable	Amount (kg)	Price (TZS/kg)	GVA (TZS)
Collectors	226,000	325	73,450,000
Cess			43,486,000
Royalty			169,500,750
Exports			1,064,531,412
Total			**1,350,968,162**

Sources: TFS (2020) and Makonda and Abdallah (2020)

5.8 Withies

Withies harvesting was not among the main economic activities, however about 0.5% households were engaged in harvesting and trade of withies in rural areas. Since 8,257,742 households (NBS and MFP, 2019) were located in rural areas implies that only 41,289 were engaged in withies harvesting and trade. Price of a bundle of withies was found to be TZS 5,000. Field data collected on withies were summarised into income, costs and GVA calculated totalled to TZS 7,163,591,012 (Table 18).

Table 18. Gross value added for withies

Variable	TZS	n	TZS per household	Gross value - added (TZS)
Income	1,795,000	8	224,375	
Costs	407,000	8	50,875	
Gross value added	1,388,000	8	173,500	
Rural households engaged in withies (%)	0.5			
Rural households engaged in withies, (#)	41,289			**7,163,591,012**

5.9 Seeds and seedlings

Seeds and seedlings are produced and traded by Government (TFS), community groups and individuals. The groups and individuals are scattered countrywide; therefore, it was not possible to quantify their production and trade. Sales and costs of seeds and seedlings production from government nurseries sources are shown in Table 19.

Table 19. Gross value - added for seeds and seedlings

Income (TZS)	Costs (TZS)	GVA (TZS)
3,712,970,014	1,389,124,754	2,323,845,260

Source: TFS (2020)

5.10 Establishments

In this report, establishments are forest products processing industries and traders of forest products. Income and costs of these establishments were estimated using field data and literature review, and were used to calculate GVA as presented in Table 5.18. Total GVA for establishments was TZS 940,190,852,050.25(Table 20).

Table 20. Gross value - added for establishments

S/ no	Type of establishments	GVA TZS	N (Number of establishments)	%	GVA per establishment	All Establishments in Tanzania	GVA by establishments in Tanzania in TZS
1	Furniture marts, carpentry and joinery	961,077,200.00	167	54.40	5,754,953.29	9,575	55,103,677,784.43
2	Timber yards	1,493,493,785.71	47	15.31	31,776,463.53	4,164	132,317,194,121.58
3	Transportation of timber	2,000,000.00		-		7,733	15,466,000,000.00
4	Sawmills	13,756,877,075.00	50	16.29	275,137,541.50	1,266	348,324,127,539.00
5	Poles treatment and trading	6,004,955,395.85	1	0.33	6,004,955,395.85	13	78,064,420,146.11
6	Logs	4,165,867,351.00	13	4.23	320,451,334.69	473	151,573,481,309.46
7	Pulp and paper	36,009,838,310.00	1	0.33	36,009,838,310.00	1	36,009,838,310.00
8	Bee-products industries	9,370,822,460.00	13	4.23	720,832,496.92	13	9,370,822,460.00
9	Handcraft	12,707,000.00	8	2.61	1,588,375.00	230	365,326,250.00
10	Charcoal briquets	155,000,000.00	1	0.33	155,000,000.00	2	310,000,000.00
11	Veneer, Plywood, Marine and Fibre boards	6,430,721,399.00	4	1.30	1,607,680,349.75	16	25,722,885,596.00
12	Black wattle	28,570,370,123.89	1	0.33	28,570,370,123.89	3	85,711,110,371.67
13	Gum and resin	1,851,968,162.00	1	0.33	1,851,968,162.00	1	1,851,968,162.00
	Total TZS	**108,785,698,262.46**	**307**	**100.00**	**75,555,353,506.43**	**23,490**	**940,190,852,050.25**

Aggregate GVA is presented in Table 21. In general, the total GVA in the forest sector was TZS 4,651,430,184,834 (Table 21).

Table 21. Aggregate gross value - added in the forest sector

Products/items	**GVA (TZS)**	**%**
Establishments	940,190,852,050	20.21
Charcoal	2,056,771,556,434	44.22
Royality for charcoal from state	9,903,475,000	0.21
Firewood	457,167,612,173	9.83
Royality for firewood from state	238,780,960	0.01
Logs-Smallholder TGs	59,097,735,684	1.27
Royality logs/poles from Government-plantations	39,475,913,775	0.85
Logs-Natural Forests	90,967,674,465	1.96
Tree growers for poles	20,164,209,402	0.43
Poles-Natural Forests	781,323,994,552	16.80
Royality for poles from natural state forests	263,333,725	0.01
Honey	112,142,054,049	2.41
Wax	31,105,031,364	0.67
Wildfruits	8,969,846,100	0.19

Products/items	GVA (TZS)	%
Resins royality from Government	132,750,000	0.00
Withies	7,163,591,012	0.15
Seeds & seedlings (Government)	2,323,845,260	0.05
Seeds & seedlings (others)	232,384,526	0.00
Forest services collections	33,795,544,303	0.73
Total (TZS)	**4,651,430,184,834**	**100.00**

The GVA estimated by NBS for 2019 was TZS 3,738,359,751,556 which is 2.7% share of GDP. According to this study, the GVA of the forest sector was estimated to be TZS 4,651,430,184,834in 2019 whichwas3.3% share of GDP. The estimated GVA wasan increase of TZS 913,070,433,277.96 (24.42%).

Charcoal contributed almost 44.22% of the forest sector GVA. This was followed by contribution from establishments (20.21%). Next to these two products/items was poles from natural forests contributing 16% to forest sector GVA, firewood which contributed about approximately 9.83%, then, honey and bee wax (3.18%)(Table 21).

CHAPTER SIX

CONCLUSIONS, RECOMMENDATIONS AND WAY FORWARD

6.1 Conclusions

The study concludes that the GVA of the forest sector is estimated to be TZS 4,651,430,184,834 in 2019 which is 3.3% share of GDP in the year 2019 (TZS 139,893,804,125,675). The study approach estimated GVA indicating an increase of TZS 913,070,433,277.96 which is 24.42% higher compared to the GVA estimated by NBS for 2019 (TZS 3,738,359,751,556) which made only 2.7% share of GDP.

The estimate made by this study is still low (3.3%) as found by previous studies reported earlier due to under declaration of income earnings and over declaration of costs of production by establishments in the sector, poor record keeping, but also most products are rural based and commands low prices.This study as pointed out earlier on has not taken into account ecosystem and environmental services such as climate amelioration, nutrients cycling, water cycling, Carbon sequestration etc which would have increased contribution of forest sector to GDP if their values were included in the estimation.

Compared to existing national statistics in the sector, this study has improved data estimate for some forest products such as charcoal, logs, poles, wild fruits, honey, bee-wax, withies, gums and resins.

According to respondents involved in tree growing and establishments, forest economic related activities have gone down in recent years such as

sales of sawn timber in the domestic and export markets. This is likely to have impact in the sector contribution to GDP in 2019.

6.2 Recommendations and way forward

GDP study findings and conclusion have raised a number of issues which are important for the MNRT to address them in order to make a significant increase to the sector's contribution.

S/n	Issue to address	Recommendation
1	The GDP reported here has not taken into account ecosystem and environmental services such as pollination, climate amelioration, nutrients cycling, water cycling, Carbon sequestration etc which would have increased contribution of forest sector to GDP.	Include ecosystem and environmental services in the estimation of the sector contribution to GDP (green accounting).
2.	The reported GDP also do not significantly capture beekeeping subsector resources adequately as most of the well-known beekeeping regions were not visited to collect relevant data.	The estimation of the Green GDP should also incorporate all products and services associated with beekeeping subsector.
3.	More efforts are needed to increase establishments (high quality technologies) especially medium/large ones because of their significant impact to GDP. The presence of too many establishments using poor technologies contributes too little value added.	Targeted incentives to promote large industries, and gradually to discourage small establishments using poor technologies.

S/n	Issue to address	Recommendation
4.	Charcoal contributed almost 45.64% of the forest sector GVA and 50% of this coming from wholesalers and retailers who are not formally organized/governed and recognized. The government collects only 0.5% of this (45.64%) as fees and taxes.	Systemic initiatives to improve governance framework and removal of regulatory overlap will significantly improve government revenue collection from charcoal. Charcoal production can be seen as an opportunity for investment in fuelwood plantations. Various efforts and initiatives that promoted use of alternative energy sources should continue.
5.	The gross profit margin of many establishments is fairly small which is a disincentive to investments and willingness to pay taxes.	Examine taxes, fees and cost structure of establishments in order to increase the GVA.
6	Availability of data and information from many investors, and more so for big private companies is a big challenge.	Streamline and formalize data availability from all stakeholders with emphasis in big private companies in the forest sector.
7	The improved share of the GVA from this study be used by NBS as a base for future estimation of sector contribution to the GDP especially for products which are currently not captured or not fully captured by NBS.	Submission of the report to NBS for use especially for products such as charcoal, logs, poles, wild fruits, honey, bee-wax, withies, gums and resins which NBS did not capture well in the past.

S/n	Issue to address	Recommendation
8.	Despite the fact that charcoal and firewood contribute more 50% of the forest subsector contribution to GDP, the subsector still lacks Strategy and Action Plan in order advance further the subsectors contribution.	There is an urgent need to have both the Action Plan and National Charcoal Strategy with the view to enhance sectors contribution to GDP.
9.	During this preliminary study we noticed poor record keeping (both revenue and expenditures) by small scale saw millers/industries which significantly impacted negatively sectors contribution to GDP. In addition, they lacked willingness to participate in the study in terms of provision of accurate data.	There is a need to have a capacity building programme within the forest sector with focus on small and medium industries in order to improve sectors data keeping and awareness among stakeholders.

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APPENDICES

Appendix 1: List of forest sector products for the study

Product Code	Product	Description	Measurement unit
Quantification of removals and production			
1.	Roundwood (wood in the rough)		
1.1	Wood fuel (including wood for charcoal)	Firewood	
1.1.C	Coniferous	Softwood	
1.1.NC	Non-coniferous	Hardwood	
1.2	Industrial roundwood	Logs (saw-logs, pulp-logs, Poles)	
1.2.C	Coniferous	Softwood	
1.2.NC	Non-coniferous	Hardwood	
1.2.NC.T	of which: Tropical	Hardwood Natural forests	
2	Wood charcoal	Charcoal	
3	Wood chips, particles and residues	Wood chips, wood residuals, briquets	
3.1	Wood chips and particles	Wood chips, wood residuals	
3.2	Wood residues (including wood for agglomerates)		
4	Recovered post-consumer wood		
5	Wood pellets and other agglomerates		
5.1	Wood pellets		
5.2	Other agglomerates		
6	Sawnwood (including sleepers)		
6.C	Coniferous	Softwood	
6.NC	Non-coniferous	Hardwood	

6.NC.	T of which: Tropical	Natural forest	
7	Veneer sheets		
7.C	Coniferous	Softwood	
7.NC	Non-coniferous	Hardwood	
7.NC.T	Of which: Tropical	Natural forest	
8	Wood-based panels		
8.1	Plywood		
8.1.C	Coniferous	Softwood	
8.1.NC	Non-coniferous	Hardwood	
8.1.NC.T	Of which: Tropical	Natural forest	
8.2	Particle board, oriented strandboard (osb) and similar board		
8.2.1	Of which: Oriented Strandboard (OSB)		
8.3	Fibreboard		
8.3.1	Hardboard		
8.3.2	Medium/high density fibreboard (mdf/ hdf)		
8.3.3	Otherfiberboard	Blockboard	
9	Wood pulp		
9.1	Mechanical and semi-chemical wood pulp		
9.2	Chemical wood pulp		
9.2.1	Sulphate pulp		
9.2.1.1	Of which: Bleached		
9.2.2	Sulphite pulp		
9.3	Dissolving grades		
10	Other pulp		
10.1	Pulp from fibers other than wood		
10.2	Recovered fiber pulp		
11	Recovered paper		
12	Paper and paperboard		
12.1	Graphic papers		

12.1.1	Newsprint		
12.1.2	Uncoated mechanical		
12.1.3	Uncoated wood free		
12.1.4	Coated papers		
12.2	Household and sanitary papers		
12.3	Packaging materials		
12.3.1	Case materials		
12.3.2	Carton board		
12.3.3	Wrapping papers		
12.3.4	Other papers mainly for packaging		
12.4	Other paper and paperboard n.e.s. (not elsewhere specified)		
Quantification of the trade of secondary processed wood and paper products			
13	Secondary wood products		
13.1	Further processed sawn wood		
13.1.C	Coniferous		
13.1.NC	Non-coniferous		
13.1.NC.T	Of which: Tropical		
13.2	Wooden wrapping and packaging material		
13.3	Wood products for domestic/decorative use		
13.4	Builder's joinery and carpentry of wood		
13.5	Wooden furniture		
13.6	Prefabricated buildings of wood		
13.7	Other manufactured wood products		
14			
14.1	Composite paper and paperboard		
14.2	Special coated paper and pulp products		
14.3	Household and sanitary paper, ready for use		
14.4	Packaging cartons, boxes etc.		

14.5	Other articles of paper and paperboard, ready for use		
14.5.1	Of which: Printing and Writing Paper, Ready For Use		
14.5.2	Of which: Articles, Molded or Pressed from Pulp		
14.5.3	Of which: Filter Paper and Paperboard, Ready for use		
	Other products	Clarinet sets	
	Forest services		

Appendix 2: Questionnaires for households' survey

Introductory note: The Ministry of Natural Resources and Tourism has embarked on an excise to improve estimation of forest sector contribution to Gross Domestic Product (GDP) in order to build a case for more resources allocation to the sector. The main objective of this assignment therefore is to collect information that will be used for that purpose. Your willingness to participate in this important activity for development of our nation is highly appreciated. Information given by you is intended for the purposes of this research and will strictly be kept confidential during the course of the study.

Questionnaire No: ……

Name of interviewe……...…Date of interview …….

Village……..…… District……..…… Region…….

Zone……

A: Socio-economic characteristics of the respondent

1. Name of the respondent……
2. Sex of respondent: Code: *1. Male 2. Female*……..…….
3. Age of the respondent…….....…….. years
4. Formal educational level of the respondent: Code: *1 = No Formal education 2 = Primary education 3 = Secondary education 4 = College/ University education……..…….*
5. Marital status: *Code: 1. Single 2. Married 3. Widow/ Widower 4. Divorced*…….....…….

6. Total number of people in the household…….How many household members are 18 years and above ……..…?

7. Describe the house in which this household lives

a. What is the type of material of (most of) the walls? **CODES:** *1=cement bricks; 2= burnt bricks; 3=mud bricks; 4=wooden (boards); 5=iron (or other metal) sheets; 6=mud and poles/withies; 7=reeds/straw/grass/fiber; 8=other, specify*	
b. What is the type of material of (most of) the roof? **CODES:***; 1=tiles 2=iron or other metal sheets; 3=thatch; 4=other, specify*	
c. What is the type of floor materials? **CODES**: *1=tiles; 2= cement; 3=earth, , 4=others (specify)*	

8. What Assets do you own (Indicate number of assets)

Assets	**Quantity**	**Assets**	**Quantity**
Sawmill		Posho mill	
Tractor		Spray pump	
Ox-plough		Irrigation equipment	
Hand-hoes		Cart	
Radio		Gas cooker	
Phone		Generator	
Television set		Sewing/knitting machine	
Machetes		Cattle	
Car		Goat	
truck		Sheep	
Motor bike		Pig	
Bicycle		Chicken	
Solar panel		Other assets (specify).....	
Refrigerator			

9. Do you own land? *Code: 1=Yes, 2=No* ……If yes what size of land do you own ……. (acres)

10. What types and size of land use do you have?..... *Code: 1=Farmland for annual crops……. (acres) 2=Land for tree growing/ woodlot …….. (acres) 3=Land for both annual crops and tree growing …….. (acres) 4=Grazing land……. (acres) 5=Others (acres) (specify)……*

11. What are the sources of your land and size of each? *Code: 1=Rent……. (acres) 2=Purchased……..(acres) 3=Inherited from family member ……. (acres) 4=Others (Specify)……*

12. If your land is from rent, how much do you pay for rent?.....(TZS/ acre/year)

13. What are your income generating activities and how much did you earn fromincome generating activities in year 2019?

S/no	**Income generating activity**	**Estimate of annual income (TZS)***
1	Crop farming	
2	Woodlot management	
3	Livestock keeping	
4	Petty business	
5	Formal employment	
6	Others……(Specify)	

Income range: **Codes: 1= < TZS 10,000/-, 2= TZS 10,000/- to TZS 100,000/-, 3= >100,000 to 500,000/- 4=>500,000/-*

B: Forest production and utilization

14. a) Did your household own a forest plantation/woodlot in year 2019? *Code: 1=Yes, 2 = No*…., if Yes, what size of forest plantation/woodlot did your household own …… (acres)? How old is your plantation/woodlot? ……. (years)

b) Did your householdparticipate in forest plantation/woodlot business as part of your household livelihood activities in year 2019? *Code: 1=Yes, 2 = No*…….

If Yes in 14b, in what way did your household participate? Code: *1=Seedlings raising for business, 2=Land preparation for tree planting,3=Tree planting, 4=Weeding, 5=Pruning, 6=Thinning, 7= Clear felling, 8=Others (specify)…….*	Total number of household members engaged in the production		Did you involve any hired labour? *Code: 1=Yes, 2= No ….*	If hired labour were involved, how many people were hired?		If hired labour, how much did you pay in TZS for hired labour in year 2019?	What was the output of the activity in year 2019 *(e.g. One acres of tree was planted, or 5000 seedlings were raised)*
	Male	Female		Male	Female		

c) What products and value did your household collect/harvest from your forest plantation/woodlot business in year 2019?

S/ no	Forest product *Codes: 1= Standing trees,* *2=Poles, 3=Fire-wood, 4=Honey, 5=Mushroom, 6=Others (specify)……*	Quantity collected (*Specify units*)	Price per unit (*Specify units*)	Duration taken in the production of this specific produce collected *e.g. Number of years*	Costs (in TZS) incurred in production	Specify type of costs *e.g. Land rent, taxes, costs of seedling raising, tree planting, weeding, pruning, thinning etc.*

15. What products and how much did you collect/harvest from natural forests in year 2019?

Forest product *Codes: 1=Standing trees, 2=Poles, 3=Thatches, 4=Withies, 5=Firewood, 4=Charcoal, 5=Vegetables, 6=Mushroom, 7=Wild fruits, 8=Medicinal plants, 9=Honey and other bee products 10=Others (Specify)……*	Total number of household members involved in the collection of the product		Quantity collected at once (*Specify units*)	Price per unit (*Specify units*)	Number of times the product is collected in 2019 *e.g. Daily, once per week, twice per week, once per month*	What costs (in TZS) do you incur every time you collect the product
	Male	Female				

Appendix 3: Checklist for establishments in forest production in year 2019

Introductory note: The Ministry of Natural Resources and Tourism has embarked on an excise to improve estimation of forest sector contribution to Gross Domestic Product (GDP) in order to build a case for more resources allocation to the sector. The main objective of this assignment therefore is to collect information that will be used for that purpose. Your willingness to participate in this important activity for development of our nation is highly appreciated. Information given by you is intended for the purposes of this research and will strictly be kept confidential during the course of the study.

Checklist Number …….....

1. Basic information

Date: …… .... Name of interviewer: ……

Name of Forest Establishment/Company: …….

Location of the Establishment:

District.....Region.....Zone.....

Name of respondent:..... Sex: *Codes: 1=Male, 2=Female* .....……

Position of respondent in the establishment/company: …… ……

S/ no	Part I General	Response			
1.	Name of business				
2.	Nature and type of business undertaken				
3.	Paid-up capital (write in-full amount -TZS)				
4.	Type of capital				
	(a) Private				
	(b) Government				
	(c) Share between Government & Private				
5.	Number of employees	Regular		Casual	
		Male	Female	Male	Female
		……	……..	……..	……..
	Part II Receipts in TZS				
6.	Income from sales of goods and services				
7.	Interest Received				
8.	Rent received if any				
9.	Subsidies received if any				
10.	Other income				
11.	**Total receipts**				
	Part III Expenditure in TZS				
12.	Wages and Salaries (including allowances, overtime, bonus etc.)				
13.	Interest paid on borrowed Capital				
14.	Rent paid if any				

15.	Depreciation provision on capital equipment	
16.	All other miscellaneous current expenditure (materials, transport, etc.)	
17.	**Total Expenditure**	
18.	Increase (+) or decrease (-) in stocks of	
	(a) Finished and semi-finished goods	
	(b) Raw materials	
19.	Corporate tax (including development levy and royalties) and dividends payable to government	
20.	Dividends distributed to other shareholders	
	Part V Volume	
21.	Total Quantity of Goods produced (indicate unit used)	

Appendix 4: Checklist for LGAs and TFS

Introductory note: The Ministry of Natural Resources and Tourism has embarked on an excise to improve estimation of forest sector contribution to Gross Domestic Product (GDP) in order to build a case for more resources allocation to the sector. The main objective of this assignment therefore is to collect information that will be used for that purpose.Your willingness to participate in this important activity for development of our nation is highly appreciated. Information given by you is intended for the purposes of this research and will strictly be kept confidential during the course of the study.

Checklist Number …….....

1. Basic information

Date: …….. Name of interviewer: …….

LGA/TFS: ……..

District.....Region.....Zone.....

Name of respondent: ……..... Sex: *Codes: 1=Male, 2=Female* ……

Position of respondent in LGA/TFS: ……
……

2. Forest resources

Type of forest *Codes: 1=Natural* *2=Plantation*	**Ownership** *Codes: 1=Village* *2=LGA,* *3*=TFS	**Size (Ha)**	**Productive forests (Ha)**	**Protected forests (Ha)**

3. Private tree growers

Number of smallholder tree growers	Area (Ha)

Name of Large-scale tree growers	Area (Ha)

4.Forest utilization

Type of dealers in forest resources	**Number dealers**

Appendix 5: Checklist for NGOs

Introductory note: The Ministry of Natural Resources and Tourism has embarked on an excise to improve estimation of forest sector contribution to Gross Domestic Product (GDP) in order to build a case for more resources allocation to the sector. The main objective of this assignment therefore is to collect information that will be used for that purpose. Your willingness to participate in this important activity for development of our nation is highly appreciated. Information given by you is intended for the purposes of this research and will strictly be kept confidential during the course of the study.

Checklist Number ……...

1. Basic information

Date: …… .... Name of interviewer: ……

Name of the NGO: …….

Location of the NGO:

District.....Region.....Zone.....

Name of respondent: ..... Sex: *Codes: 1=Male, 2=Female* ……

Position of respondent in the NGO: ……

Main business of the NGO: .....

2. Staff size:

Number of full-time employees (FTE)?

Number of part-time and seasonal employees?

How many male and female employees?

3. Support services provided by the NGO

S/no	Type of support services provided	Expenditure (TZS)

4. Benefits received for the support services provided

Permanent Secretary
Ministry of Natural Resources and Tourism
Government City Mtumba,
Waziri Mkuu Street,
P. O. Box 1351, DODOMA - TANZANIA
Tel. No. : +255 26 2321514, Fax No. : + 255 26 2321568
Email: ps@maliasili.go.tz/dfob@maliasili.go.tz