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Investigating the contribution of forests to the livelihood of rural communities. A Focus on Households in Sheko Woreda, Southwest Ethiopia.

By

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Abstract

Households from rural areas of Southwest Ethiopia are often dependent on the services and products provided by the forest and its biodiversity. Thus, a huge number of forest-dependent communities have been exploiting a range of socio-economic, environmental, and cultural benefits from the forest ecosystem. However,the sustainability of these benefits is threatened by over-utilization. The level of exploitation is dependent on the livelihood capitals, the institutional arrangements, and the external environment in which people are living in.

In response to empirical gaps in our knowledge, this exploratory study aimed to understand the contribution of forests and Participatory Forest Management (PFM) institutions to the total income of the forest-dependent communities, and the challenges of forest-based income diversification under the existing means of sustainable livelihoods. Different literature is reviewed to show how rural communities are managing their livelihood and forests are contributing to the communities' livelihood strategy. Field data were collected from systematically selected 60 households through a face-to-face, semi-structured questionnaire. The collected data were analyzed using SPSS version 20 software for descriptive and cross-tabulation analysis. Excel Microsoft was used jointly for graphic presentation of results.

The findings showed on-farm activities offer the main livelihood diversification means (80%), and forest-related incomes are contributing 51.8% of the total household income, but significantly dominated by single forest product (forest coffee). The forest-based income is not well diversified enough due to a lack of human capital, market link, and market value promotion for different forest products. The role of PFM in sustainable forest biodiversity conservation was found significant, but needs institutionalising as an approach. Thus, local government should work intensively to increase the value of the forest to maintain sustainable forest conservation and the wellbeing of the forest-dependent communities.

Key words; Sustainable Livelihood ; Humancapital; Biodiversity; Sustainability; Participatory Forest Management.

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List of Abbreviations

BD Biodiversity

CARE Comprehensive Aid Resources Emergency

CSA Central Statistics Agency

DFID Department for International Development of the United Kingdom

FARM Africa Food and Agriculture Research Management for Africa

FMA Forest Management Association

GIZ Deutsche Gesellschaft für Internationale Zusammenarbeit

HH Household

JICA Japan International Cooperation Agency

LH Livelihood

MDG Millennium Development Goal

NTFP Non Timber Forest Product

PFM Participatory Forest Management

SNNPR South Nation Nationality People Region

SL Sustainable Livelihood

SLF Sustainable Livelihood Framework

SOS Social service Society

UNDP United Nation Development Program

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CHAPTER. 1. INTRODUCTION AND BACKGROUND

1.1. Introduction

This chapter reviews how rural communities are modifying forest resources to support their subsistence in general. The role of forest in regulating the natural ecosystem services, the value of Sheko Woreda forest to local, national and international communities, and issues affecting the sustainability of forest community interaction are elaborated. Moreover, the research aim and objective, and the contribution of the study to sustainable forest management, and the existing literature are outlined.

1.2. Background and Rationale

Rural populations across the developing world (Africa, Asia, South, and Latin America), have been modifying forest ecosystems using traditional knowledge, practice, and law to earn livelihoods (Endamana et al., 2016; Chao, 2012; Miah et al.,2012) because forests offer food, fuel, income, and employment for millions of people. Forests, especially tropical forests are important for biological diversity, but are declining in developing countries due to a lack of sustainable utilization (Brockerhoff et al., 2017) and population pressure (Abate, 2020; Teshome, 2014). Moreover, the forest ecosystem has delivered a broad range of economic, social, environmental, and cultural benefits in poverty alleviation and the wellbeing of humankind (Abate, 2020; Masiero et al., 2019; Melaku et al., 2014; Leßmeister et al., 2015; Langat et al., 2016; Turker et al., 2010).

Even though people have some understanding on the value of the forest, it is deteriorating over time, due to their being seriously undervalued, a failure from environmental services in capturing the attention of users compared to the private service (Abate, 2020; Masiero et al., 2019; Endamana et al., 2016). Illegal forest encroachments and extractions are nearly out of control due to population growth and continuous restructuring of the forestry institution of developing countries, as well as lacking in capital (human and financial) for law enforcement (Duguma et al., 2019). Moreover, the impact of different sectors' policies on the forest is not well understood by developing countries and has resulted in a rapid rate of deforestation (Sutcliffe et al., 2012).

According to related literature(Turker et al., 2010; Reichhuber and Requate, 2012), forest value is wide and broadly can be divided as direct (in-kind), indirect (environmental), and optional future value. Similarly, Zhang and Pearse (2011) and Masiero et al. (2019) divide the value of the forest into extractive and non-extractive values, broadly with sub-divisions. These authors also conclude that extractive values (timber, fuel-wood, non-wood products, and related) are easier to measure their economic value compared to non-extractive values (value of the forest for soil conservation, flood preservation, micro-climate regulation, water purification, and related environmental value) which are more complex and indirect (Masiero et al. , 2019). Moreover, forests maintain an optional value which involves reflecting on the ultimate possible (long-term) values of maintaining the forest.

The understanding of people's economic value of the forest varies among developed and developing countries. For example, people in developed countries have relatively greater concern about the environmental value of the forest compared to people in developing countries (Zhang and Pearse, 2011). This is explained by the existence of better land tenure system, privatization policies, and government incentives to the private sector, human capital, and technology but there is limited awareness on the diversified value of the forest. People and governments of the world have been struggling to maintain forests for the emerging generation (Zhang and Pearse, 2011). However, forest degradation remains a critical challenge and threat to climate change mitigation all over the world (Eshetu, 2014). These problems and research gaps raise the research question that this research aims to answer; what contribution does the forest make to the livelihood strategies and livelihood outcomes of forest-dependent households?

1.3. Context of the study area

The contextual area chosen for this research is part of the Southwest Ethiopia. Ethiopia is a country located at the Horn of Africa bordered by Kenya, South Sudan, Sudan, Djibouti, Eritrea, and Somalia. It is the most inhabited country in Africa next to Nigeria with a 2.61% annual rate of population growth (Ethiopian Population, 2019). Over 83.9% of Ethiopian population are living in a rural area with traditional

extensive agricultural economic activities (CSA, 2013); though, Ethiopia's forest diversity and natural heritage are threatened by deforestation and forest degradation.

Historically, the country's forests have been very important for the livelihoods of its people (Abate, 2020). Forests are also equally important in Ethiopian religious beliefs (Tilahun et al., 2015; Klepeis et al., 2016; Mekonen et al., 2019). Due to a high dependency on the forest, the forest cover of the country was reduced from 30% (end of 19th century) to less than 4% (Lemenih et.al., 2015; Eshetu, 2014; Wood et al., 2019). Another study reported that the forest cover has reduced to less than 3% (Solomon et al., 2018). More recently, the Global forest resource assessment estimates the forest coverage of Ethiopia has increased to 15.7% (FAO, 2020). This report also justifies the exponential increment of forest coverage has come from the green economy development policy of the country (reforestation of degraded areas and natural forest conservation plan), availability of additional data from satellite images, and an amendment made on the definition of forest to include the lowland shrubs as a forest area. This confirms that estimations of forest coverage area is often debatable due to variations in the data source and analysis methodology (Solomon et al., 2018).

Population growth, the land tenure system, agricultural expansion, and weak law enforcement have contributed to the degradation (Teshome, 2014; FAO, 2020; Kedir et al., 2017). As the population grows, there is likely to be further deforestation and forest degradation to obtain land for cultivation, settlement, livestock grazing, wood product consumption, and other income-generating activities to secure their livelihood. The government-owned land tenure system of the country has reduced communities' sense of ownership over the forest and aggravated motivation to convert into other land-use systems (Wood et al., 2019; Eshetu, 2014). Lack of cooperation and finance resources remain challenging for the government to implement law enforcement properly. The lowland forested areas were also considered as a potential area for large and small-scale investment and settlement (Ango, 2018; Eshetu, 2014; Kedir et al., 2017). This has brought a significant challenge for the Southwest forest of Ethiopia.

The Southwest Ethiopia forest is the remnant high forest of the country with a unique character in terms of biodiversity and endemism (Wood et al., 2019; Abate, 2020; Woyesa and Kumar, 2020; Awas, 2013; Reichhuber and Requate, 2012;

Brockerhoff et al., 2017). It is also a habitat for wild coffee Arabica where most of the forest areas with coffee have been modified (Wood et al., 2019; Woyesa and Kumar, 2020). This forest has been declining in terms of its potential and quality due to the conversion of forest into other land-use systems, mainly forest coffee, but still, the livelihood of local communities is not benefiting from the forest coffee due to a lack of an appropriate market link, price fluctuations and climatic factors (Woyesa and Kumar, 2020). Forest conversions have also been aggravated because of a lack of understanding on the interaction between the direct and indirect value of the forest (Ango, 2018; Awoke, 2014; Sutclliffe et al., 2012; Reichhuber and Requate, 2012).

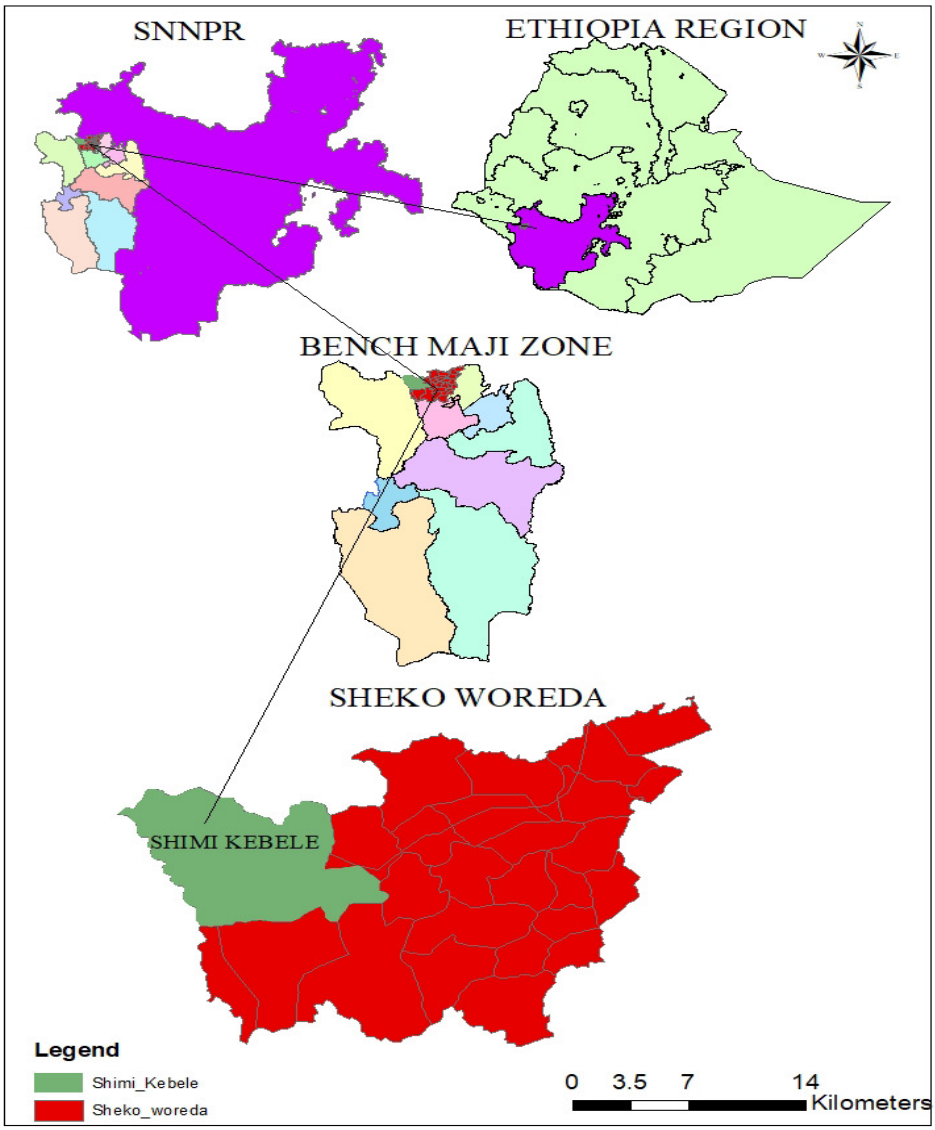
Harmonizing the sustainability of this interaction in a win-win condition represents the interest of both national and international communities. Due to this, a Participatory Forest Management (PFM) approach has been implemented in key forest conservation areas of the country to ensure the sustainability of forest communities' interaction. PFM helps to mitigate the problem of sustainable conservation against the weakness of a top-down, expert-led approach of government, with a weak institutional capacity and a lack of coordination among various actors (Ameha et al., 2014; Wood et al., 2019).

One area of particular interest is the Sheko Woreda (district), found in the Bench-Sheko zone of South Nation National People Regional State (SNNPRS) of Ethiopia. It is located about 600km southwest of the capital city Addis Ababa. The forest of the woreda is one of the remnant forests of the country and rich in flora and fauna diversity and is one of the wild coffee conservation sites of the country where coffee is grown wild in the forest (Wood et al., 2019). Furthermore, the forest of this woreda is a transition forest from lowland Gambela forest to high land forest of Keffa and Illebabor (Awas, 2013).

The Sheko Woreda/District forest, which is part of the Ethiopian remnant forest has been modified and degraded for some decades, due to agricultural expansion, settlement, forest product extraction (Awas, 2013; Sutcliffe et al., 2012).As it is open access and rich in wild coffee, the attractive economic return from forest coffee speeds up the modification of this forest (Woyesa and Kumar, 2020; Ango, 2018). Thus, increasing the economic value of natural resources especially the

forest ecosystem is vital to encouraging communities' involvement in sustainable forest management (Sutcliffe et al., 2012).

Figure 1 Map of the Study Area



Source; Extracted from Ethiopia CSA map (2013)

The woreda has diverse ethnic groups. Sheko, Bench, and Majeng represent the native inhabitants. These indigenous communities have a strong link with the forest and highly value the forest. They have been collecting different forest and non-forest products for subsistence and income generation using their indigenous knowledge without affecting the forest. At present, forest management traditions has been seriously affected by people coming from the northern and central parts of the country, who value conversion of forest to other land use systems more than conservation (Wood et,al., 2019). The primary reason is land scarcity in the northern and central parts of the country (Teshome, 2014), whereas the forest areas in Sheko Woreda are open access and have a significant potential for wild coffee.

1.4. Research contribution

Deforestation and environmental degradation are the main factors that influence food security and sustainable growth of the forest-dependent communities of Ethiopia (Ellen, 2011). Due to this, joint forest management has been introduced to enhance the livelihood of forest-dependent communities and sustainable forest management (Wood, et.al., 2019). The theoretical framework of PFM is linked to the joint management of communities and local government to secure sustainable forest management and contribute to the livelihoods of forest-dependent communities (Kedir et.al., 2017). An interesting part of PFM is the inclusion of potential stakeholders in the decision-making process against the centralized system of government. Facilitating communities' social institution formulation to secure their benefit (incentive) and adapting the institution to the socioeconomic and culture of the communities will contribute significantly to the positive outcome of PFM (Ayana et.al., 2017). The adaptive nature of the PFM approach increases the motivation of the communities to manage their institution with a great sense of ownership to bring a measurable positive impact on the conservation and their livelihood but requires a supportive government policy.

Enhancing the PFM approach has a vital role in food security and poverty alleviation because it gives an opportunity for the communities to collect different products legally to support their subsistence and income generation (Wood, et.al., 2019). Since forests are one of the natural assets in the livelihood strategy of rural

people and threatened from overexploitation, PFM has a substantial role in forest degradation mitigation and improvement of the economic benefit of the forest (Kedir et.al., 2017).Even though PFM institutional arrangement has received attention from scholars and policymakers; still there are some debating arguments. The positive argument is PFM has brought radical change on devolving rights and responsibility. With this, deforestation has reduced and benefits are generated for the livelihood of the forest-dependent communities (Kedir et. al., 2017). The negative criticism is that success and positive outcomes of PFM are driven only by NGOs because government stakeholders have not internalized the approach and sustainability is at risk (Ayana et al., 2017).

Therefore, this research explores the contribution of forest and PFM in the livelihood of forest-dependent communities and sustainable forest management. It elaborates to what extent and how communities are benefiting economically from the forest managed under PFM. The willingness of the communities to manage their forest under PFM and what factors are influencing sustainable forest management are explained in the study and will contribute to the existing livelihood and PFM related literature. The finding of the study also will be helpful for development practitioners who work on the livelihood of the forest-dependent community and sustainable forest management by indicating issues that should be addressed to maintain forest community interaction.

1.5. Research Aim and Objectives

Given the above contextual background of forest community interactions, this study aims to explore the contribution of forests and PFM to the livelihood strategies and outcomes of forest-dependent households of the study area. To fulfil this research aim, the specific research objectives are to;

a) Investigate the strategies followed by Sheko woreda forest dependent households in maintaining their livelihoods;

b) Understand the role of PFM in the financial contribution of forests to the total income of forest-dependent communities;

c) Identify key factors which are influencing income to be generated from Sheko woreda forests managed under PFM;

d) Provide PFM related management recommendations to improve livelihoods and sustainable forest management.

1.6. Summary

This chapter has reviewed the role of forests in the livelihood of forest-dependent communities, the significance of southwest Ethiopia forest, and the threats of sustainable forest management which underpins this study. The contribution of the research to the existing theory, research aim and objectives of the study were also outlined. This was followed by an overview of the research contribution of this thesis and an overview of the content of the following chapters.

CHAPTER-2. LITERATURE REVIEW

2.1. Introduction

Forest as a natural resource has diversified value in the livelihood of the forest-dependent communities. In this chapter, pieces of literature are reviewed to explain the diverse services of the forest, the concept of sustainable livelihood, the importance of livelihood diversification, and the role of PFM in enhancing the sustainability of forest-based benefits under different external factors. These explanations will enable the reader to understand how communities are diversifying their livelihood activities using the owned asset and the contribution of PFM in achieving daily subsistence and better living conditions.

2.2. The Concept of Livelihood

The concept of livelihood has become the key premise of development intervention to concentrate on the active participation of stakeholders, especially within problem identification and sustainability of development intervention (Wang, 2018; Loison, 2015; Scoones, 2009). The livelihood of a given community demonstrates how members of that community are living, how the owned capitals are combined to minimize the risk of vulnerability factors, and how different institutions are influencing their regular activities (Baffoe and Matsuda, 2017; Tang et al., 2013; Scoones, 2009). A livelihood is composed of people's ability to combine the asset they own to influence the institution they are working with (Baffoe and Matsuda, 2017). Therefore, livelihood represents a means of ensuring subsistence and better-off living conditions based on the available livelihood asset. The concept of livelihoods is becoming a convenient means to interpret the economic activities of people (Loison, 2015; Tang et al., 2013). It indicates how people select activities and interacts with various controlling institutions to gain adequate living outcomes (Wang, 2018; Loison, 2015). Access to livelihood capitals (human, natural, physical, social, and financial) predetermines the outcome of rural livelihood (Baffoe and Matsuda, 2017; Kassa, 2019). The livelihood strategy of a household is also determined by the ability/skill possessed by the household to make a rational decision on the selection of diversified activities.

The centre of livelihood represents the ability to live using one's own capability and available assets under the influence of external factors. DFID (1999) shows rural households are forced to attempt more than one activity to support their livelihood. These activities can represent agricultural intensification, expansion of farmland, trading, labour working, employment in the formal sector. Labour exchange between family or neighbours, including migration, has also been utilized to access food, cash, and various human needs (Tang et al., 2013). The term livelihood is also commonly used with different development projects to show livelihood strategy. But these development projects and dialogue do not address livelihoods perspectives, including questions of knowledge, politics, size, and dynamics of livelihoods approach perspectives, methods, and frameworks (Loison 2015). In most cases, rural people have been considered as passive recipients of government policies (Tang et al., 2013). But it is not the reality, because elements of human life, the ecology, economy, knowledge, politics, ethical, social, and technological aspects are changing due to technological development and globalization. Therefore, a strong intervention from local government to minimize the pressure of globalization and population growth on the natural resources is needed.

The top-down development policy has a weakness in addressing the impact of livelihood assets distribution, power equality, institutions arrangements, long term environmental impacts, social relations, and livelihood strategies to address poverty alleviation policies (Baffoe and Matsuda, 2017).Because of this, many developments and poverty alleviation projects of Africa have failed due to lack of active participation from the actual stakeholders (rural communities) to incorporate their input (Baffoe and Matsuda, 2017). This confirms that complex rural development problems will not be solved by the intervention of a single institution and needs to consider the reality from the perspectives of local communities. Answering rural problems, including sustainable management of natural resources should examine the present reality without imposing upon primary stakeholders. Thus, the term livelihoods brings different perspectives together, allows conversations between disciplines, and provides an institutional bridging function linking people, professions, and practices in new ways (Scoones, 2009). Moreover,

articulating livelihoods' perspectives in terms of power, politics, knowledge, dynamics, and participating of different disciplines/scholars, has altogether, contributed to the emerging of a sustainable livelihoods approach.

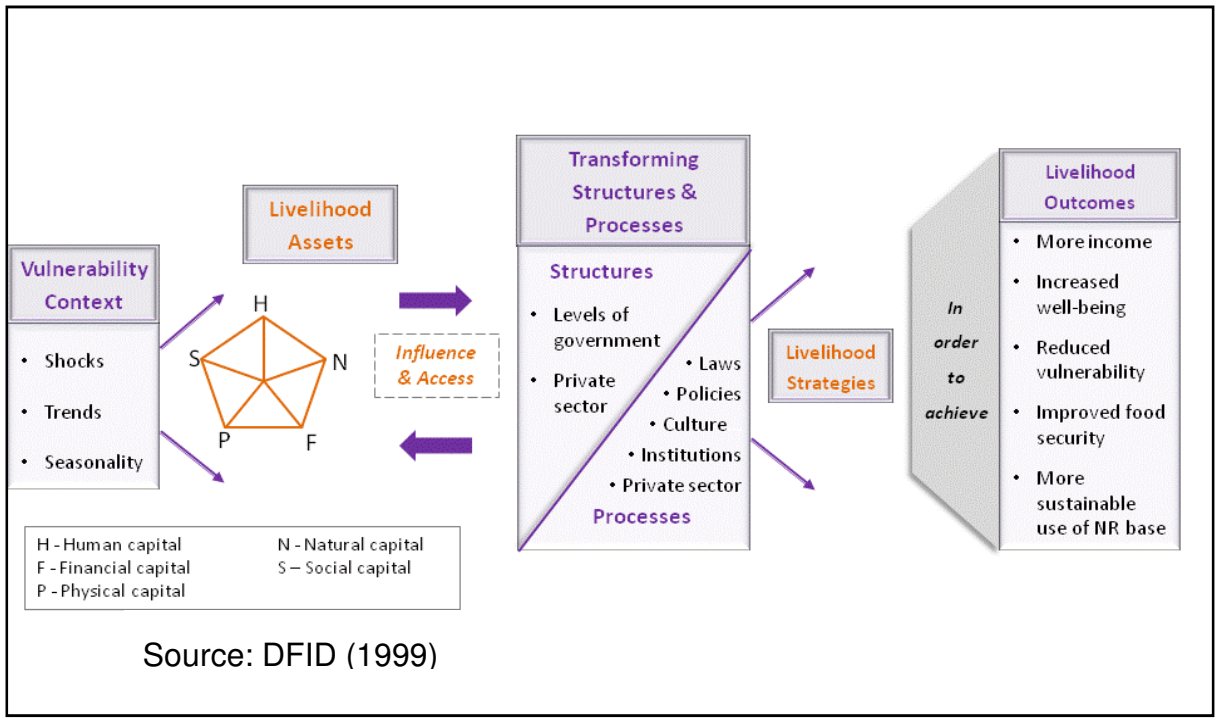
2.3. The concept of Sustainable Livelihood (SL)

The sustainable livelihoods (SL) approach framework was developed to help analyze the existing livelihood strategy and challenges of a community at micro, intermediate and macro levels, as well as to help develop an appropriate development strategy (Wang, 2018; Serrat, 2017). It is a way of thinking about development intervention to mitigate poverty in rural communities and a means to measure the dimension of poverty from different directions holistically (Ashley & Carney, 1999). The approach enables researchers to consider the livelihoods of the poor, factors affecting livelihoods, and the way they interact. SL has a broad range of explanations by independent scholars. For example, Wang (2018) and Chambers and Conway (1992) have explained SL in terms of capability, equity and sustainability. It represents how people/society is earning livelihood outputs under institutions or policies to achieve sustainable development. SL also represents a means of living against vulnerability factors which demand capabilities, access to assets, and routine activities to function economically and socially sustainable living conditions. It is equally described as the ability of a household to get his/her life by combining the own assets, and the present activities to earn income under the control of existing socially recognized organizations (Tang et al., 2013).

The SL framework (see Figure 2) offers a tool for rural livelihood study. Its principle follows centering of people, dynamics to adapt to the ground reality, holistic to address interlinked elements, and sustainability of outcomes (DFID, 1999; Scoones, 2009). The framework is applied to investigate development challenges and assess the impact of a development intervention of communities wherever they are living (Manlosa et al., 2019). Because, the objective of the framework is to direct scholars to think in a holistic manner about the interaction between the diverse living environment and how these factors are influencing the livelihood strategy of poor households when securing subsistence and better living conditions (Ashley and Carney, 1999). This adaptable nature of the livelihood framework has

enabled researchers to use the framework in assessing and designing different projects and programs initiatives and monitoring of impact in different countries of Africa, Latin America, and Asia. Ashley and Carney (1999) show there is substantial progress in the application of the SL Framework. For example, most of the literature cited about diversification of livelihood from this study had followed the Sustainable Livelihood Framework (SLF) to understand how livelihood elements are influencing the strategy of the household specifically and the community as a whole.

Figure 2. The Sustainable Livelihood Framework (SLF)



Source: DFID (1999)

Similarly, different researchers used the concept of DFID's SLF to study variables of rural livelihood in Ethiopia. For example, Segers et.al (2005) used this as a tool to assess the impact of development intervention in rural Tigray (Northern Ethiopia), and analyzed the positive impact of the project in enhancing communities access to a different asset by giving greater attention to sensitive, cultural and policy issues. Tesfaye (2011) also followed the SLF to show the contribution of Participatory Forest Management (PFM) to the livelihood of Bale communities

(Southern Ethiopia). His results show that the forest is contributing about 34% of the annual household income and buffering the forest-dependent communities from severe poverty. Fikadu et.al (2021) recently used an adapted livelihood framework to explore determinants of livelihood diversification in Assosa (Western Ethiopia) and conclude that LH diversification of the household is determined by the education level, access to irrigation, and household-urban linkages than landholding size and other livelihood assets. Sime and Anne (2019) used the SLF to explore livelihood vulnerability and coping strategies of communities living in the central rift valley of Ethiopia. These studies show how adapting the SLF is possible to include the socioeconomic, culture, and environment of the working area, even though findings vary based on the objective of the scholars, and socioeconomic tradition of the communities. For the purpose of this study, the SLF is used to explore the interaction between livelihood factors and the contribution of PFM as an institutional approach to the livelihood of forest-dependent communities.

With regards to the components of the SLF, the capability of households or individuals refer to the ability to maintain fundamental living conditions and the ability to access adequate basic needs of life (Serrat, 2017). Equity refers to adequate access to assets, resources, opportunities required for all individuals and households, especially for the most disadvantaged and vulnerable people. Sustainability refers both to the environment (not to degrade and overexploit it) and social sustainability (the ability of the household to cope from stress under the existing transforming opportunities) to make a stable living (Munanura et.al., 2016; Chambers and Conway, 1992). The above ideas confirm livelihood can be transformed if the household is able to combine the available assets and access through day-to-day activities under existing social and institutional factors. This shows that predicting achievements of a SL is difficult and demands a complex system of analysis because the growth of livelihood is influenced by access to resources, population growth rate, vulnerability to risk, and social injustice (Guha et al., 2018). Principally, livelihoods are sustainable if the selected strategy enables the household to cope with and recover from stress (without demanding external support), maintain a decision power and access to the asset without affecting the sustainability of the natural resources for the coming generation (DFID, 1999; Serrat, 2017; Onyas et al., 2018).

The SL approach was developed in the late 1990s due to the shortcomings of the community development approach of the 1970s (Bennett, 2010). It was developed by the international development organization; namely the Department for International Development of the United Kingdom (DFID), the United Nation Development Program (UNDP), CARE, and Oxfam (Brocklesby and Fisher, 2014; Quandt, 2018). The early community development approach follows a top-down approach, whereby local people are left out of decision-making and have no power over resources. SL was developed as an alternative approach to solving poverty problems through the active participation of stakeholders' especially in developing countries because it helps to learn from the livelihood practice of the people involved and the impact of institutional arrangements (Brocklesby and Fisher, 2014; Bennett, 2010). Moreover, the SL approach was used as a tool to implement the Millennium Development Goals (MDG) plan; which is a reduction of poverty by half and increasing of human wellbeing globally. The MDG collectively achieved good progress in most of its indicators, but it is an uneven achievement and with some shortfalls (MDG Report, 2015). The MDG report justifies the reason for uneven achievement as the lack of sound strategies, adequate resources, and political commitment of countries.

Initially, the SL approach was criticized as it is difficult to analyze the complexity of the livelihood system in a logical way (Serrat, 2017). Additionally, there was a gap of cooperation between government sectors towards its implementation, addressing gender traditions and culture. However, through the evolution of the approach, these aspects are now being included (Ashley and Carney, 1999).The aims of the SL approach will be achieved only if it is operated through active participation of the impoverished community to know how these working environments interact and affect the lives of the poor (DFID, 1999; Bennett, 2010). Participation of the poor helps to improve their access to quality social services (education, information, technology, nutrition, health), build a conducive social environment (culture norm), access to natural resources, infrastructures, finance resources, supportive policy, institutional arrangements, and competitive markets for all resources (DFID, 1999). So, centring people in any livelihood development activities helps to explain how people are performing their livelihood using the

present capital and how sustainability of their livelihood will be affected by others (Chambers and Conway, 1992; Scoones, 1998).

This shows therefore, that SL is the function of capital assets owned by the household and activities implemented to satisfy livelihood needs under the influencing environmental factors (Scoones, 1998). Assortment and trading-off these assets; utilizing one form of asset in building other forms of asset is a traditional strategy followed by the household (Manlosa et al., 2019). Therefore, the head of the household exercises balancing of the asset they have for sustainable adaptation and wellbeing of their livelihood. That is why people's live and livelihood strategy depend on the assets they have privately or in the common pool and its link to the wider institution and policy (DFID, 1999).

The logic of the SL Framework and its elements (DFID, 1999) has some fundamental components. First, people`s life is exposed to vulnerability factors and seasonal changes, which have a direct impact on the capability of people. The Ethiopian economy, which is rain-fed agriculture, is highly subjected to vulnerable factors (Asfir, 2016; Bazezew et al., 2013). The common constants of Ethiopian farming which increase vulnerability to shock are climate variability (temperature and rainfall), land degradation (resulted in the loss of production per unit area), population growth, death of relatives, and the poor socioeconomic capability of rural communities (Sime and Anne, 2019; Teshome, 2016). Loss in production due to a security problem, malaria infection, shortage of farmland, variability of rainfall, death of relatives, increased cost of services are the vulnerable factors seen in the study area. Selling of fixed assets, crediting from others, and engaging in off-farm activities and migration are the common strategies to survive from these factors (Sime and Anne, 2019; Asfir, 2016). People’s livelihood and their assets are influenced by vulnerability factors (trends, shocks, and seasonality of their occurrence). Different components of vulnerability affect people in different ways and influence the coping strategy of the household or society positively (introduction of modern agricultural technology) or negatively (the poor may lack the capability to adopt the new technology).

Secondly, the household livelihood is built from the combination of human (skill, knowledge and labour), natural (access to the stock of natural resources), social (socially trusted relationship, network, and influencing norms), financial (saving, credit access), and physical capitals (infrastructures, equipment, livestock, house). The availability of these capitals varies among household heads and agro-ecology of the Ethiopian environment (Bazezew et al., 2013) and different ecologies provide different resource endowments and communities will employ different strategies to achieve livelihood outputs. This reality enforces them to support each other and share the available capital as a subsistence strategy using their social norm. For example, the better off individuals will share some of their extra assets (farmland, crop, money) for the poor to be paid at the next production season. The social norm is respected by the residence of a specific area to maintain their positive social interaction in solving problems and supporting each other now and for the future (Bazezew et al., 2013) because acting against the social norm is morally unacceptable and will result in exclusion from any social services.

Thirdly, communities will design a strategy to increase the endowment of assets through time to achieve encouraging livelihood outcomes. Livelihood positive outcome is inhibited by access to livelihood assets and the existence of supportive institutional arrangements (DFID,1999). Since access to the livelihood assets is not uniform among the communities, households will be enforced to design strategy that can enable them to access a range of activities and combination to achieve livelihood goal; that is a safe living condition. The commonly used strategy is diversification of livelihood activities (DFID, 1999; Manlosa et al., 2019), which enables the households to access additional assets. The livelihood strategy is not moving from one form of livelihood activity to other, rather it is flexible to combine different activities to meet the various needs (DFID,1999).

Livelihood diversification varies from place to place based on the availability of capital and technologies. For example, livelihood diversification through non-farm activities in Nepal (small business, enterprise, commercial farming) is adapted to generate additional income to secure the livelihood of rural farming communities (Khatiwada et al., 2017). The case is different in Ethiopia because on-farm and off-farm diversification are the dominant means of livelihood diversification due to

limited adoption of modern technology, infrastructure development, and unskilled human capital (Asfir, 2016; Ahmed and Daba, 2018; Bazezew et.al., 2013).

Livelihood strategy selection is also influenced by the existence of supporting institutional arrangements (policy and institutions) and geographic location because they govern the accessibility of facilities like farmland, education, crediting centre, decision making power and availability of infrastructure for efficient implementation of strategy, and achievement of livelihood goals (DFID,1999; Khatiwada et al., 2017; Asfir, 2016; Ahmed and Daba, 2018). So, the satisfaction of the household is determined by the efficiency of the household to combine the available capital and strategically cope with vulnerability factors to achieve improved living conditions.

The SL framework as a development tool will help analyze the interaction of these factors to promote a diversified more adaptive flexible and feasible livelihood strategy and to achieve SL outcomes in terms of income and wellbeing without affecting natural resources. The SL framework shows how household's livelihood systems interact with different external environments (DFID, 1999). The vulnerability contexts comprise of unpredictable events that negatively affect the livelihood capability of rural people. Ethiopian rural communities are sensitive to climatic change which exposes the rural poor to drought, flooding, and land degradation that affects agricultural production, water resource, and human health seriously (Teshome, 2018). Livelihood assets represent resource-based categories of household capitals that are linked to each other (DFID, 1999). Accessibility of livelihood assets are also influenced by existing institutions (formal and informal) which are man-made structures to facilitate the availability of assets and minimizing vulnerability. On the other hand, livelihood strategy is a choice that people can make to achieve their livelihood goals and is influenced by the asset, policy, and institutional context in which they are living in. Livelihood outcomes are positive achievements of livelihood strategies, like food security, income security, health, well-being, and asset accumulation. These outcomes are dependent on the sustainability of natural ecosystem services. This is why sustainable forest management through PFM has secured the attention of the Ethiopian government in the mitigation of forests and its ecosystem degradation (Wood et al., 2019).

Studies on PFM's contribution, confirm that forest income, forest conditions, and a sense of ownership over the forest are progressing and its sustainability demands collaboration of stakeholders (Wood et al., 2019; Dereje, and Mulugeta, 2019; Ameha et al., 2014). Usually, exponential immediate return from PFM is not expected rather sustaining the direct and indirect values of the forest is the priority (Abate, 2020. Masiero et al., 2019; Melaku et al., 2014; Leßmeister et al., 2015; Langat et al., 2016) because unregulated extraction of the in-kind forest products will affect the productivity of the ecosystem as a whole

In general, livelihood outcomes are influenced by the vulnerability context, assets of the households, policy, accessibility to technology and institutions where people are working in. These factors enforce the communities to select feasible means of livelihood diversification to achieve subsistence and welfare as an outcome.

2.4. The Importance of Diversification in Rural Livelihood

People who are living in developing countries of sub-Saharan Africa, South-Eastern Asia, and Western Asia are subjected to food security problems due to frequent political instability, conflict, climate change, and live below subsistence thresholds (FAO, 2014, 2017; Gautam and Andersen, 2016). These vulnerable factors are enforcing people to design their own livelihood strategy to overcome this vulnerability based on the resources they have. Livelihood strategies refer to actions initiated, and choices made by households to achieve immediate subsistence demand and the ultimate goal of livelihood (Adam et al., 2013; Loison, 2015; Gebru et al., 2018). It includes production activities and investment strategies of households to get sufficient income and arrange self-insurance against vulnerability contexts. The strategies followed by different households will determine how they will make use of the present capital to attain their livelihood results (Liu et al., 2018).

Livelihood diversification is a frequently applied household norm to cope with the economic and environmental shocks and an opportunity to diversify activities and assets in order to survive and achieve an improved living standard (Kassa, 2019; Manlosa et al., 2019; Loison, 2015; Gebru et al., 2018; Gautam and Andersen, 2016). Livelihood diversification can exist at the community or household level due

to the existence of desperation in desired and acquired capital. Rural livelihood diversification is commonly intensifying regarding on-farm activities, supporting on-farm capitals with off-farm, non-farm, or a combination of all these to improve the living standard of the family (Loison 2015; Manlosa et al., 2019; Baffoe and Matsuda, 2017). People use livelihood diversification in diverse contexts based on the capital asset they have. Some use it for accumulation of resource/asset while others practice for reducing the risk or to cope with temporary crises.Other nations use it as a response to large scale economic or environmental changes beyond local control (Quandt, 2018; Baffoe and Matsuda, 2017; Loison, 2015). Generally, poverty reduction can be achieved by interventions targeted at rural livelihoods to address these vulnerabilities. So, understanding the local livelihood context, the sources, and nature of risks and the coping behaviour of the communities and their efficiencies is important for the success of livelihood policies because vulnerability is highly related to political, social, economic, and historical realities of specific places (Gautam and Andersen, 2016).

Sustainability of livelihood is not the only reduction of poverty; rather it is the sustainability of the environment, economy, social issues, and institution (Downie et al., 2018; Onyas et al., 2018) because there is a paradox between livelihood demand and environmental sustainability and achievement of livelihood objective and compromising the livelihood opportunity of others. This will need detailed awareness-raising work for the community to internalize the wider livelihood output (sustainability of life) than the potential conflicting issues. As a development tool, the SL framework is flexible and adaptable to summarize factors affecting and their relationship in determining the livelihood of people. Accessing financial services and responsive institutions is a fundamental predictor of a sustainable livelihood, since people need a range of assets to achieve their livelihood outcome.

2.5. Value of forest ecosystem

An ecosystem comprises a geographic area where living organisms (plants, animals, and microorganisms) and non-living (weather and landscapes) environments work together to form life (Masiero et al., 2019; UNEP, 2014). Ecosystem services are different, complex, and dependent on beneficiaries' interest

(Masiero et al, 2019). For example, ecosystem services mostly help to reduce run-off or soil erosion, but might offer an intermediate service for someone interested in the recreational value of the waterfalls. In short, ecosystem services are the direct and indirect benefits of ecosystem structures and processes which contribute to social ecological and human welfare (Baskent, 2020). The interaction and intervention of human capital to the ecosystem services will determine the sustainability of ecosystem services and the existence of life (Galvani et al, 2016) because population growth is natural and has an impact on the environmental resources. So, extraction of one form of ecosystem service (ex. Increased agricultural production through deforestation) in the form of forest degradation will lead to a natural disaster.

Forests of the world are one of the most essential resources which need sustainable management both for the income they generate and for the environmental services they provide (Masiero et al., 2019; Jahanifar et al., 2017; Brockerhoff et al., 2017; Meijaard et al, 2013). However, the economic benefits of forests are not valued by all stakeholders (Masiero et al, 2019; Endamana et al, 2016; Brockerhoff et al, 2017; Jahanifar et al. 2017; UNEP, 2014) and sometimes participation of the rural poor is excluded. The lack of active participation of forest-dependent communities has been aggravating the removal of forests and conversion to other land use-system and become difficult to control. That is why scholars around the world are pushing the decentralization of natural resource management and engagement of local forest users in the management of forests (Wood et al., 2019; Wright et al., 2016). Forest degradation has caused a long-term impact on natural systems, especially on the livelihood of the poor (Masiero et al, 2019), who are usually more dependent on natural resources.

Forests as the essential component of the ecosystem, delivers a range of environmental, economic, social, and cultural values in supporting the well-being of people (Masiero et al., 2019; Jahanifar et al., 2017; Brockerhoff et al, 2017). Since there is no unique definition for the absolute value of the forest, Turker et al. (2010) and Reichhuber and Requate (2012) have summarized the value of the forest as direct, indirect, optional, and existence values. Studies in different developing countries show the contribution of income generated from forest product to the livelihood of the local communities ranges between 27-39% of the aggregated

household income (Endamana et al., 2016; Makoudjou et al., 2017; Ameha et al., 2014). Other studies show that forest contribution to the total income of Malawi`s community is only 15% and reaches up to 76% in India (Miah et al., 2012). This confirms that forest contribution to the wide-ranging income of communities and varies from place to place. The variations can stem from social heterogeneity, availability of economic options, forest land, and suitability of the area for agriculture and forestry activities. Forest ecosystem are contributing to the livelihood of forest-dependent communities, as explained above but its contribution is not adequately documented (Angelsen et al., 2014; Kedir et al., 2017).

2.6. Value of Environmental Resource for Rural Livelihood

Rural communities are the main actor in environmental degradation, and they are also the victims of environmental degradation (Jahanifar et al., 2017; Wassie, 2020). This is primarily due to the overutilization of elements of the environmental resource. Forest, the key component of natural resources and the common good have the potential to contribute to poverty prevention by generating income and functioning as safety nets for the local poor (Masiero et al., 2019), but dependence on forest resources without diversifying livelihood activities will not sustain the contribution of the forest and lead to poverty. This show over extraction of forest products will significantly affect the normal functioning of other environmental elements.

People living in the rural part of the developing countries are collecting diverse products from the natural environment (wood and non-wood products, resources from water bodies, and related resources) for their day-to-day subsistence and to generate income (Langat et al., 2016; Angelsen et al., 2014; Belche et al., 2015). This indicates that the environmental resources have been contributing significantly to ordinary consumption, risk absorbance, and capital accumulation of rural communities to achieve better living conditions (Angelsen et al., 2014). Extraction of natural resources varies from place to place based on level of dependency, community class, gender, infrastructure, accessibility, culture, vulnerability, and even policy of countries (Angelsen et al., 2014).

Forest income from the natural environment is mostly environmentally sourced compared to plantation forest because it receives relatively no or limited cost for management (Angelsen et al, 2014). Past and recent research on the value of forest resources of developing countries (Asia, Africa, and Latin America) shows forest contribution to the livelihood of rural communities has significant variation. The reasons for such significant differences are the nature of people's preference at the study areas, inconsistency of key variable definitions, and incompatibility of study method (Fisher et al., 2010). Even though there are methodological problems and inconsistencies, fundamental case studies reveal that forest environments remain critical resources for rural dwellers to avoid poverty and unexpected income shocks (Angelsen et al., 2014; Wunder et al., 2014). So, understanding the relative contribution of environmental income to the aggregate income of the rural community is important to identify the livelihood means of rural people, describe what factors control poverty and inequality, as well as understand the implications on the degradation of natural resources, and to design effective development and conservation strategies (Angelsen et al., 2014).

2.7. The Value of Participatory Forest Management (PFM) to sustainable forest management

Participatory Forest Management (PFM) has emerged as a potential means of joint forest management with the involvement of forest-dependent communities and government mainly to mitigate forest degradation and deforestation (Kedir et al., 2017; Mengist and Alemu, 2019). Its concept was started in different parts of the world to promote the active participation of communities in sustainable forest management. For example, the ideal forest co-management model started in India around the 1970s (Alooni, 2002). It is the departure of government-controlled forest management and maximum revenue generation into people-oriented forest policy, to address forest biomass degradation of the country. Nepal and Philippines adopted community based forest management as a strategy for sustainable forest management to improve the socioeconomic of their community around the 1950s, Brazil started a number of participatory forest management approaches around the 1990sto increase the active participation of communities in the sustainable

management of its unique forest. Similarly, Tanzania in Africa, which has more than 40% forest cover, is also deteriorating due to illegal logging, fire and mining, but started the implementation of PFM as a rural development strategy in 1996 (Mengist and Alemu, 2019). Active involvement of stakeholders in problem identification, planning, and implementation is started recently in the 1990s and become a development framework to harmonize the state-controlled approach and its conflict with the forest-dependent community (Wood et al., 2019; Tesfaye, 2011). This is the time where empowerment of local poor through capacity building and forest-based income has got recognition. PFM achieved the decentralization of rights and responsibilities to the local communities to secure sustainable management of natural resources.

Forest deforestation and degradation remain key challenges for Ethiopian forests, due to the centralized and exclusively top-down, protective approach of the country (Wood et al., 2019). Nationalizing of the natural forest was carried out at different periods, but the approach was unable to halt the problem and resulted in forest fragmentation (Wright et al., 2016; Kedir et al., 2017; Wood et al., 2019). In the late Ethiopian governances, the forest areas were also considered as an alternative area for settlement, agricultural expansion, and the regime is the sole decision-maker (Kedir et al., 2017). This exclusion and state-controlled forest management have resulted in continuous conflict between government bodies and local communities because in the centralized state-controlled forest management approach communities have no legal right to harvest any product from the forest, even though their livelihood directly depends on the services of the forest ecosystem (Kedir et al., 2017; Wood et al., 2019) Because of this, the Ethiopian forests were subjected to overutilization and degradation (Wood et al., 2019; Wright et al., 2016). This is due to the fact that sustainability of conservation areas is adversely affected by a top-down approach and conservation becomes challenging without the involvement of communities (Wood et al., 2019; Buchenrieder and Balgah, 2013; Gatiso, 2017; Kedir et al., 2017).

PFM was introduced into Ethiopia in mid 1990 by NGOs (FARM Africa, GTZ, JICA, and SOS Sahel) and scale up to cover about 40% of the country`s forest resource (Kedir et al., 2017; Tesfaye, 2011; Gobeze et al., 2009). Currently, the Federal government of the country and subsequent regions have recognized the

contribution of PFM to sustainable forest management through forest proclamation No 1065/2018. The community-based approach (PFM) recognizes natural resource tenure right, people and local institutions' traditional property and useright, as well as reasonable benefit sharing from the sustainable management (Wood et al., 2019; Tadesse et al., 2018; Ameha et. al., 2014; Buchenrieder and Balgah, 2013). Involving the local community helps to maintain people and forest interactions, reduce the cost of conservation and increase awareness of the community on the rules and regulations of forestry (Wood et al., 2019; Gatiso, 2017). PFM equally contributes to poverty reduction and local community development in addition to conservation because it enables the community to have access to various benefits (Kedir et al., 2017; Mengist and Alemu, 2019). It gives clear rights and responsibility to all stakeholders. Collecting forest and non forest products on a regulated basis for home consumption and income generating is the main right gained by the community, and protecting the forest from deforestation and degradation is their responsibility (Wood et al., 2019; Tadesse et al., 2018; Mengist and Alemu, 2019). Studies made by Mengist and Alemu (2019) at Chilimo (PFM in Western Shewa, Oromya region), Kedir et al. (2017) at Dodolla (PFM in Bale, South-eastern Ethiopian highland) and Wood et al. (2019) at Sheko (PFM in SNNPR) on the success of pilot PFM`s show the forest based income of the communities have been increasing due to the right they got to market forest and non forest product harvested from the PFM forest and they have significantly improved the health conditions of the forest by controlling any illegal activities. These studies also show sources of forest income are diversified based on the forest potential. For example, the source of forest-based income of Chillimo communities involves selling of timber, forest seed, and seedlings through their marketing coop.

The success and sustainability of PFM however, depends on the ability of the community to exercise their rights, responsibility, power to make decisions, strength of their institution, and availability of government support. Studies by Abab (2018) and Ameha et al. (2014) show PFM contributes frequently to forest conservation, but the level of communities' active participation and in-kind benefit needs further work to ensure the sustainability of the approach. Because of this, alternative, income-generating activities and diversifying of benefits from the forest have

received attention to increase the value of the forest (Sutcliffe et al., 2012; Wood et al., 2019).

Generally, PFM has contributed to the attitudinal change of the communities on sustainable forest management, socioeconomic benefit increment, forest cover and diversity improvement (Mengist and Alemu, 2019; Wood et al., 2019; Kedir et al., 2017). The PFM approach offers an increased sense of ownership, power of negotiation, commitment for sustainable forest management, income from different forest products, the productivity of the area, and forest cover as a whole.

2.8. Summary

This chapter has explained the contribution of forests to the livelihood of forest dependent communities. It also elaborates the concept of livelihood and the importance of livelihood diversification for a SL. The role of forests in regulating ecosystem services and natural resources for healthy living environment was discussed, but the sustainability of ecosystem services is under threat due to deforestation and forest degradation. Moreover, the contribution of PFM to sustainable forest management and its challenges are explained in detail. Even though the forest has a vital role in the LH of forest-dependent communities (see Wood et al., 2019), its direct and indirect values are not well understood by the communities of the study area (Kedir et al., 2017). Therefore, to enhance our understanding, the next chapter documents the adopted methodology utilised to contribute to knowledge around the value addition of the participatory forest management approach and forest-based LH literature.

CHAPTER 3. METHODOLOGY

3.1. Introduction

The concept and evolution of the Sustainable Livelihood Framework (SLF), its role in the study of rural communities' livelihood, the rationale and challenges of the forest biodiversity of the study area, and the forest-community interaction were discussed in the literature reviewing part. Conseqeuently, this chapter outlines the research philosophy, the research questions, the research design, the development of a questionnaire and the research process. Next, ethical concerns and data analysis procedures are explained.

3.2. Research Philosophy

Research philosophy represents the framework of the researcher to be followed during research designing, data collection, and analysis (Ryan, 2018; Saunders et al., 2019; Easterby-Smith et al., 2012; Samy and Robertson, 2017). It outlines the beliefs of the researcher and highlights what the researcher perceives to be truth and reality (ontology assumption), enquiring of nature for acceptable legitimate knowledge (epistemology assumption), and the research technique and method to be used in the process (methodology). These paradigms influence the research perception, methodology, and interpretation of the meaning of the results. These principles are also inter-related in answering a research question (Saunders et al., 2019; Ryan, 2018; Pessu, 2019; Easterby-Smith et al., 2012; Samy and Robertson, 2017)

The three assumptions of the researcher are summarized as follows. The ontology assumption of the researcher within this research context, is critical realism whereby, a forest community interaction is a concrete and inevitable fact but the sustainability of that interaction has various challenges. This should be explored through a modified, dualist/objectivist epistemology. This is warranted by an acceptable and justifiable knowledge through data collection, analysis, and interpretation of results (Samy and Robertson, 2017; Pessu, 2019; Saunders et al, 2019; Hurlimann, 2019). Thus, the phenomena are to be measured and proved empirically to show facts existing independent of the researcher's experience and

knowledge (Samy and Robertson, 2012; Alakwe, 2017; Ryan, 2018).However, valuing the principles of research ethics, local knowledge, and the tradition of the communities and learning from them through field observation were taken into account (Saunders et al., 2019). This makes a post-positivist paradigm of the researcher; whereby, a human being and their social world are not static (knowledge is subjective which can grow through culture and history of people) and cannot be studied as a physical phenomenon, because people have different cultural, social background and experiencing different social realities (Samy and Robertson, 2017; Saunders et al., 2019; Alakwe, 2017; Ryan, 2018). This shows that reality and knowledge are personal perceptions, experiences, and feelings that are socially constructed under the culture and history of societies (Samy and Robertson, 2017; Alakwe, 2017). These social facts are modifying individual actions. Hence, humanity issues (personal meanings, culture, background history, and life experience) were taken into account during data collection and observation to harmonize the post-positivism reality and knowledge of this social study (Ryan, 2018; Samy and Robertson, 2017). This shows a degree of flexibility was employed to help direct how data could be collected, analyzed, and interpreted.

A post-positivism philosophy relies on scientific evidence to reveal the factual nature of how society operates. Subsequently, the design of a face-to-face structured survey is followed, because it enables the collection of measurable and observable phenomena for the production of credible data and facts through scientific analysis without influencing the researcher's interpretation (Ryan, 2018; Pessu, 2019; Saunders et al., 2019; Alakwe, 2017; Bryman and Bell, 2015; Easterby-Smith et al., 2012). This dualist (i.e. objectivism and subjectivism) paradigm was taken into account in framing the research design.

There are three approaches in reasoning out a research study and explaining the logic of the study (Ryan, 2018). These are deductive approach which designed from the general hypothesis to specific to falsify or verify existing theory, an inductive approach which framed from specific observation to general theory resulted in generating or building of new theory, and adductive reasoning usually starts with all available information and proceeds to the formation of a hypothesis to be tested (Rahi, 2017; Saunders et al., 2019; Easterby-Smith et al., 2012; Ryan, 2018).

A deductive approach was followed to test the existing livelihood theory could work or not on the forest-dependent communities of this specific study area. As the deductive approach is appropriate to adapt the general livelihood concept into a specific objective (contribution of the forest) and it enables testing of the existing livelihood strategy of the communities statistically. The present theory in rural communities' livelihood diversification reveals combining the available assets is compulsory even though the strategy varies through demography, accessibility, culture, and availability of resources (Geremew et al., 2017) In this study, the possible means of livelihood diversification were assessed following the principle of a livelihood framework, the contribution of forest income, and the role of PFM in sustaining forest based benefits were identified through data analysis and referring the existing studies.

3.3. Source of Data

Research data can be generated from primary and secondary sources based on the objective of the research. The objective of data collection in this research is to get quality information on variables to produce a convincing and credible answer for the research question (Sajjad Kabir, 2016). Primary, quantitative data was required to obtain the desired standard and quality information to verify the result statistically (Jilcha, 2019) and ensure it is also free from personal judgment and interpretation. There are different methods of primary data surveying. Some of them are interviews (face-to-face using structured, semi-structured, and open-ended questionnaires), questionnaires (electronic/paper form for self-completion), observation, and focus group discussion (Sajjad Kabir, 2016).

Primary data was collected through face-to-face interviewing to investigate the strategy followed by the community in obtaining access to different livelihood assets, the means of risk mitigation, the influence of institutional arrangements, and the output of their strategy because first-hand data is reliable, objective, and less manipulated by human-beings compared to secondary data (Sajjad Kabir, 2016; Jilcha, 2019). Face-to-face interviewing using, a semi-structured questionnaire was used to acquire in-depth, valid, and consistent information through triangulation,

observation, and literacy skill has no effect on the rate of responding (Sajjad Kabir, 2016; Jilcha, 2019).

There is also, an alternative option to collect data using electronic media using a technological platform like a telephone, email, zooming for effective time and cost management, and could be applicable when there is an accessibility problem due to infrastructure, security, pandemic, and other reasons (Lobe et al., 2020; Sajjad Kabir, 2016). This was unused for this study due to lack of technical facilities and accessibility.

3.4. Research Questions

The economic, environmental, and unique characteristics of the Southwest remnant forest of Ethiopia are deteriorating due to forest land conversion. The study area is part of this remnant forest where forest conservation is undervalued than conversion due to different reasons. In reality, sustainable forest management will be achieved only if the forest and its biodiversity are able to contribute to the livelihood of forest-dependent communities. Due to this, this exploratory research explores the contribution of forest to the LH of the forest-dependent communities of the study area and the challenges encountered. This will be achieved by exploring the livelihood strategy followed by the communities, the contribution of forest to the total HH annual income, the contribution of PFM to the forest-based income, and factors affecting forest-based income diversification. Research questions were developed based on the perceived value of the forest to the life of the communities (Makoudjou et al., 2017; Ameha et al., 2014; Angelsen et al., 2014; Eshetu, 2014) and the value of the SLF from previous studies (DFID, 1999; Scoones, 2009; Wang, 2018). Conceptual research questions were established to understand the livelihood strategy followed by forest-dependent households of the study area and to triangulate their strategy with the concept of the SLF (DFID, 1999). Thus, the following three conceptual hypotheses were established to achieve the research objectives and to contribute to the forest and forest-dependent communities' interaction.

The first hypothetical question is related to the means of livelihood diversification followed by the communities under the existing dynamics of nature. This includes;

H1 There are enough livelihood assets and their combination to contribute to the sustainability of the household livelihood.

H2 The communities have their own means to divert the risk of vulnerability in securing a sustainable livelihood.

H3 The existing institutional arrangements are positively determining the transforming ability of the household.

The second question is related to the contribution of the forest to the livelihood of the household. This includes;

H4 Forest-based income has a significant contribution to the livelihood of the forest-dependent household.

H5 PFM has a significant contribution to sustainable forest biodiversity conservation.

The third question is related to the hindrance of forest-based benefit. This relates to;

H6 Forest-based income sources are diversified enough to support the livelihood of the household.

H7 Local knowledge and government support are efficient to diversify the economic benefit to be generated from the forest.

In addition to the above hypothesis, the following cross-cutting issues were also considered in the data collection

- The gender participation level of the household
- Perception of the household regarding the indirect value of the forest

- Contribution of PFM in the livelihood of the household and sustainability of forest conservation.

3.5. Research Design

The Sheko forest possesses national and international value, but its sustainability has been severely challenged by the alteration of the forest land into other land-use forms (Wood et al., 2019). However, the reason behind the conversion and the relative contribution of forest to the livelihood of the communities was not adequately documented (Wood et al, 2019). The threat of conversion will reduce if and only if the economic value of the forest is endorsed by decision-makers and forest-dependent communities (Sutcliffe et al., 2012). So, this exploratory study (Akhtar, 2016) using a quantitative research method was deployed to investigate the relationship between the rural communities and the forest to describe data numerically through statistical analysis (Rahi, 2017; Sykes et al., 2018; Sajjad Kebir, 2016). Primary data were collected from a purposive selected kebele (smallest governmental administration structure) which has diversified communities, large forest cover, and better accessibility. Primary data are more accurate to describe variables (Sajjad Kabir, 2016; Jilcha, 2019). The data was collected from household heads selected through stratified random sampling to prevent biases. Face-to-face interviewing using a semi-structured questionnaire was used to gain deep insight and information on the forest-community interaction. Since the data was collected within a short period and the information is gathered from different cross-sections of the communities, a single cross-sectional design was used to analyze the data. Descriptive data analysis was conducted to illustrate the means of livelihood diversification and valuing of the forest among the diverse ethnic classes statistically. The results will help to establish a baseline for other exhaustive studies but offer an exceptional contribution to the conservation of this forest biodiversity area.

3.6. Questionnaire Development

A face-to-face, survey questionnaire was used for this quantitative research study because it offers the advantage of collecting the best detailed and correct data through triangulation using extended questions and actual observations in a flexible manner (Sajjad Kabir, 2016). The standardization of variables makes the scientific analysis and comparison of findings easy (Pessu, 2019; Saunders et al., 2019). .Even though the questionnaires are designed for quantitative data collection, some of the questions are followed by open-ended qualitative questions to obtain additional information to aid discussion and to triangulate the reality of respondents answers.

Denscombe (2017), Rahman (2016), Sajjad Kabir (2016) & Jilcha (2019) have explained both advantages and disadvantages of using questionnaires. The advantages include: it is structured based on the objectives of the study; it provides an opportunity to receive a standardized answer for easy coding and analysis; the data can be analyzed and visualized in the absence of the data collector; and results are interpreted numerically. Some drawbacks include that: developing a questionnaire needs time; pilot testing is important in testing validity, and sometimes the actual data collection is time-consuming in face-to-face surveying (Sajjad Kabir, 2016).

The content of the questionnaire was designed based on the concept of DFID's (1999) sustainable livelihood framework guidelines to acquire sufficient information for livelihood analysis. The framework has contributed to the structuring of the content of the questionnaires, maintaining validity and reliability, and reducing the time required for testing and data collection (Sajjad Kabir, 2016; Jilcha, 2019). The data collection questionnaire was structured to capture reliable information on elements of livelihood assets, vulnerability factors, transforming institutions, and livelihood output details. In addition to this, the contributions of forest and PFM to the livelihood of the communities were incorporated. The variables of these questionnaires were assessed through coding. Most of the variables were assessed in a binomial scoring, but income from multiple sources was assessed by summing up the product of current production stock with the average selling price of each item.

The questionnaire also offers an introductory text and explanation which indicates why the research was conducted, the objective of the data collection, the role and rights of the respondent, and how the information will be managed by the researcher (See Appendix 1). By performing this, transparency was developed with the respondent, and their consent to take part was obtained for the ethical issues of the research (see sec 3.10 & Code of Ethics and Conduct, 2018).

3.7. Pilot testing

Before the actual data collection, the questionnaire was assessed by experienced academic professionals. Constructive feedback was received to restructure its content. Following the adjustment, a pilot test of the questionnaire was done using randomly selected household heads to identify any potential problems, to become familiar with the data collection approach, and to make sure the research design is feasible, viable, and reliable to achieve the study objective (Denscombe, 2017). The pilot testing enabled the researcher to know whether the questionnaire was appropriate for the objective, well defined, clearly understood, and presented in a consistent manner. Some limitations of the questionnaire included; respondents getting tired easily due to its length; the effect of interviewing in a public area (i.e. interruptions); the language barrier; and responding without appropriate attention. Further adjustments were made to avoid duplication of the questions based on the feedback of the pilot testing. An audio recording of the face-to-face survey was done for a check-up of any un-clarity during data translocation and analysis. The final survey can be seen in Appendix 2.

3.8. Sampling

Sampling is deployed in all scientific studies since total population surveying is impractical due to its workload and cost (Gabler and Hader, 2016). Sampling helps to measure the characteristics of the population without contacting every individual (Rahi, 2017; Jilcha, 2019). There are two common methods of sampling; probability and non-probability sampling. In this study, probability sampling was used for its

representativeness and to reduce sampling error as compared to non-probability sampling. Random sampling will give an equal chance of being chosen for each member of the population (Rahi, 2017; Jilcha, 2019). The sampling process was stratified to avoid biases among communities' ethnic strata. This aimed to ensure the sampling approach avoided any bias (Gabler and Hader, 2016; Rahi, 2017).

Before conducting the survey, the Kebele administration was sought to have an overview of the structure of the kebele`s households and used as a reference to determine the composition of the sample. Kebele household heads are listed to permit acquiring a sampling frame. The population was classified into strata of three sub-groups following ethnic classes for the simplicity of sampling, triangulation of their forest dependency, and analysis. The three ethnic classes are Mejengir, Sheko, and non-local.

Sample household heads (n=60) were selected through stratified random sampling to have a representative sample of all ethnic classes and sex composition (Sajjad Kebir, 2016; Rahi, 2017; Cronoy, 2018; Jilcha, 2019). Although the study is at the smallest government administration structure (kebele), to be cost-effective, the size of the sample may be considered small. However, no significant data differences would be expected from increased sampling under a similar socioeconomic structure (Hertwig and Pleskac, 2010).The sample was distributed into three ethnic classes proportionally (Mejengir 16, Sheko 18, and Nonlocal 26) to secure representation of all ethnic groups.

The first sample was selected at random from the first 1-10 list of each group and the interval for the next n^{th} sample household was obtained by dividing the total listed household number (N) of the ethnic group by the proportion of samples given for that specific ethnic group (n). Stratified random sampling also helped to address female representation and to avoid any overwhelming biases of male-dominated data.

3.9. Research process

Preparation for the study was made through communicating with the kebele administration. Explaining the objective of the study, the process to be followed,

familiarization with the socio-culture of the kebele residents, sample selection, and assigning of language translators, the research was conducted from December 2019 to April 2021, taking into consideration, the convenient time of the interviewee, COVID-19 pandemic restrictions, and the researcher's own working commitments.

Finally, detailed data on the household livelihood assets external vulnerability factors (stress, loss in production, health problem, natural disaster, civil unrest) working institutions (supporting policy institutions), and activities (the practice of the household in combining these factors) were collected. Triangulation was also used to check whether they understand the questions. The process was also recorded for cross-checking during data translocation and coding (Denscombe, 2017; SajjadKebir, 2016; Saunders et al., 2019).

Initially, the data collection began by doing door to door, but travelling to each home and reliability of timekeeping were difficult. Because of this, the sampled household heads were asked to join the survey at an undisturbed, central place at a time suitable to them. Half of the data collection was conducted under COVID-19 pandemic restrictions. This had an impact on the study due to social distancing, staying at home and the safety of travelling. There was also an option to use a technological platform for data collection in this case (Lobe et al., 2020), but this could not be applied for this study, due to lack of skills and technological facilities available in the rural communities. The problem was managed through phone communication to arrange an appointment and maintaining social distance.

3.10. Ethical considerations

Ethical principles of research like informed consent, openness, and honesty, right of participants to withdraw, protection from harm, debriefing, and confidentiality striving for new knowledge, accountability, mutual trust, intellectual property rights are becoming central protocols of any research (Denscombe, 2017; SajjadKebir, 2016). These issues were addressed in this research during questionnaire preparation (evading any sensitive issues), data collection (respecting the communities and their culture), and data analysis (no sharing of information with the third party without their consent). Transparency and prior consent were

addressed during the data collection. Transparency was achieved by informing all participants about the nature and purpose (only for the purpose of study) of the research and the right to withdraw at any time (Saunders et al., 2019; Denscombe, 2017; Sajjad Kebir, 2016). Once the participants were aware of the objective of the research, the process to be followed, what will be done with the collected data, the right not to answer any sensitive question, and that the data will not be shared with any third party without their approval was communicated verbally. Their willingness to take part in the process was confirmed by signing a confirmation letter, which is the consent form (see Appendix 2). By doing so, the researcher has addressed the British Psychological Society's ethical principles respecting people, competence professional work, responsibility, and integrity (Code of Ethics and Conduct, 2018) and was approved by the University of Huddersfield's Ethics Committee. Once the participant's commitment to take part in the process was confirmed, a safe area that was free of any disturbance was selected; an introduction to the general content of the questionnaire was offered to relax the interviewee (see Appendix 1). After completion of the questionnaire, a debriefing of the researcher's understanding was made for confirmation of any misunderstanding and making adjustments if needed. At the end of the survey process, verbal thanks was offered for the participants' patience, time, and valuable information.

3.11. Data Analysis

The analysis was carried out using SPSS Version 20 software and Microsoft Excel. The data was entered into the SPSS software, coded for analysis, screened, and cleaned to make sure that it is free of any mistakes before analysis. The SPSS software was used for descriptive and cross-tabulation analysis, while Microsoft excel was used for the creation of figures and graphs. Each of the questions was analyzed either descriptively by itself, in relation to others, and cross-tabulated among the ethnic classes to know the relation and difference of livelihood strategies of the diverse ethnic class, the contribution of the forest to the total incomes of the different ethnic classes, and factors affecting the income to be generated from forest-related products. The analysis of data was performed based

on the logic of a positivism approach to arrive at a comprehensive understanding of livelihood experience and knowledge of the communities.

3.12. Reliability and Validity

Reliability and validity of research are features to be used in research quality measurement (Mohajan, 2017). They measure the repeatability and accuracy of the research data and finding. Reliability measures the stability/ consistency of the data measurement tool across time and researcher which is the repeatability of the research, while validity measures how is the accuracy/ appropriateness of the measurement against other existing theories and data (Taherdoost, 2016; Mohajan, 2017).

In this study, questionnaire data collection, which is commonly applicable for social studies, has used to collect relevant, reliable, and valid data (Sajjad Kabir, 2016), which shows questionnaire tools have got the recognition of scholars in terms of reliability and validity of its measurement. So, attention was given to framing contents by referring to existing literature. Accordingly, the questionnaires are designed following the universally recognized sustainable livelihood guideline and were checked by a technical expert to maintain the validity and reliability of its content (Taherdoost, 2016). Pilot testing was also done and the undesirable items were excluded to maintain the consistency of the questionnaire. Finally, it was applied for actual reliable data collection, and if the data reliability is maintained, then its validity is expected to be high.

3.13. Summary

This methodology elaborates upon the adopted procedures of this research. It shows the philosophy of the research, how the research was designed, and how the questionnaire was developed. The sample size, means of sampling, data collection process, method of data analysis, ethical issues and reliability/ validity of the measurement were presented. The next chapter outlines the results of the data analysis and demonstrates how assets are combined, substituted, and switched

under the existing institutional arrangement to gain improved living conditions by diverting risks and accumulating other form of asset.

CHAPTER 4. RESULT OF THE ANALYSIS

4.1. Introduction

The results of the analysis are presented sequentially following the DFID SLF. Demography of the households is presented first to provide an overview of the households featured in the sample study area, followed by the livelihood strategy of the households which contributes to the first objective of the study. The analysis shows how different ethnic groups are combining the assets they have, what vulnerable factors and operating institutions are affecting them, and how they are managing these prevailing factors to achieve wellbeing. Following this, the contribution of the forest products and PFM to the livelihood of forest-dependent communities is presented which shows the significance of forest in the livelihood of the household and how it has been managed by different ethnic classes. The analysis of other livelihood elements is also presented to indicate how they have been influencing the means of livelihood diversification of the household.

4.2. Demography characteristics of the households

4.2.1. Ethnic and age distribution

The demographic distribution of the sample shows that respondents are ethnically composed of Mejengir (16HH, 26.7%), Sheko (18HH 30%), and nonlocal (26HH, 43.3%) communities with a gender proportion of 60% male and 40% female (Figure 3). Their age distribution falls in the range of 20-59 years (96.7%), the effective working age and above 60 years (3.3%) which play a reduced role when contributing to the activities of the household (see Figure 4). The detailed triangulation of the age structure of the respondent pointed out that the local communities (Sheko and Mejengir) are marrying at an early age (20-30 years) while the nonlocal communities are entering marriage after reaching 30 years old.

Figure 3. Sex distribution of the sampled household

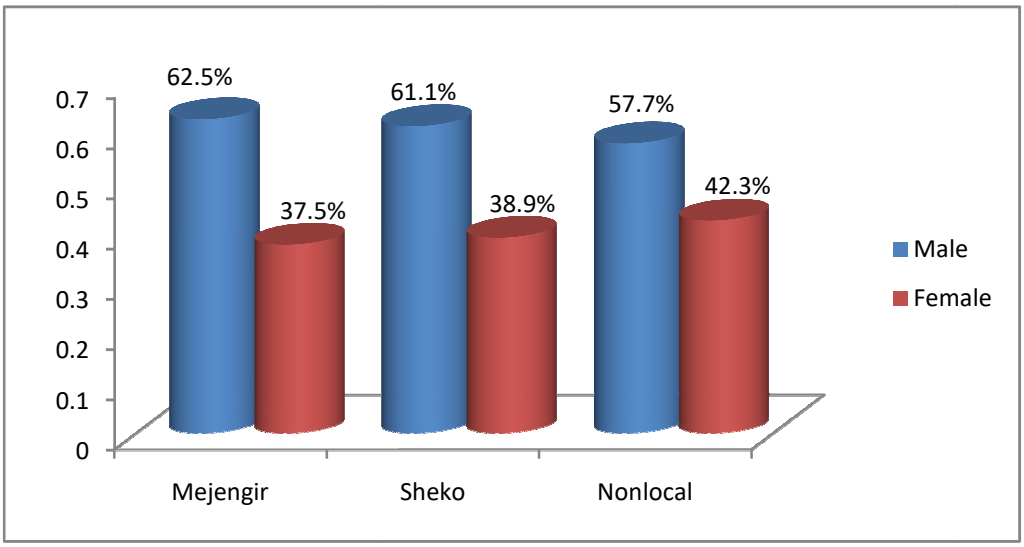
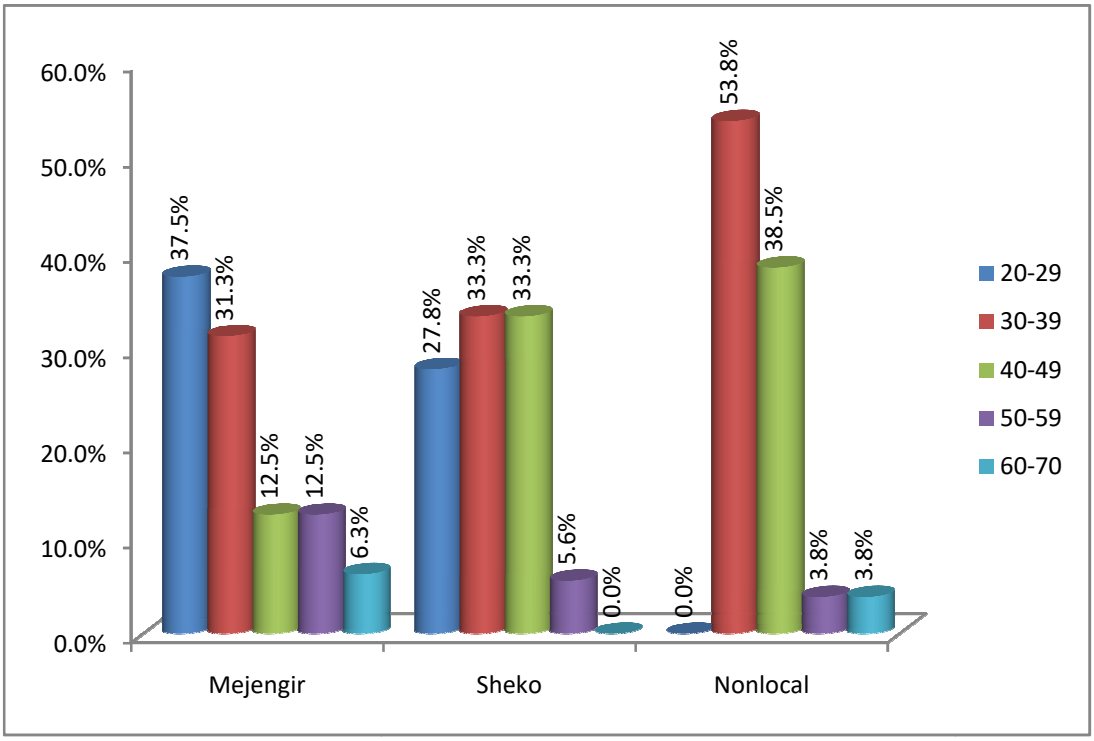


Figure 4. Age class distribution of the sampled household heads



4.2.2. Educational status of the sampled household heads

The education status of the sampled household heads revealed 48.3% as being illiterate and could neither write nor read and 51.7% are literate. The ethnic class

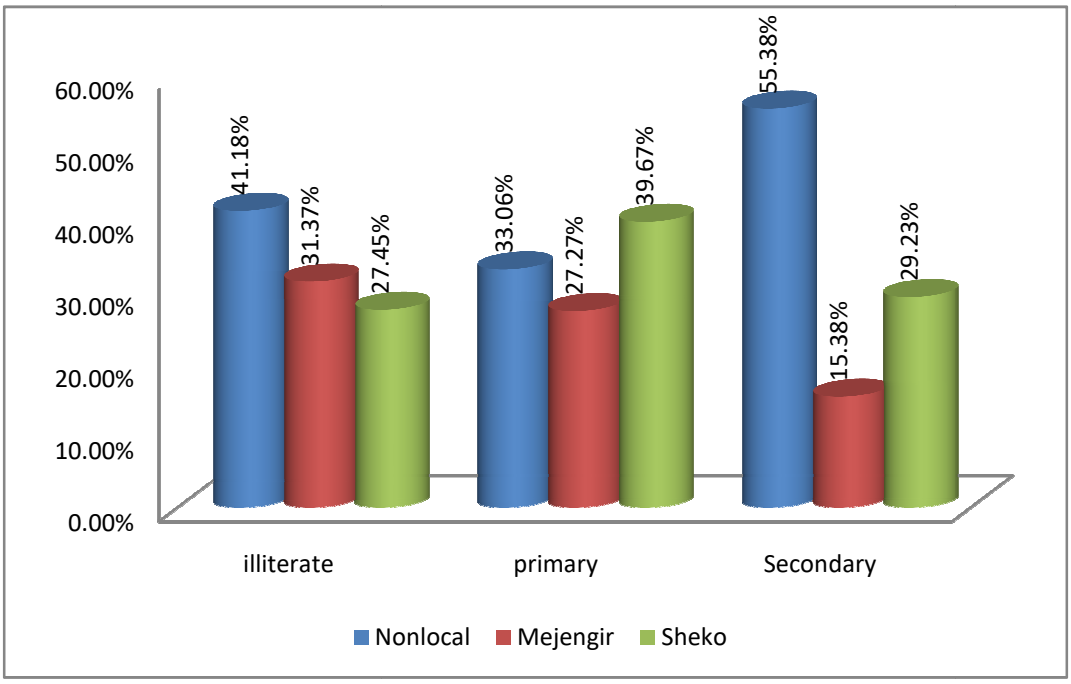
distribution of illiteracy shows 69% of Mejengir, 42% of nonlocal, and 39% of Sheko were illiterate (Table 1). Higher ratios of illiterate household heads were observed due to a lack of formal and informal education centre in the kebele. This was especially apparent regarding the Mejengir communities who were too far from the education centre, even though a supplementary school has now been constructed near their residence. On the other hand, the broader illiterate Nonlocal communities are individuals who are living on other`s farmland, supporting their livelihood through shared farming, labour work, and are economically weak to attend school. This shows illiteracy is adversely affecting the livelihood diversification capacity of the household (Kassa, 2019; Gebru et al., 2018) because educated household heads have better skills and knowledge to look for alternative livelihood diversification opportunities and have better access to technologies than illiterate individuals.

Table 1. Sampled Household head's Educational status

Ethnic Class	Educational Class attained											Total
	0	1	2	3	4	5	6	7	8	9	10	
Mejengir	11	0	2	0	1	0	0	0	1	1	0	16
Sheko	7	0	3	2	0	0	1	3	0	0	2	18
Nonlocal	11	1	1	0	1	2	5	2	2	0	1	26
Total	29	1	6	2	2	2	6	5	3	1	3	60

Statistics of the family education status (from the total count) show that 78.5% were literate and 21.5% whose age is greater than 7 years are illiterate. This shows that households are committed to educating their children and access to school is improving through time. The detailed triangulation of family education status shows that the nonlocal communities represent the highest ratio of the illiterate (41.18%) and they have also the largest family ratio that attained secondary school (55.38%) (Figure 5).

Figure 5. Educational status of the Sampled Households Families

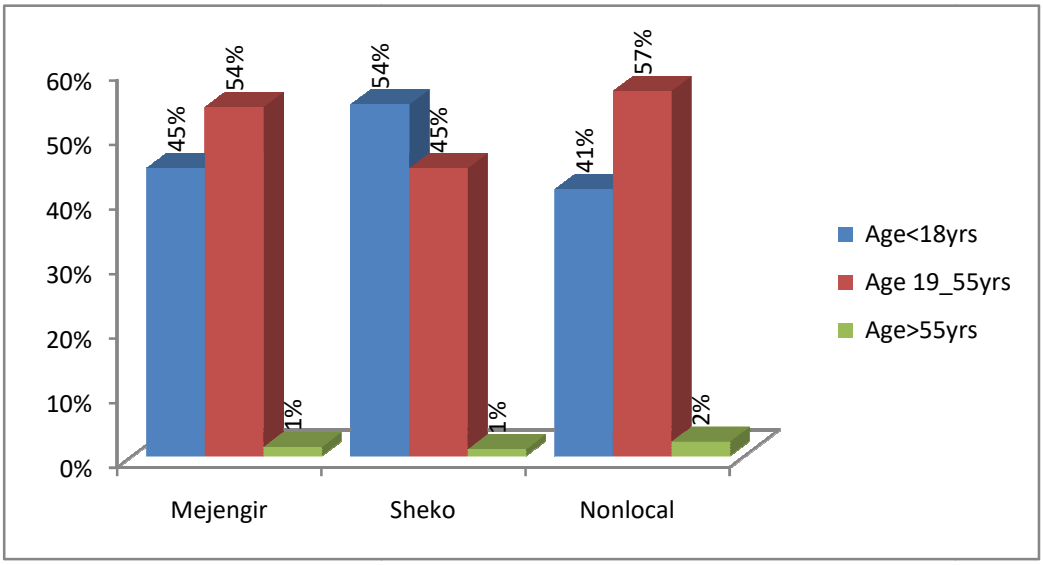


The reason behind this statistic is that nonlocal households have a shortage of initial assets due to a lack of farmland, but can increase their assets through shared production. Once they build assets, they are committed to educating their children up to the completion of secondary school and colleges for the succeeded ones. However, the youth of local communities start to develop their own assets and family at a premature age by dropping out of their education. These results are in line with the early age characteristics of the local communities' households (Figure 4).

Age distribution of the sampled household's families was also assessed to identify their contribution to the livelihood. The result shows a significant number of family members are below age 18-year (46.67%). More than half of the families are of working-age between 19-55-year(52%), and 1.33% are above 55-year (Figure 6). Ethnic class-based distribution of the family age structure shows the Sheko communities contain the highest ratio of under 18-year age (54%) and the lowest ratio of effective working age (45%) which indicates they have weak understanding on the value of family planning and give birth at their early age because usually children are considered as an asset. A significant number of families below age 18-year and above 55-year has a negative impact on the livelihood diversification

strategy of the household because they are less able to engage in income-generating activities (Kassa, 2019; Gebru et al., 2018).

Figure 6. Age structure of the household Families

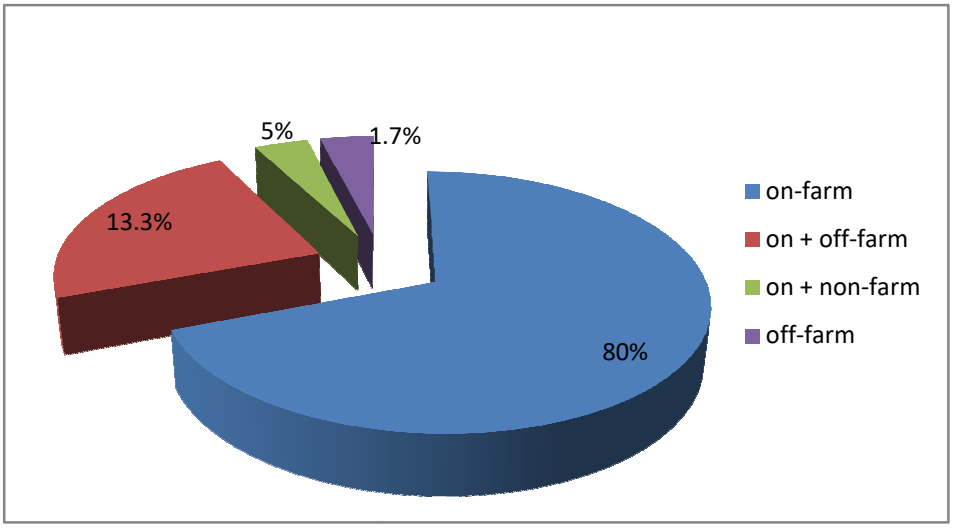


4.3. Means of Livelihood diversification

In this particular study area, the economic activities of the respondent are classified into on-farm, off-farm, non-farm, and their combination for analysis reason. On-farm activities are farming of cereals, fruit, vegetables, and livestock husbandry practiced on the rural farmland. Off-farm activities are off-season activities that could be done to support the income of the household which include employment on other farmer`s land for daily payment, selling of fuelwood/charcoal, and handcrafting. The non-farm activities are trading of different subsistence material like selling of small goods, serving of local drink and food to diversify and accumulate cash income. A combination of these activities was seen in the study area because the on-farm income alone could not feed the growing population and off-farm and non-farm activities are not well developed in the study area due to lack of infrastructures. So, even though agriculture has continued to be the primary economic activity of the rural farming communities, engagement in diverse livelihood activities to generate income and enhance life security was observed among the sample. The results show on-farm (crop production and livestock husbandry) is the main and dominant

livelihood diversification activity of the households (80%) combining on-farm with off-farm activities (working for daily labour, selling of fuel-wood, and charcoal) was accounting (13.3%), combined on-farm with non-farm (selling of local drink and food) activities were shared (5%) and only 1.7% of respondents were engaged in off-farm activities (Figure 7). Ethnic base triangulation of livelihood diversification shows 93.8% of Mejengir, 83.3% of Sheko, and 69.2% of nonlocal communities were engaged in the intensification of on-farm activities. The combining of on-farm with off-farm activities was exercised by 23.1% of nonlocal, 11.1% of Sheko, and no Mejengir communities. On-farm is combined with non-farm activities by 6.3% of Mejengir, 5.6% of Sheko, and 3.8% of Nonlocal communities to support their livelihood from seasonal petty trades (selling of local drink and food). Exclusively Nonlocal communities were engaging in off-farm activities (3.8%).

Figure 7. Means of livelihood diversification of the sampled household heads



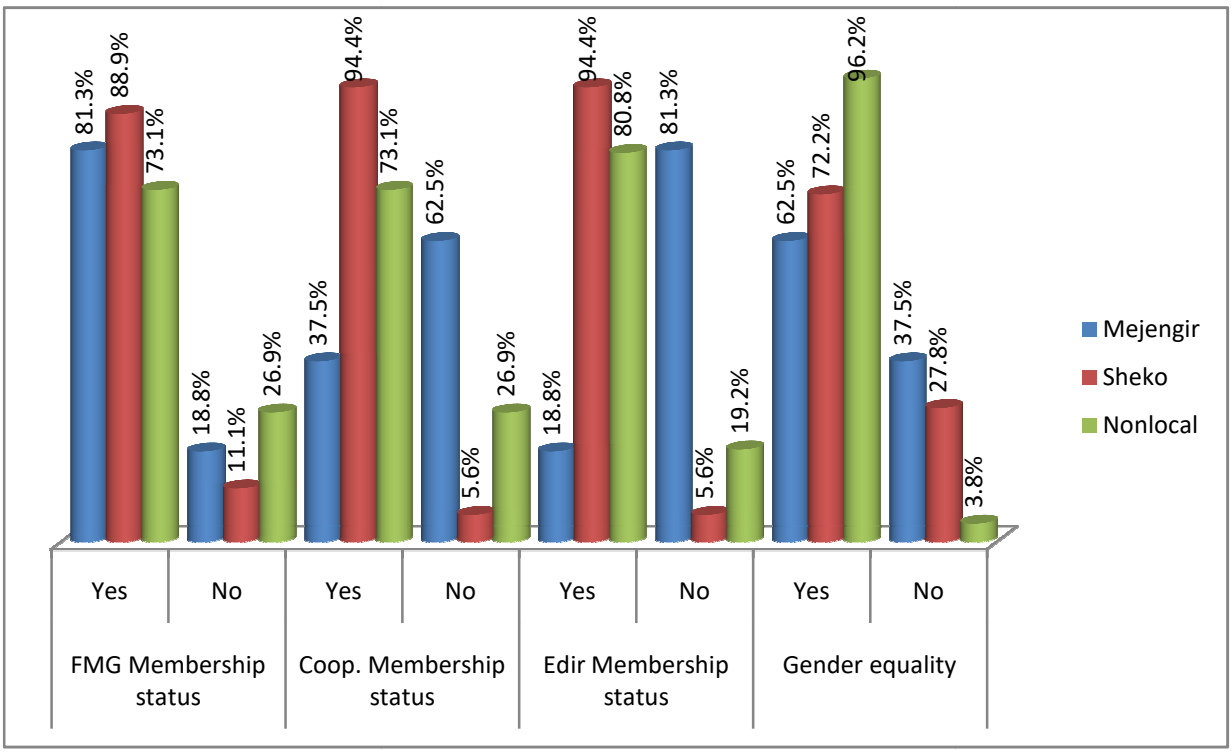
The results show that mixed agriculture (cereals, livestock, fruit, and vegetable) represents the main economic activity in the study area from which almost all (80%) the sample households derived their livelihoods, mainly from subsistence agriculture (composed of crop production and livestock husbandry) and forest products from PFM forests. In addition, agriculture constitutes the most important source of employment, livelihood diversification and helps to retain a strong relationship between the landholding households and shared producers under their local norms.

4.4. Status of Social Institutions

The analysis on the social interaction of the sampled households shows that all sampled households are members of formally established kebele administrations (to get legal administrative support and protection) and non-formal collaborating institutions (to share social problems and support). These two arrangements are morally respected and accepted by the local community and government because they have been contributing to the smooth relationship of communities between each other and with the local government. Enhanced membership to a marketing cooperative was seen amongst the Sheko 94.4% and Nonlocal 73.1%, but the proportion is small for Mejengir communities 37.5%. The reason behind is they have received an extension service lately due to infrastructure problems and the isolated living culture of the Mejengir communities. Being a member of any formal or informal institution will enable them to acquire different social services and increase the bargaining ability to secure rights and benefits over different assets (Kassa, 2019; Gebru,et.al.,2018).

Edir, the locally established supporting institution was used and highly acknowledged by the Sheko 94.4% and Nonlocal 80.8% communities to support each other. Members of Mejengirs were least likely to participate in Edir (18.8%), because they have been receiving the services of Edir from their church (Figure 8). Gender sensitivity of ethnic classes was analyzed and show the Nonlocal communities were highly encouraging of female decision-making in the household management (96.2%), followed by Sheko(72.2%) and Mejengir(62.5%) (Figure 8). This show the Mejengir communities are less committed to practicing gender equality due to a lack of awareness and cultural influence.

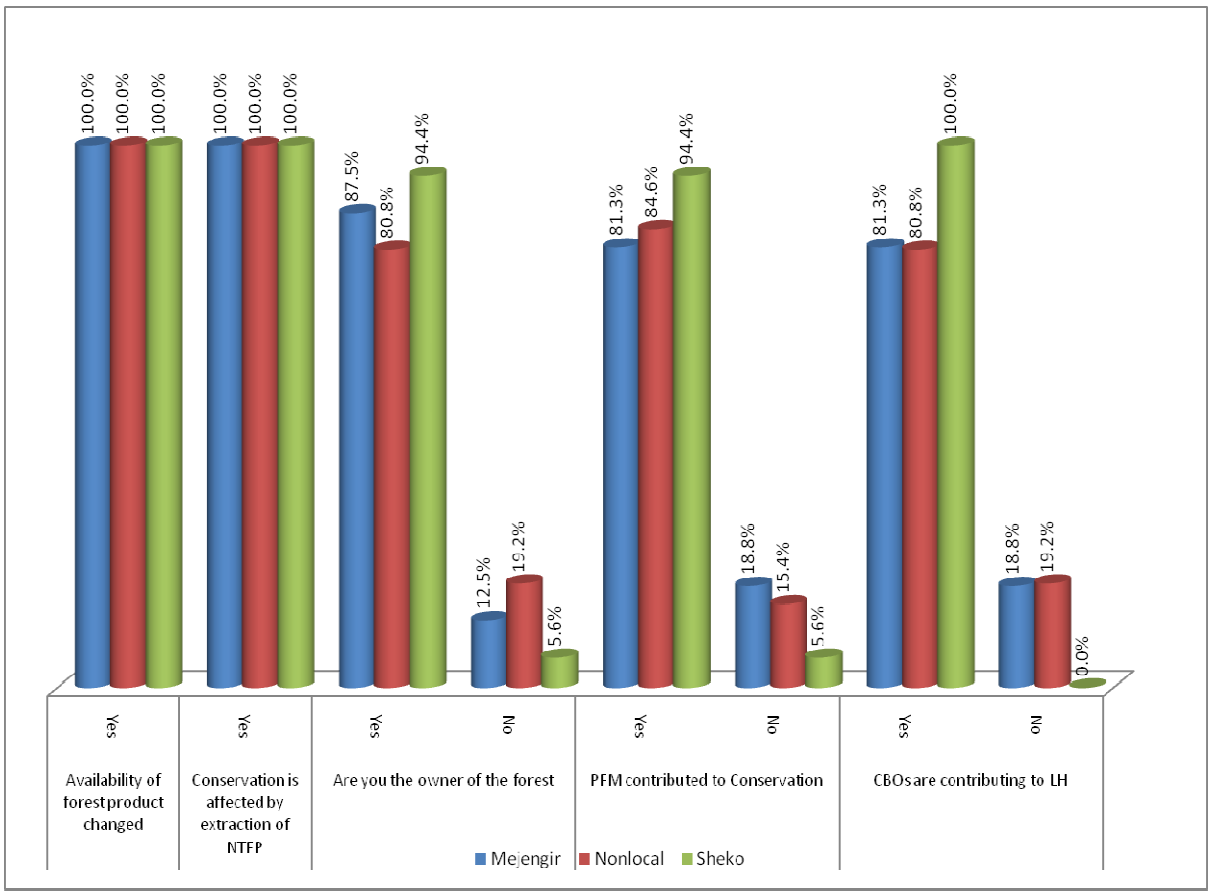
Figure 8. Membership status of the sampled households to different Institutions



On the other hand, 88.9% of Sheko, 81.3% of Mejengir, and 80% of nonlocal ethnic classes are members of the Forest Management Groups (FMG) (Figure 8). This higher percentage of engagement shows that the communities are highly committed to managing their forests sustainably due to the introduction of the PFM approach, because the forest was seriously degraded due to forest land grabbing. NTFP especially forest coffee development was aggravating the degradation of the forest and resulted in a shortage of forest products (Figure 9). Triangulation over the problem shows forest coffee development was negatively affecting the forest cover and forest diversity (100%) and resulted in a scarcity of harvestable forest products including fuel wood (Figure 9). On the other hand, the introduction of PFM has contributed positively to the establishment of regulated forest product extraction and laid the ground for sustainable forest and biodiversity conservation (Figure 9). The introduction of PFM has raised a sense of ownership for the communities (Sheko 94.4%, Mejengir 87.5%, and nonlocal 80.8%). Due to this, Sheko 94.4%, Mejengir 81.3% Nonlocal 84.6% have recognized that PFM is a potential means to secure

sustainable forest management and have recognized that it has contributed to the LH of forest-dependent communities (Figure 9).

Figure 9. Value of PFM to forest degradation mitigation



4.5. Status of land holding

The analysis for the per household landholding of respondents reveals that the total land holding of the communities is Mejengir (38.7%), followed by Nonlocal (35.8%) and Sheko (25.5%) (Table-2). The results demonstrate the landholding nature of the three community classes because the sampling is representative and witnessed by their location. As we go far from the center (main road) to the remote area of the kebele, the communities are less populated and have access to more land.

Table 2. Land use system (ha) of households under different ethnic class

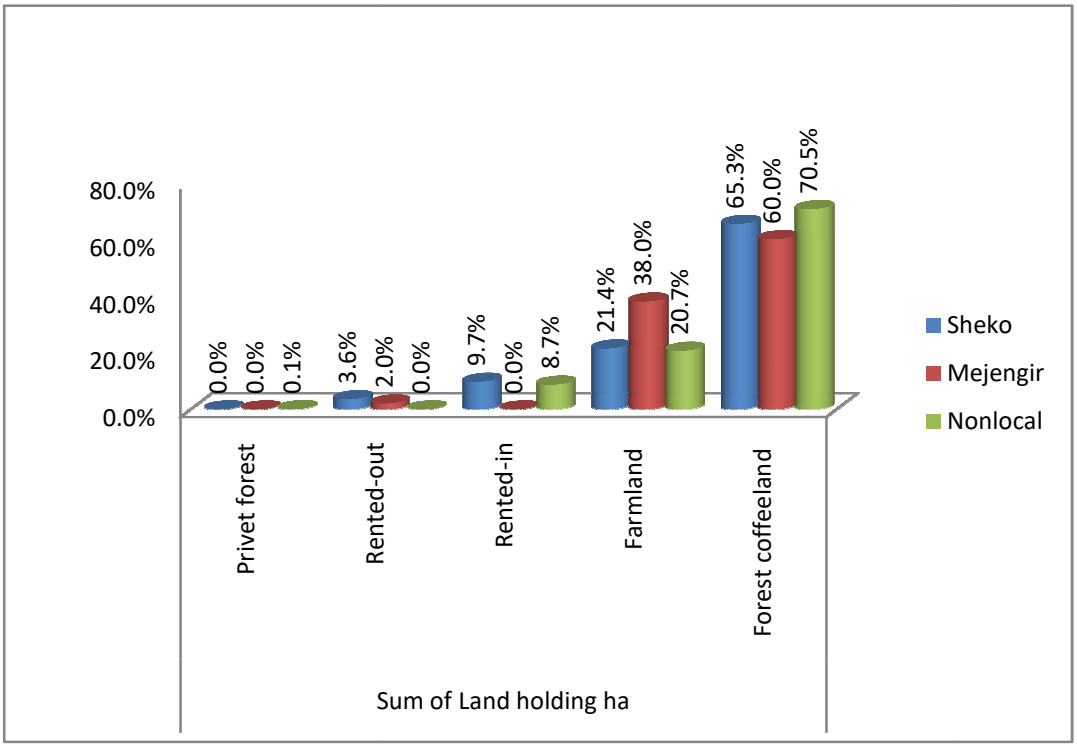
Ethnic class	Rented in	Private Forest-land	Rented -out	Farmland	Coffee land	Total land	Percentage
Sheko	4.75	0	1.75	10.5	32	49	25.5%
Mejengir	0	0	1.5	28.2	44.5	74.2	38.7%
Nonlocal	6	0.055	0	14.2	48.5	68.755	35.8%
Total	10.75	0.055	3.25	52.9	125	191.955	100.0%
Percentage	6%	0%	2%	28%	65%	100%	

The triangulation of the dominant landholding (coffee and crops) show that non locals are more likely to be forest coffee landholders (38.8%) while the Mejengirs hold cropping land (53.3%) (Table-2). This shows that the nonlocal communities have given enormous attention to commercial cropping than subsistence, which shows their livelihood diversification skills to manage their livelihood in the absence of farmland. The landholding is extremely irregular from 0-12 ha. For example, from the total respondents, landless was accounted by 8.3% and respondents without coffee land represent 10% and both are from nonlocal communities. Similarly, 36.7% of farmland holders (for annual cropping and settlement) have less than 0.5ha which is insufficient for food self-sufficiency of the household expected to be a minimum of 1ha (Reichhuber and Requate, 2012), but 46.7% of the respondents have a total land area (farm and forest coffee) greater than three ha. This irregular distribution of land enforced communities to diversify available assets to access other form of assets.

Averaging the total land use system of the communities shows, the land is mainly retained for forest coffee (65%), followed by annual crops (27.6%), and the remaining are land rented in (5.6%) and land rented out (1.7%) (Figure 10). Some individuals are forced to rent-out part of their land during shortage of income commonly during health problem and wedding ceremony, while better-off individuals will rent-in from these individuals to increase asset of the LH. Maize, sorghum, and root crops are the dominant annual crops grown by the communities mainly for subsistence and to a lesser extent for income generation. Different fruit species

(Banana, Avocado, Mango, papaya, citrus) and spices are grown using an agroforestry system to support household food self-sufficiency.

Figure 10. Landholding Distribution of the sampled households



4.6. Forest product harvesting and utilization status

The natural forest which is managed under PFM has become the sole source of forest products of respondents. The forest harvesting status of respondents shows that fuelwood has been collected from the natural forest mainly for home consumption (100% local communities and 92.3% nonlocal communities), and a small amount (7.7%) of the nonlocal communities were collecting fuel-wood both for home consumption and income-generating (Table 3).The responsibility of fuelwood collection for home consumption is on the shoulder of women`s (Mejengir (93.8%), Sheko (72.2%), Nonlocal (69.2%)), which shows nonlocal women are receiving better labour support from their husbands during fuel-wood collection (30.8%) (Table 4).

The results also show that forest coffee has been collected by all communities as a source of income (100%), both male and female have been working jointly in the harvesting process (78.3%), unless women are house head (20%). Benefits from the forest coffee were also managed jointly in a transparent way (66.7%), but a considerable male monopolization of the benefits was seen (13.3%), especially in the Mejengir communities (Table 3, 4, and 5).

Mejengir and Sheko communities were well known for traditional beekeeping, but the results show that only 55% of the respondents have a beehive for honey production, and 45% of the respondents are not practicing beekeeping (Table 3). This indicates that the tradition of beekeeping has gradually been declining within the current generation. The Mejengir and Sheko communities produce a relatively similar amount of honey for income-generating (i.e.68.8% and 66.7% respectively) and some nonlocal (Meniet and Bench) communities contribute 38.5% of their annual income from honey production. Harvesting honey has been the responsibility of the male since it needs tree climbing, and night travelling. The financial benefit coming from honey has traditionally been managed by males (51.5%), although some households were managed jointly (36.4%) and the remaining 12.1% of honey production and benefits have been managed by women when they are a house head. Women house heads who have a beehive have been harvesting honey through labour payments and shared production with an experienced male (Table 5).

Interpretation of forest spice harvest status shows 43.3% were not collecting and generating any benefit from spices at all, 21.7% were collecting for income generation, 33.3% were harvesting only for home consumption, and only 1.7% was collecting both for income-generating and home consumption (Table 3). Spice collected for income-generating is mainly from the domesticated Black paper, long papper, Indian cardamon, Ethiopian cardamon, turmeric, and some herbs from home gardens. Forest spice collection was commonly done by the male (8.3%) when they travel to the forest for hanging and checking of beehives, and other forest product collection since forest spice availability is infrequent. The benefits from spices for home consumption were managed totally by women and the income generated from spice sales is managed by the female (26.7%), male (1.7%), jointly (28.3%) (Table 5).

The forest fruit collection is mainly for home consumption (88.3%) and commonly collected by women (88.3%) and they were mostly used for home consumption and sold for income-generating. The widely collected forest fruit is Luya (Trichilia dregeana) both for home consumption and market, others with the sweet and sour taste have been collected by children for enjoyment and cultural medicine. Weak utilization and harvesting of traditional medicine was seen in the study area. Most respondents (73.3%) were not collecting any traditional medicine and the existing (26.7%) collection was for a local medication for common sickness (Table 3, 4 and 5).

Construction wood was collected mostly for home consumption, and it was not a regular activity in the communities. This is mainly because most respondents have converted their home into iron sheet covered houses which can serve for more than thirty years based on the quality of the construction. Respondents also commented that illegal forest product collection (especially lumber) by economically weak individuals was carried out when they encountered a shortage of income to sustain the livelihood of their family.

Table 3. Status of forest product collection by the sampled households

Ethnic class		why fuel wood is collected		Why coffee is collected	Why honey is collected		Why spice is collected				Why forest fruit is collected			Why traditional medicines are collected		Why construction wood is collected	
		Home consumption	Consumption & sell	income generation	No collection	income generating	No collection	income generating	home consumption	for both	No collection	home consumption	for both	No collection	home consumption	No collection	home consumption
Mejengir	Count	16	0	16	5	11	7	3	5	1	0	15	1	11	5	0	16
	% within the respondent	100.0%	0.0%	100.0%	31.3%	68.8%	43.8%	18.8%	31.3%	6.3%	0.0%	93.8%	6.3%	68.8%	31.3%	0.0%	100.0%
Sheko	Count	18	0	18	6	12	6	2	10	0	2	16	0	14	4	5	13
	% within the respondent	100.0%	0.0%	100.0%	33.3%	66.7%	33.3%	11.1%	55.6%	0.0%	11.1%	88.9%	0.0%	77.8%	22.2%	27.8%	72.2%
Non local	Count	24	2	26	16	10	13	8	5	0	3	22	1	19	7	6	20
	% within the respondent	92.3%	7.7%	100.0%	61.5%	38.5%	50.0%	30.8%	19.2%	0.0%	11.5%	84.6%	3.8%	73.1%	26.9%	23.1%	76.9%
Total	Count	58	2	60	27	33	26	13	20	1	5	53	2	44	16	11	49
	% within the respondent	96.7%	3.3%	100.0 %	45.0%	55.0%	43.3%	21.7%	33.3%	1.7%	8.3%	88.3%	3.3%	73.3%	26.7%	18.3%	81.7%

Table 4. Who are collecting the forest product

Ethnic class		Who are collecting																					
		fuel wood		coffee			Honey				Spice				forest fruit			traditional Medicine				construction wood		
		Female	Both	Male	Female	Both	No	Male	Female	Both	No	Male	Female	Both	No	Female	Both	No	Male	Female	Both	No	Male	Female
	Count	15	1	0	2	14	5	10	0	1	7	2	4	3	0	14	2	11	2	1	2	0	14	2
	% within the respondent	93.8%	6.3%	0.0%	12.5%	87.5%	31.3%	62.5%	0.0%	6.3%	43.8%	12.5%	25.0%	18.8%	0.0%	87.5%	12.5%	68.8%	12.5%	6.3%	12.5%	0.0%	87.5%	12.5%
	Count	13	5	0	4	14	6	9	3	0	6	1	4	7	2	16	0	14	2	2	0	5	12	1
	% within the respondent	72.2%	27.8%	0.0%	22.2%	77.8%	33.3%	50.0%	16.7%	0.0%	33.3%	5.6%	22.2%	38.9%	11.1%	88.9%	0.0%	77.8%	11.1%	11.1%	0.0%	27.8%	66.7%	5.6%
	Count	18	8	1	6	19	16	9	1	0	13	2	1	10	3	23	0	19	3	3	1	6	16	4
	% within the respondent	69.2%	30.8%	3.8%	23.1%	73.1%	61.5%	34.6%	3.8%	0.0%	50.0%	7.7%	3.8%	38.5%	11.5%	88.5%	0.0%	73.1%	11.5%	11.5%	3.8%	23.1%	61.5%	15.4%
Total	Count	46	14	1	12	47	27	28	4	1	26	5	9	20	5	53	2	44	7	6	3	11	42	7
	% within the respondent	76.7	23.3	1.7	20.0 %	78.3	45.0	46.7	6.7 %	1.7	43.3	8.3	15.0 %	33.3	8.3	88.3	3.3	73.3	11.7 %	10.0 %	5.0	18.3	70.0	11.7 %

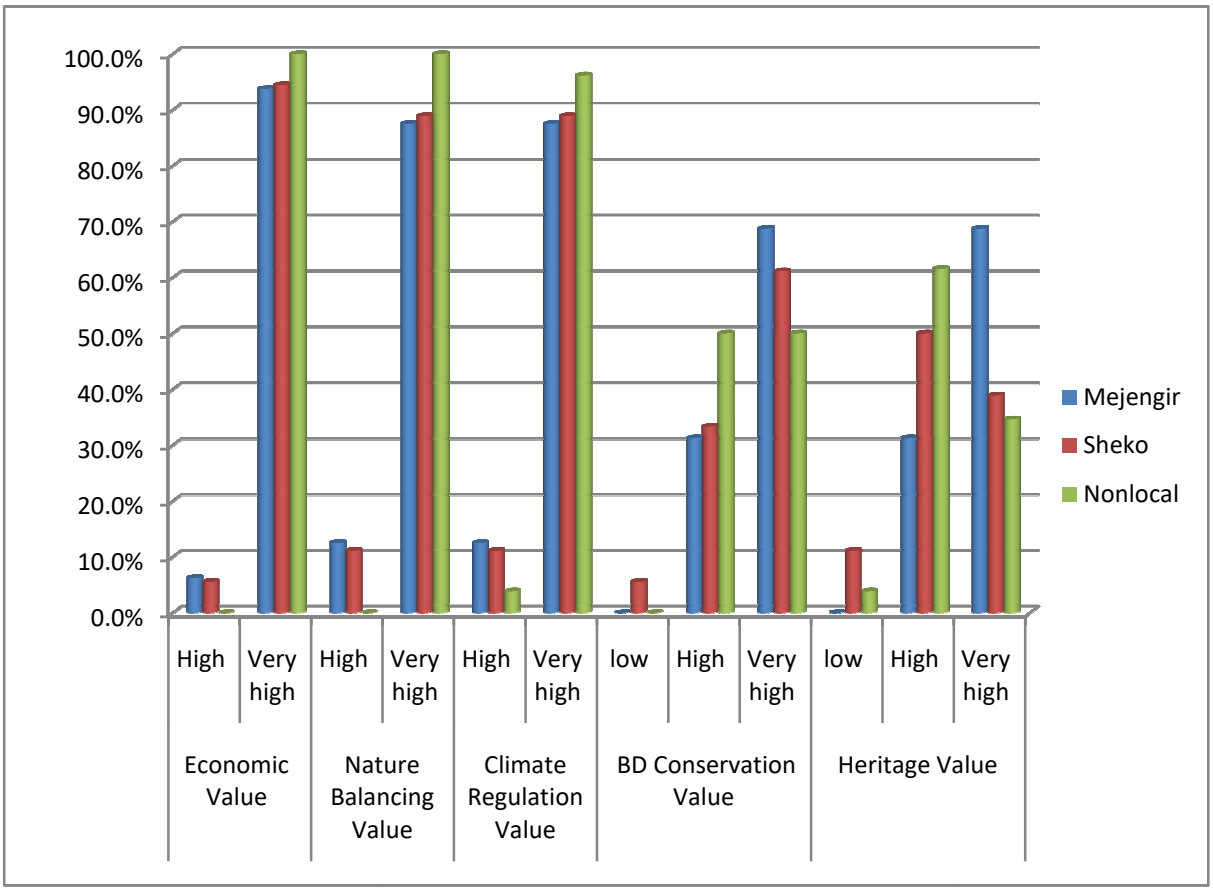
Table 5. Who manage the benefit of forest product

		Who will benefit from the																								
		Fuel wood			forest coffee			honey				spice				from forest fruit			traditional medicine				construction wood			
		Male	Female	Both	Male	Female	Both	.00	Male	Female	Both	.00	Male	Female	Both	.00	Female	Both	.00	Male	Female	Both	.00	Male	Female	Both
Mejengir	Count	0	16	0	4	2	10	5	5	0	6	7	1	6	2	0	14	2	11	1	1	3	0	14	2	0
	% within the respondent	0.	100%	0	25.%	12.5%	62.5%	31.3%	31.3%	0.	37.5%	43.8%		37.5%	12.5%	0	87.5%	12.5%	68.8%	6.3%	6.3%	18.8%	0	87.5%	12.5%	0
Sheko	Count	0	18	0	3	4	11	6	7	3	2	6	0	9	3	2	16	0	14	2	2	0	5	12	1	0
	% within the respondent	0	100%	0	16.7%	22.2%	61.1%	33.3%	38.9%	16.7%	11.1%	33.3%		50.0%	16.7%	11.1%	88.9%	0.0%	77.8%	11.1%	11.1%	0.0%	27.8%	66.7%	5.6%	0.0%
Non local	Count	1	24	1	1	6	19	16	5	1	4	13	0	1	12	3	22	1	19	2	2	3	6	15	4	1
	% within the respondent	3.8%	92.3%	3.8%	3.8%	23.1%	73.1%	61.5%	19.2%	3.8%	15.4%	50.0%		3.8%	46.2%	11.5%	84.6%	3.8%	73.1%	7.7%	7.7%	11.5%	23.1%	57.7%	15.4%	3.8%
	Count	1	58	1	8	12	40	27	17	4	12	26	1	16	17	5	52	3	44	5	5	6	11	41	7	1
	% within the respondent	1.7%	96.7%	1.7%	13.3%	20.0%	66.7%	45.0%	28.3%	6.7%	20.0%	43.3%		26.7%	28.3%	8.3%	86.7%	5.0%	73.3%	8.3%	8.3%	10.0%	18.3%	68.3%	11.7%	1.7%

4.7. Communities' perception to indirect value of the forest

Measuring the exact value of the forest in the livelihood of the community is challenging because communities offer no experience to record their income source and are unable to remember the benefits they gain from the forest. This forest valuation methodology also lacks uniformity. Due to this, estimating the relative income and scoring were frequently used in the valuation of the direct and indirect value of the forest. Likert scoring was conducted to assess the perception of the communities toward the indirect value of the forest. The sampled household heads were made to score their perception on the value of the forest as low, high, or very high. All of them scored the value of the forest as high and very high (Figure 11). This shows that they are highly valuing the direct and indirect values of the forest. Comparison between ethnic classes show the nonlocal communities valued the forest as very high (100%) regarding the economic and nature balancing values of the forest, while the Mejengir communities also value very high (68.8%) to the biodiversity and heritage values of the forest. This shows that the local communities have been valuing the sustainable value of the forest more than nonlocal communities, while nonlocal communities valued the immediate economic benefits and its regulating effect on the production.

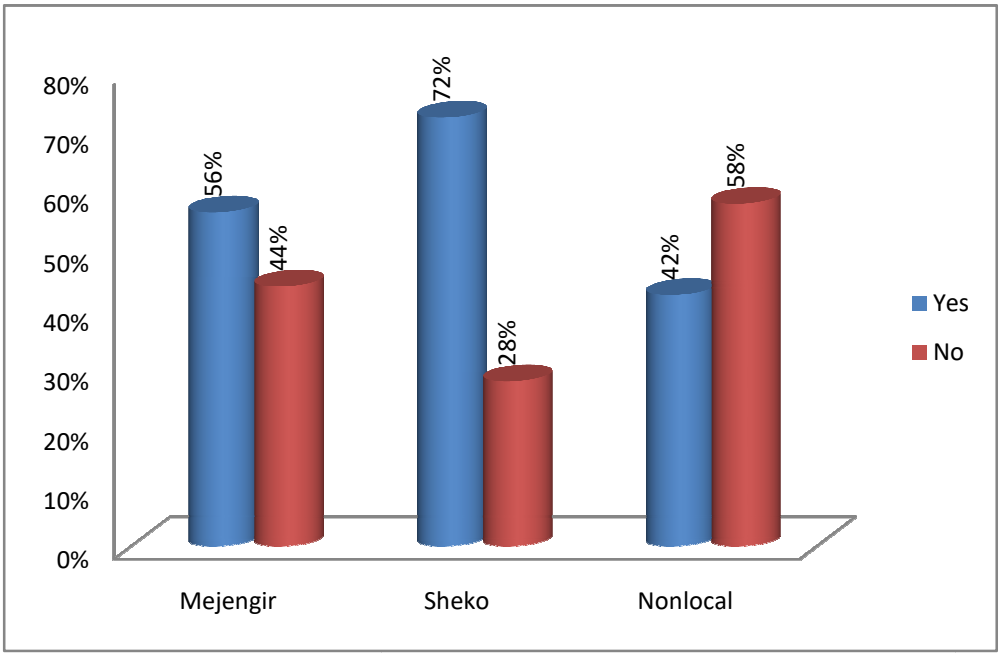
Figure 11. Perception of the respondent on the indirect value heritage of the forest



4.8. Status of annual income, Vulnerability and means of Mitigation regret

Even though 58% of Nonlocal, 44% of Mejengir, and 28 % of Sheko communities are capable of organising their livelihood through diversifying of available capital; Here, 72% of Sheko, 56% of Mejengir, and 42% of Nonlocal communities are exposed to a shortage of annual income to accommodate the services of their household (Figure 12). This condition has resulted from the impact of higher numbers of family members aged less than 18-years (Figure 6) and the value of education in diversifying the livelihood income (Figure 5 and Table 1).

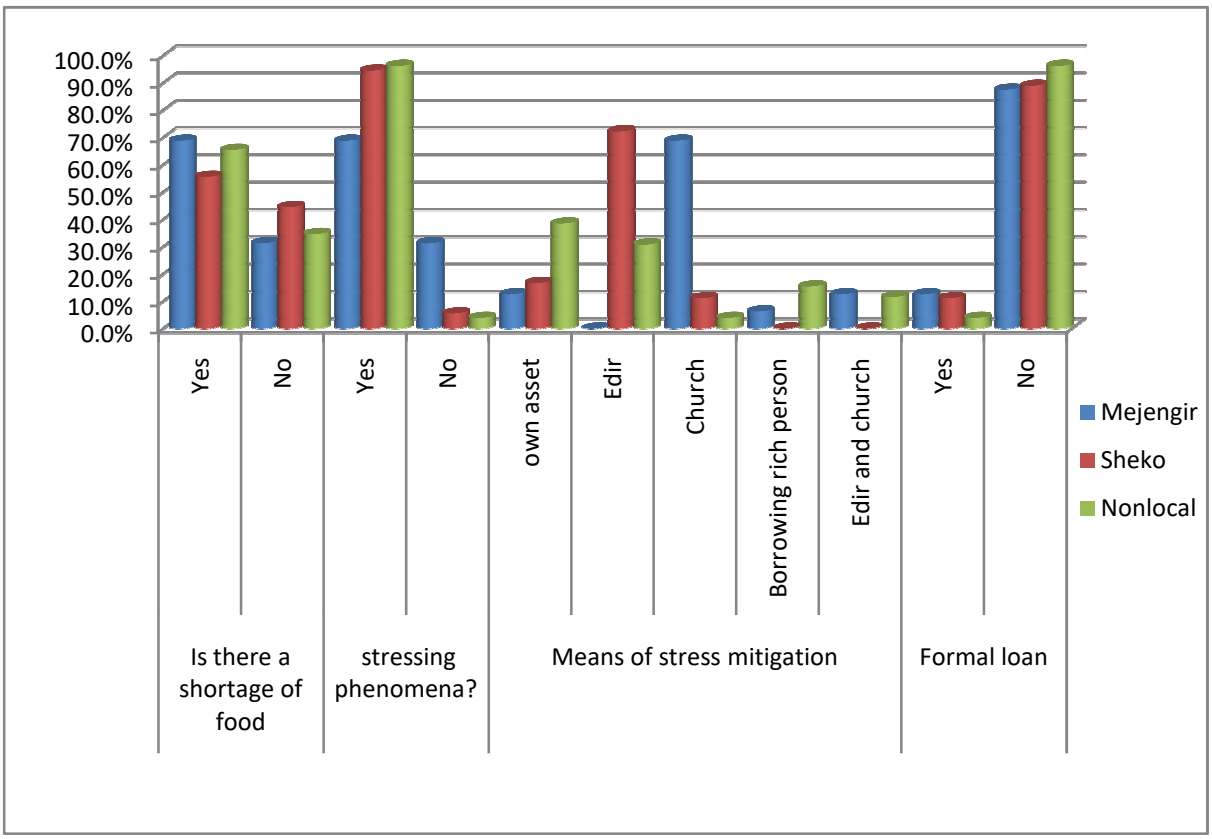
Figure 12. Is there a shortage of annual income to support households' subsistence?



Shortage of food in picking season, health problems, and unexpected civil unrest were identified as vulnerability factors of the communities. The unpredicted civil unrest from mid 2018- 2020 affected 96.2% of Nonlocal, and 94.4% of Sheko, and 68.8% of Mejengir communities for more than two consecutive years and exposed 44.4% of Sheko, 34.6% of Nonlocal, and 31.3% of Mejengir communities to a shortage of food self-sufficiency and displacement (Figure 13). Some of them managed the problem by themselves using accumulated assets (Nonlocal 38.5%, Sheko 16.7%, and Mejengir 12.5%). They also borrowed money from various sources to overcome the risk. Sheko 72.2% and Nonlocal 30.8% borrowed from their local institution Edir, while 68.8% of Mejengir, 11.1% of Sheko, and 3.8% of Nonlocal borrowed from religious institutions (church), 15.4% of Nonlocal and 6.3% of Mejengir were looked after by richer colleagues and 12.5% of Mejengir and 11.5% of Nonlocal borrowed equally from Edir and Church. The communities perceived the service from government crediting institutions as weak compared to other crediting informal institutions. Mejengir 12.5%, Sheko 11.1%, and Nonlocal communities3.8% obtained credit from formal government crediting centers (Omo micro-finance). The

proportion is insignificant compared to Edir because it is challenging to obtain their service during stressful times, due to the long bureaucracy and requirements of collateral. The above results show most of the communities were able to avoid risks using their accumulated assets and local institutions, and they have been reducing borrowing from rich colleagues significantly through time.

Figure 13. Stressing factors and means of mitigation

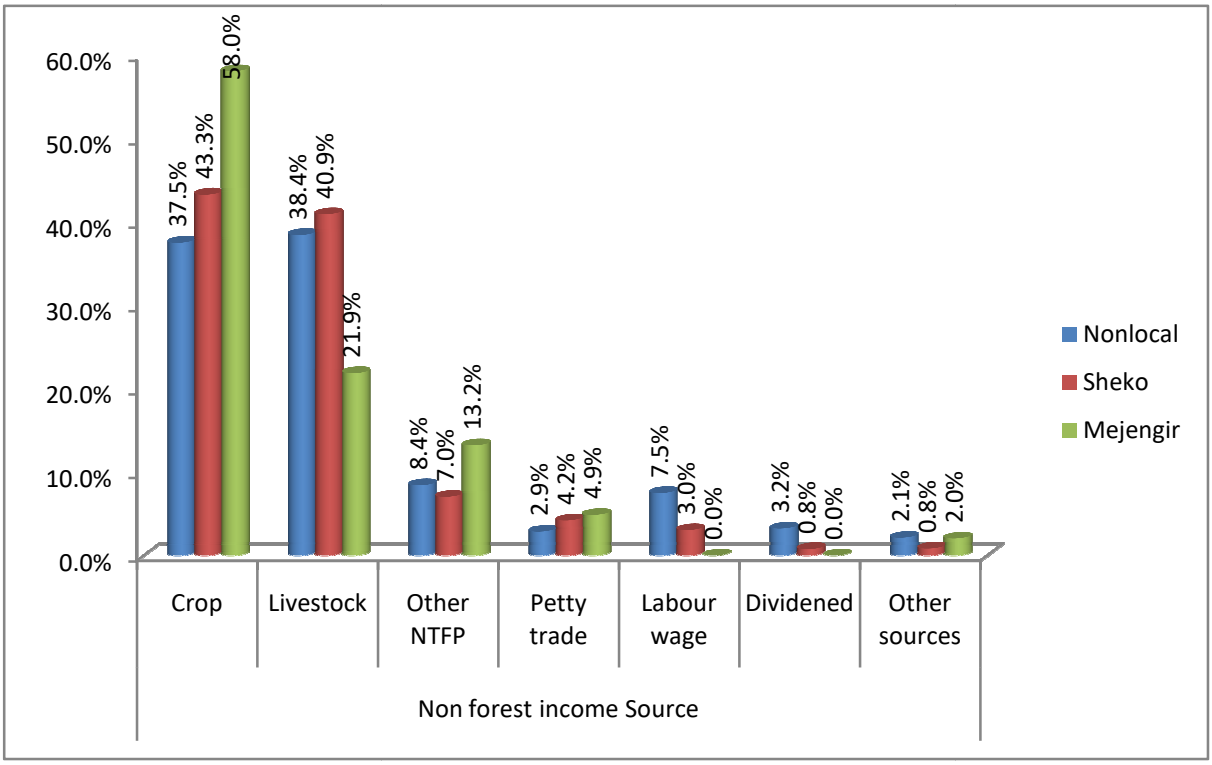


4.9. Relative income source of the household

The relative income of the household was explored by classifying it into forest and non-forest-based sources to demonstrate their contribution to the livelihood of communities. The non-forest base income source of the household has a better diversification than forest-based income because communities have better income-generating practices on home garden activities to diversify their assets and livelihoods. Ethnic class-based triangulation of non-forest-based income sources show that crop production has a relatively greater income contribution for Mejengir

communities (58%) followed by Sheko (43.3%) and Nonlocal (37.5%) (Figure 14). This is relatively in line with the landholding of the ethnic classes (Figure 10). Livestock has the highest relative income contribution to the Sheko communities (40.9%) followed by Nonlocal (38.4%), and Mejengir (21.9%) (Figure 14). This shows Sheko and Nonlocal communities have been supporting their livelihood using cattle and their by-products because they are closer to the town to supply the by-products easily to market than the Mejengir communities. On the other hand, they are share producers due to lack of farmland, and having an ox is a criteria to engage in shared production with landholders.

Figure 14. Relative income contribution of Non-forest sources for the sampled households



The known Non-timber spice which is produced out of the forest is turmeric (erid). The production of turmeric (other NTFP, Figure 14) was high in Mejengir communities (13.2%), followed by Nonlocals (8.4%) and Sheko (7.0%), because its production is dependent on the availability of land and shared producer since it is a labor-intensive activity. Seasonal trading activity during coffee harvesting time is exercised by local women to supply daily subsistence food and local drinks since

there is a surplus cash income in the hand of the local communities. Temporal trading is exercised better in the Mejengir (4.9%) and Sheko (4.2%) communities to accumulate financial assets compared to nonlocal (2.9%) communities since a license is obligatory in their living area (it is part of the town administration). Livelihood income diversification through labour work was practiced in Nonlocal (7%), Sheko (3%), but not in Mejengir communities (see section 4.3 and Figure 14). This was due to the existence of landless households in the nonlocal communities engaged in casual work and shared production to support their livelihood. The dividend from the marketing cooperative was insignificant in general, despite the fact it has been growing based on easier accessibility to governmental extension services. The Nonlocals who are living along the main road have been generating a considerable benefit (3.2%) from the marketing institution, while Sheko (0.8%) which is insignificant and not at all in Mejengir communities (Figure 14). This shows that the government extension service has been growing from the town to the remote areas slowly. Income from renting of houses and remittance from relatives contributed to the total income of Nonlocal (2.1%) and renting out of land were contributed for Mejengir(2%) and Sheko (0.8%) communities as another source of income to support the livelihood of the households.

On the other hand, the relative forest-based income of the household (51.8%) is more significant than the non-forest based income (48.2%) (Figure-15), but it is enormously contributed by a single product forest coffee (74.5%) followed by wood products (12.8%), traditional honey production (7.9%) and spices (4.9%). The triangulation of forest-based income with ethnic class shows forest coffee has a higher income contribution for the nonlocal communities (77.2%) followed by Sheko (73.1%) and Mejengir (71.1%), but the opposite is apparent for income from traditional honey production Mejengir 15.6%, followed by Sheko 6.6% and Nonlocal (Meniet and Bench communities) 3.7% (Figure 15). Incomes from spices contributed 7.7% for Nonlocal, 2.4% for Mejengir, and 2.0% for Sheko communities. The spice income is ordinarily from home gardens than the natural forest. Nonlocals have been benefiting more than the others due to their location (near to the main road) and faster adaptation of agricultural extension services. The volume of traditional honey production is better in Mejengir communities (15.6%) since beekeeping is their early tradition but, it is reduced as compared to the honey potential of the area. The

reason behind this is the current generation of the local communities have been departing from the tradition of beehive hanging. The elders are less able to climb a tree and make a beehive while the young are unmotivated to do so. They (the local communities) have been giving tremendous attention to forest coffee development due to its better market linkages. The locals have more forest areas before the introduction of the PFM approach and were easily getting forest coffee using nonlocal labour through shared production. This enables Mejengir communities to enjoy developed forest coffee land with the least input and the nonlocal communities have got an opportunity to get some forest coffee land through shared coffee development by contributing their labour and money.

Figure 15. Relative income contribution of Forest based income sources for the households

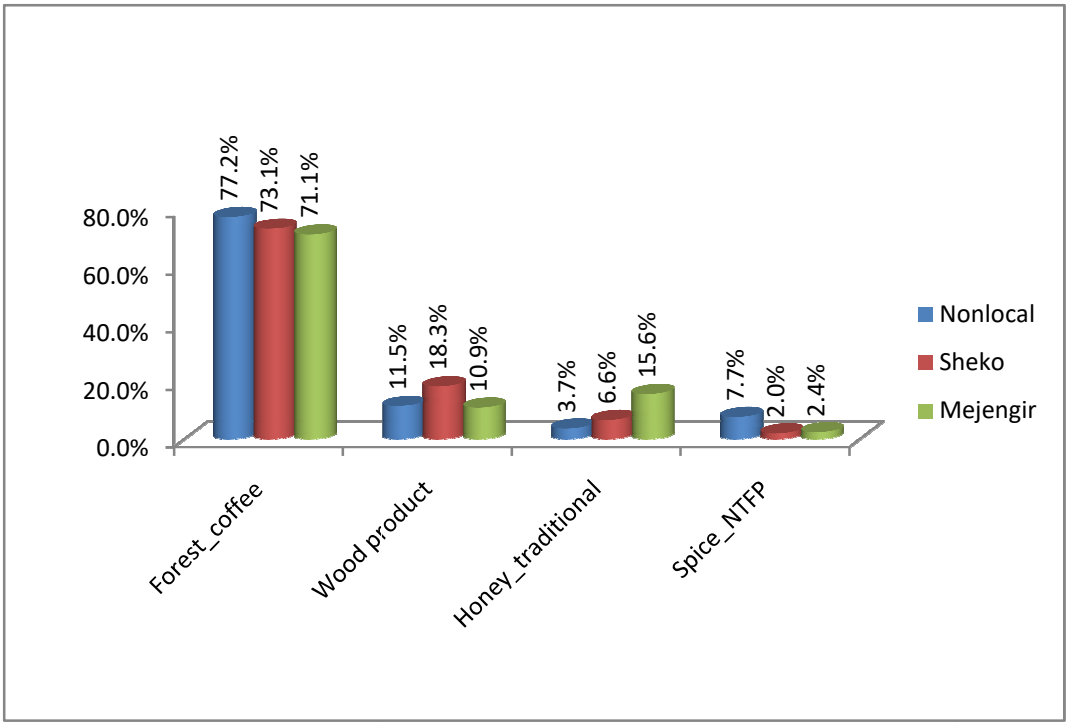
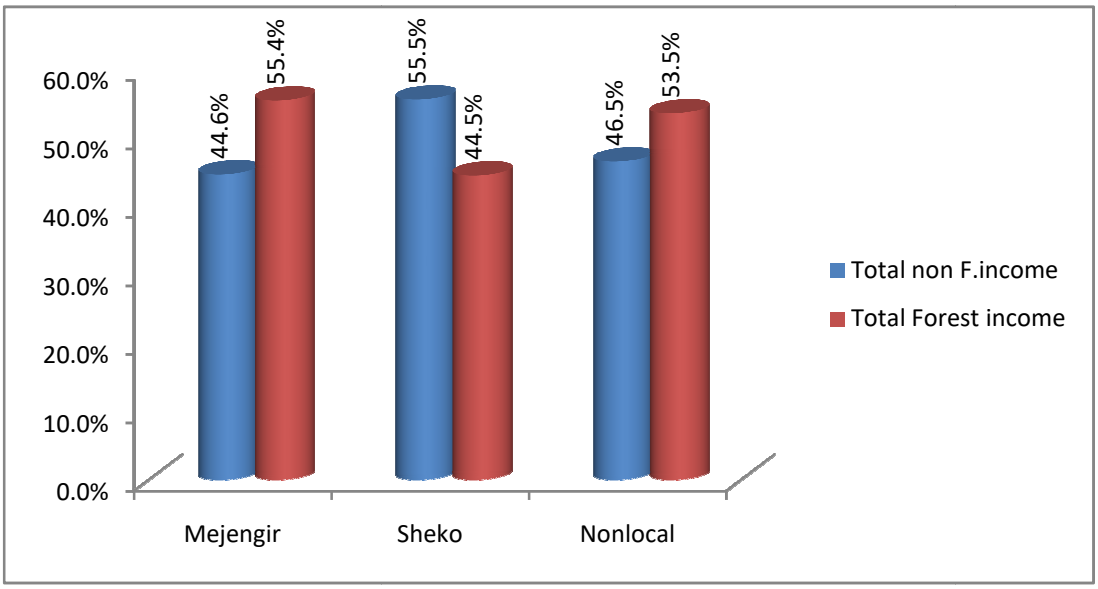


Figure 16. Comparison between the two relative income sources

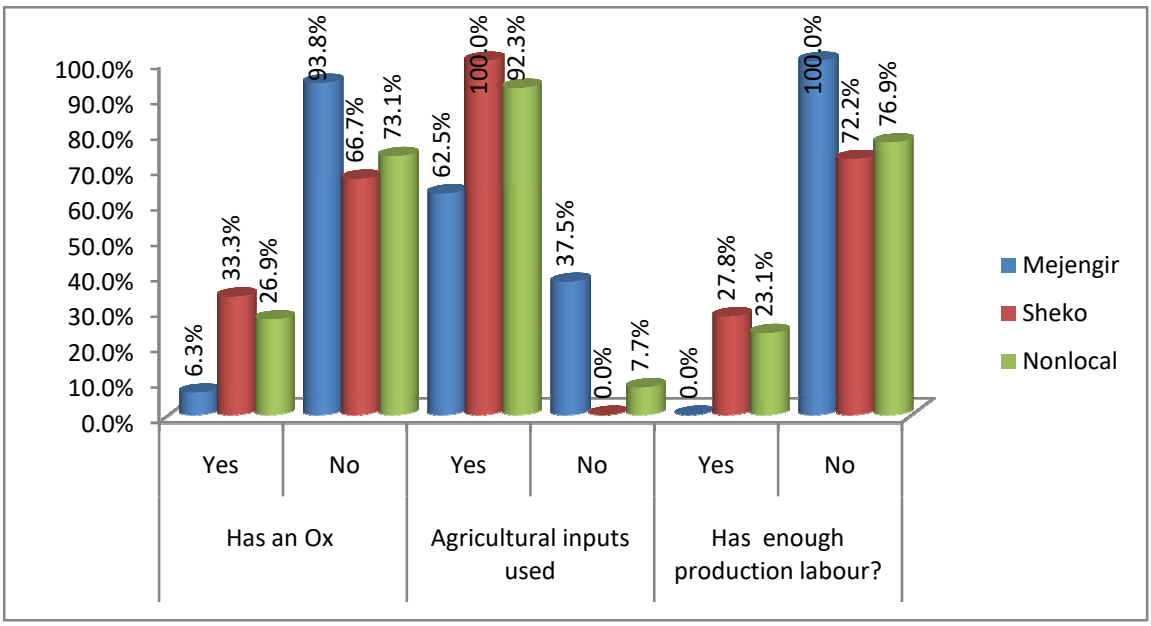


4.10. Utilization of agricultural inputs least

Agricultural cropping of rural communities is dependent on the availability of animals (mainly oxen) and utilisation of agricultural inputs, but most of the sampled households have no ox (77.9%). Oxen owning distribution shows that Sheko 33.3% followed by Nonlocal 26.9%, and the least is found in Mejengir 6.3% communities (Figure 17). This is an indicator of the existence of strong social relationships between the ethnic classes for shared production practice between the landless (non-locals) and the farmland holder (Mejengir) communities.

Concerning agricultural inputs, mainly improved seed and fertilizer have been used by 100% of Sheko, 92.3% of Nonlocal, and 62.5% of Mejengir communities to increase the production per unit area (Figure 17). Analysis of the average production labour shows there is a shortage of labour for 83% of respondents. Only 17% of respondents have enough working labour in their family (Figure 17). This is a significant problem in Mejengir communities which make them 100% dependent on the availability of external labour from shared producers. The reason for the shortage of labour was recognized as there is overlapped seasonal activity between on-farm and beekeeping activities mainly and weak commitment of the local community to contribute human capital efficiently to livelihood diversification activities.

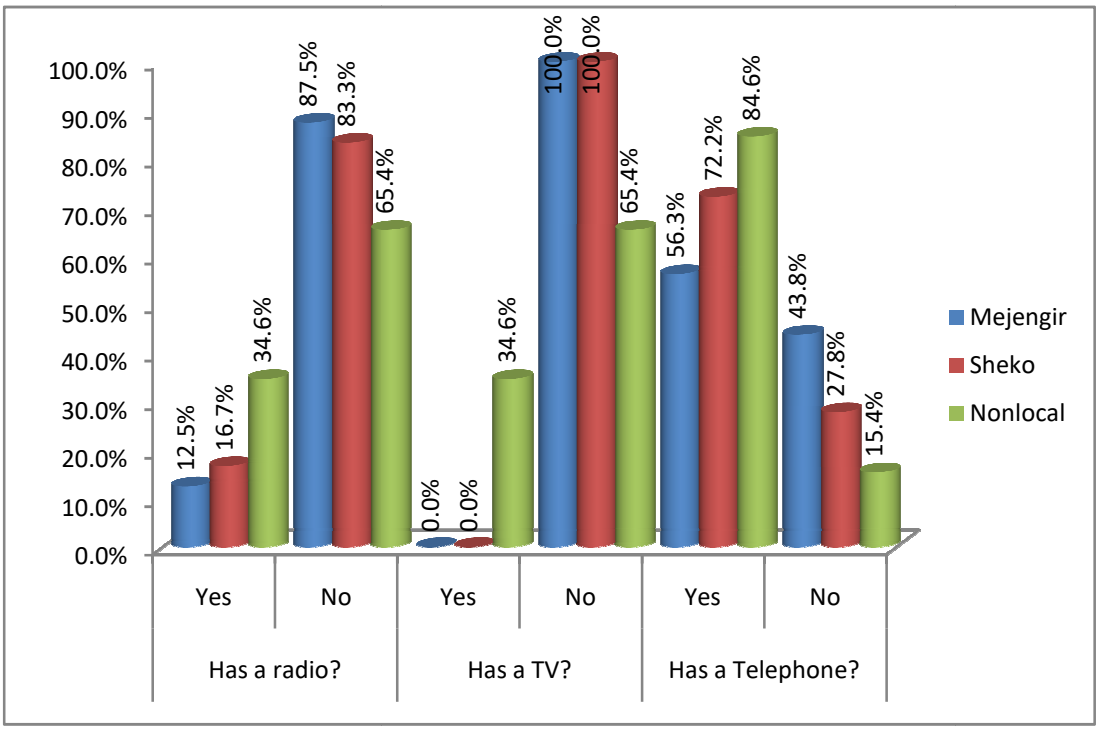
Figure 17. Households access to production inputs



4.11. Source of new information for the Households

The availability and accessibility of contemporary information play a key role in the selection and diversification of livelihood activities. Access to multiple sources of information was assessed and shows the availability of electronic media for accessing new information was small for radio 21.3%, and TV 11.5%, but better for mobile phone coverage (71%)(Figure18). The distribution of these Media was higher in Nonlocal followed by Sheko and least in Mejengir communities. The coverage of electronic media was inadequate in rural areas due to a lack of electricity and other infrastructures.

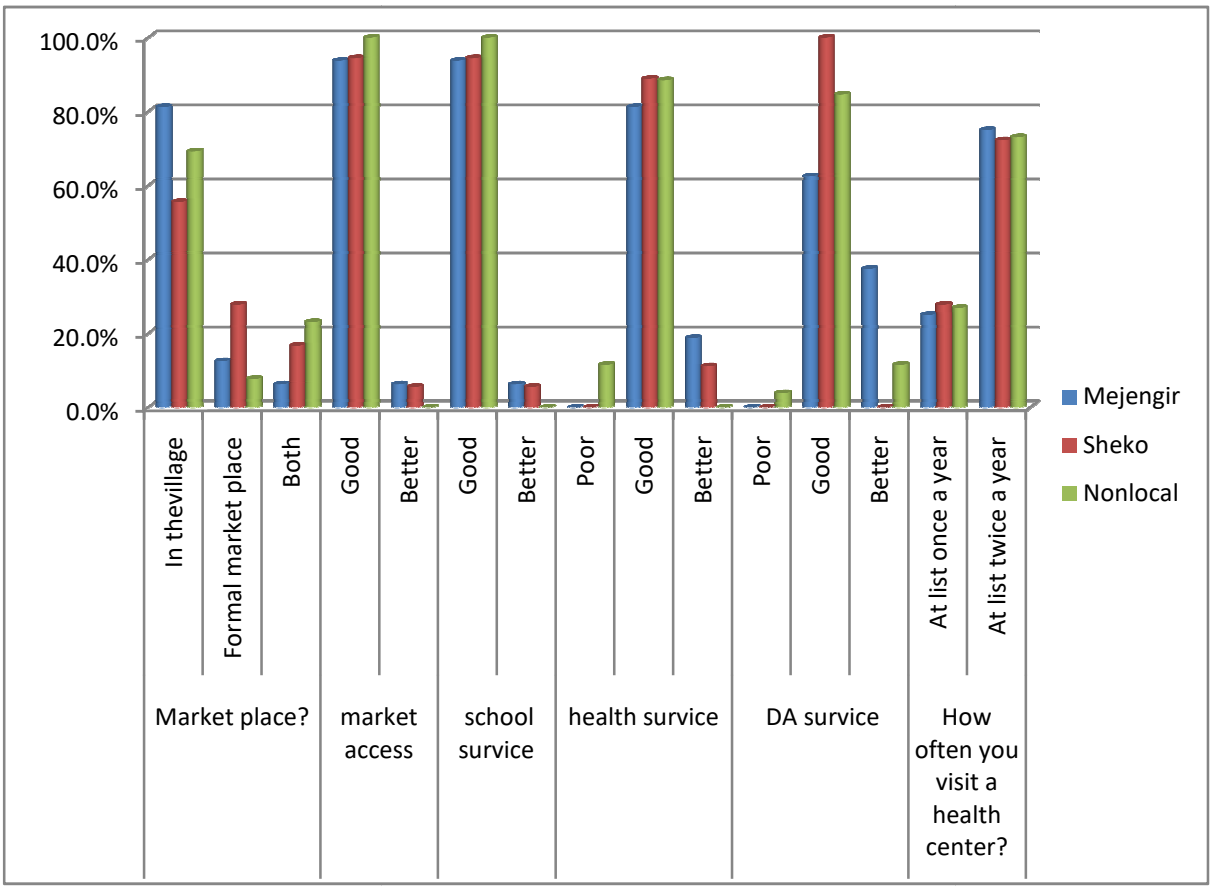
Figure 18. Sampled household heads access to Electronic media



4.12. Availability of social service and infrastructure for the households

Social services include commodity and services accessed from the common pool for the whole community. Interpreting the service of market exchange shows the majority of the respondents (Mejengir 81.3%, Nonlocals 69.2% and Sheko55.6%) were exchanging their products in their village with formal and informal merchants. However, Mejengir12.5%, Nonlocals 7.1% and Sheko27.8% were selling at the formal marketplace and Mejengir 6.3%, Nonlocals 23.1% and Sheko16.7% were selling both in the village and formal market place due to lack of infrastructures such as transport and information on market price (Figure 19). This supports the idea of Gebrul et al. (2018) and Kassa (2019) which state livelihood diversification of communities living in the remote area have been adversely affected by market distance. The respondents also explained that they are acquiring good services from the market, school, health centre, and developmental agent relatively, but there is still a serious health problem that forces them to visit health centres more than twice a year (73.3%), mainly due to Malaria outbreaks (Figure 19).

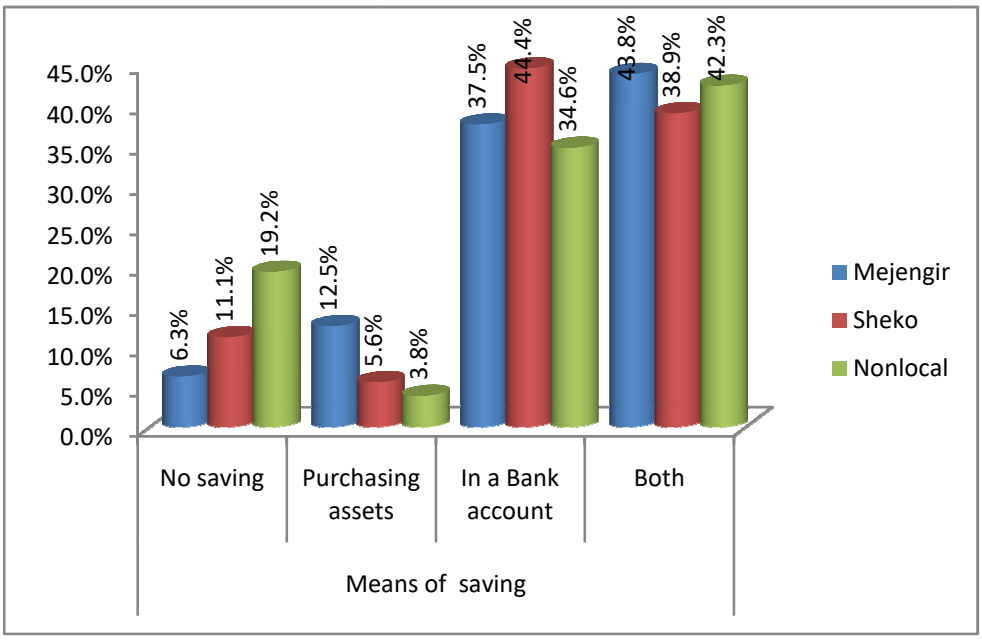
Figure 19. Status of common service Availability



4.13. Means of Cash Saving

Different cash-saving systems were seen among the ethnic groups (Figure 20). Averaging the most popular mean shows saving both at formal institutions (bank and micro-enterprise) and purchasing of assets (42%), saving only at Banks (39%), and relatively few households used only purchasing of assets (7%) as a means of saving. Some households were unable to have any means of saving (12%), but this related mainly to nonlocal poor communities due to their hand-mouth living status.

Figure 20. Means of cash saving of the sampled households



4.14. Households understanding on Government Policies

Understanding government development policy and strategy is an input to the livelihood diversification strategy of a household. The averaged analysis of sampled households' understanding of government policies and improved technologies shows that most of them were not informed regularly (55%), others were informed regularly (41.1%) and 3.8% of them possess no information at all (Table 6).

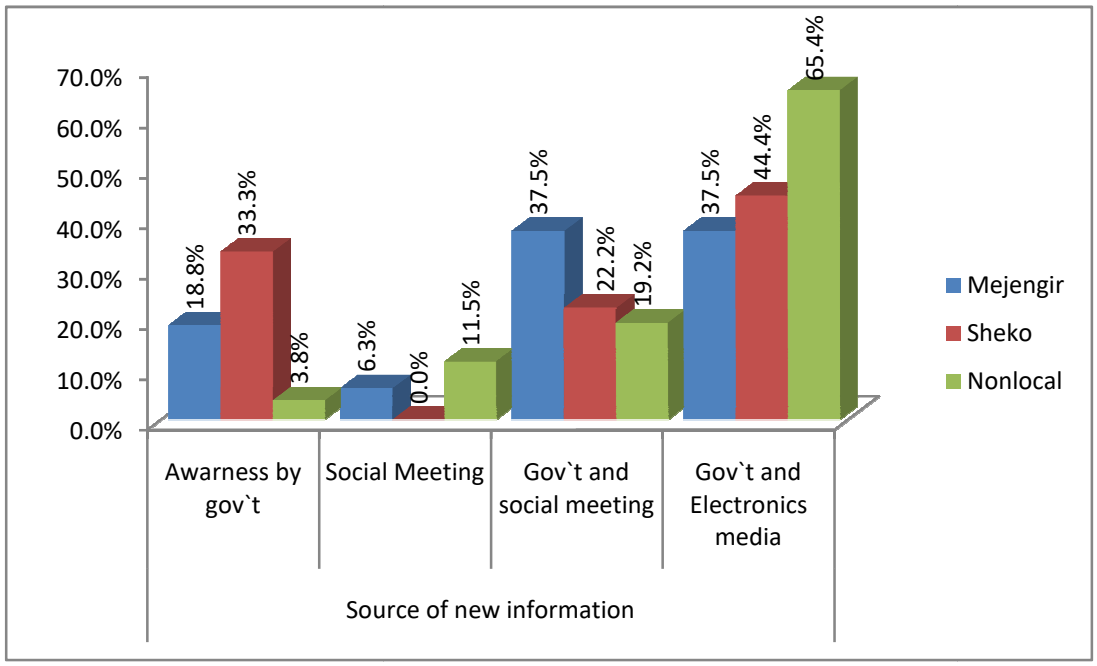
Table-6. Communities access to government new policies and technology

Ethnic class	No information	Irregularly informed	regularly informed
Mejengir	0.0%	37.5%	62.5%
Sheko	0.0%	77.8%	22.2%
Nonlocal	11.5%	50.0%	38.5%
Average	3.8%	55.0%	41.1%

The awareness of communities on government policies was influenced by government resources and the commitment of communities in attending awareness-raising meetings. Interpretation of new information sources reveals that nonlocal

(65.4%), Sheko (44.4%), and Megengir (37.5%) accessed information on government policy from government meetings and electronic media which is mainly related to accessibility to the kebele centre and electronic media (Figure 21).

Figure 21. Source of new information

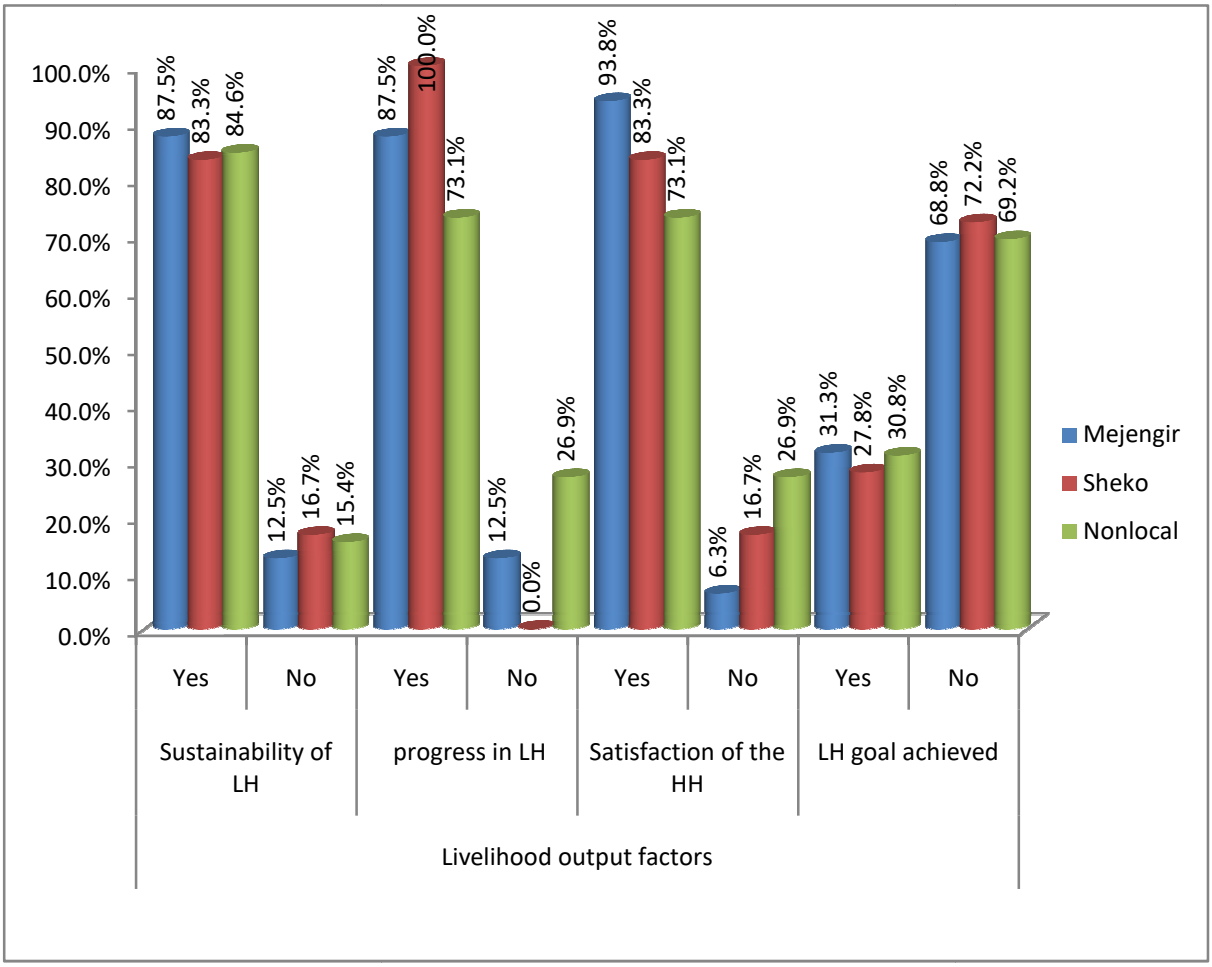


4.15. Livelihood Output of the Communities

The livelihood output of the household is a function of access to assets and the supporting environment. Since livelihood is influenced by these factors, the achievement of improved livelihood is gradual and will take time because all household will not have equal access to all livelihood assets . Accordingly, respondents were made to evaluate the change they have gained through time by comparing their early living status with the present social, economic, and cultural environment. The results show they are managing their livelihood problems by themselves (sustainability 85%). Their living standard (accumulation of the different assets) has been growing through time (progressing 87%). They are satisfying the demand of their livelihood using the owned capital (satisfaction 83%), but they are unable to achieve higher-level living standards (goal 30%) due to a lack of capability to compute the increased cost of living, globalization, and different vulnerability

factors. Triangulation of livelihood output among the ethnic classes shows that local ethnic groups are better off than the nonlocal communities to maintain a relatively sustainable, progressing, and satisfying livelihood (Figure 22).

Figure 22. Status of the households Livelihood outputs



4.16. Summary

In this chapter, the demography of the study area, means of livelihood diversification, the distribution of different livelihood assets among the ethnic classes, the contribution of forest resource and the role of PFM in the livelihood of forest-dependent communities, factors affecting the livelihood activities, and output of livelihood activities of the sampled household heads were presented and cross-tabulated among the diverse ethnic groups. The results show that communities are exercising different livelihood strategies to use the assets they have wisely, and to

sustain their livelihood under different influencing factors. Forest-based income has been contributing significantly and has a normalization effect between the poor and the weather. The implications of these results on livelihood diversification and sustainable forest management are now discussed in the next chapter.

CHPTER 5. DISCUSSION OF THE RESULTS

5.1. Introduction

This chapter discusses the study results. More specifically, it elaborates the result of the study against the research objectives to show how the research problem is addressed and what has been contributed to existing theory and the literature of forest-dependent communities LH. This includes the livelihood strategy, the contribution of the forest and PFM in the livelihood of forest-dependent communities, and the challenges of the forest-based economic benefit diversification. This will offer further insight how to sustain the forest community interaction of the study area and provide data to form conclusions and relevant recommendations.

5.2. Livelihood diversification status

Livelihood diversification offers a route to sustain daily subsistence and to achieve the wellbeing of the communities in the long run. It is determined by the right to access different livelihood assets (Peng et al., 2017; Manlosa et al., 2019; Kassa, 2019) and used to mitigate social, economic, and cultural pressures. The findings of this study show local communities have been diversifying their livelihood using three means of LH strategies (On-farm, Off-farm, and Nonfarm) and their combination based on the owned assets and opportunities. All household members, including women, are contributing their effort in diversifying LH capitals. Women have overloaded responsibility both at home and in fieldwork especially in local communities, even though management of financial capital is controlled by their husbands.

On-farm activity is the dominant means of LH diversification of the study area because it is a common feature for all agrarian communities. On-farm activity includes growing different crops (cereals, permanent cash crops, vegetables, NTFPs, and animal rearing activities) to support the sustainability of their LH. It is highly subjected to the availability of farmland where the available asset will combine to form additional asset. On-farm activities are a good opportunity for local communities (Sheko and Mejengir) to gain human capital of the non-local communities in building of additional asset. Their farming system was too traditional

(shifting, burning, and hoeing) and they have not utilized resources they have efficiently due to a lack of skill and experience on improved farming, and weak working traditions. They have used the land as a surplus resource for a long period of time to generate income during any risk environment.

The nonlocal communities came to the area as a shared forest coffee collector and became settlers of the area through time. The traditional farming system of the local communities enabled the nonlocal to build up different assets through shared farming, land renting in, and local purchasing of the forest and farmland when the local communities are experiencing a shortage of capital to support their livelihood. This shows even though on-farm activities are the dominant LH diversification strategy and the local communities have a diversified potential asset source, they are not used efficiently. The non-local communities are more advanced when using their assets by combining with assets of the local communities. This justifies the first conceptual hypothesis (H1) as there is a potential asset to support sustainable LH, but not used in a diversified way due to lack of skills and the existence of a weak working culture. This also supports Peng et al. (2017) who show the livelihood strategy of rural farmers is affected by geographic location, working tradition, owned capital, and labour quality.

In most cases, people with a shortage of capital are travelling from rural to towns looking for livelihood options and off-farm employment (Belcher et al., 2015; Peng et al., 2017), but the opposite is true in the study area, where urban to rural travelling is common to seek a means of livelihood diversification activities through land renting and shared forest coffee collection. This seasonal travelling of people from towns and other parts of the country to the rural parts of the study area resulted in an overutilization of natural resources and will lead to further vulnerability of local communities. The reason for the town to rural travelling is the lack of alternative livelihood activities around the town to absorb the growing unemployment of the country.

Capital exchange through shared production, land renting, and selling is still working using the traditional norm of the communities, but it is a potential risk to sustainable forest management (Belcher et al., 2015). The population of the area is growing and livelihood of the rural farming communities have a number of vulnerable conditions (mainly shortage of food, health problem, death of relatives) which enforce them to

sell their farmland and engage in illegal deforestation to sustain the life of their families and access additional land. In the meantime, the better off individuals will use their financial capital and their skills to purchase farm and forest land from local communities illegally with the least price. This is witnessed by the existence of larger forest coffee land in the hands of nonlocal (Figure 10).

Diversifying livelihood activities is a common means of subsistence and asset building (Manlosa et al., 2019; Kassa, 2019) because utilizing the available asset in a diversified way is a tradition of maintaining resilience over challenges. On the other hand, utilization of the available capital over multiple activities represents a strategy followed by rural communities to increase capital resources to save their family from vulnerability factors as explained by Manlosa et al. (2019). Limited access to some livelihood capitals have a push factor for the households to engage in low return survival activities like labour working and shared production, but it has a pull factor for other households to access another form of asset to accumulate more capital (Kassa, 2019). This interaction was clearly seen in the study area between the farm landholder and those who lack ownership of farmland. The one who lacks farmland is enforced to visit the landholder for shared production or land rent. At this time the landless pays his human and financial capital for the landholder to get farming land and the landholder gains additional human and financial capital to make his farmland productive which could contribute to subsistence and capital accumulation. This method of livelihood is supported by the households' morals without the enforcement of any external body, and helps to minimize the vulnerability of their livelihood. Thus, the second conceptual hypothesis (H2) of this study is satisfied.

The existence of a strong social relationship helps maintain trust and smooth relations among the communities of the studying area to support each other. The landless were able to work on others' farmland, through renting-in and shared production. This type of asset sharing has been used as a means of diverting livelihood problems like shortage of money for the poor in periods of recession and lack of farmland for the better-off households. Moreover, all of the tested households are engaging in on-farm activities due to the higher rate of illiteracy (section 4.2.2) because pursuing an enhanced livelihood activity is dependent on the skilfulness and the talent of the households to triangulate the advantage and disadvantage of livelihood options. The off-farm and non-farm activities are not addressing wider

communities of the study area and mostly used with the combination of on-farm activities (Figure 7). This is due to a lack of infrastructure like agro-industry and commercial agriculture which can absorb a large number of human resources. Due to this, some households are supporting their livelihood through off-farm activities for subsistence (the poor) and non-farm activities to build-up some additional capital (the better off). This supports the finding of Loison, (2015) in Sub-Saharan African countries; who verified that farmers living in the rural area are engaging in trade business or employed in industries (skilled ones) and labor-intensive activities (without skill) if rural infrastructure developing policies are in place. Off-farm activities are exercised frequently by the landless in the non-local communities of the study area due to the existence of better labour work opportunities near the small towns than remote areas (Belcher et al, 2015).

Income from existing on-farm diversification and intensification is not adequate enough to accommodate the demand of the growing population and expansion to the forestland will remain a challenge in a growing rural population. The existing off-farm activities are also not able to absorb the growing unemployment of the area in the future. On the other hand, non-farm activities are nearly absent in the study area due to lack of infrastructure, skill, and experience in the remote areas. This shows infrastructure expansion, skill development, and introduction of improved technologies are vital in raising the coverage of small to large scale non-farm activities as a means of employment for the growing rural population and to reduce their pressure on the natural resource (Loison, 2015; Belcher et al., 2015). The benefits of formal institutions like cooperatives and crediting institutions are not acknowledged well by local communities due to the past negative (embezzlement, weak leadership capacity, and bankruptcy) history of cooperatives (Yenesew and Debeb, 2019; Tesfamariam, 2015). Currently, improvement on institutional management is seen with a strong follow-up of cooperative unions and expected to address good market linkage for the rural communities' production. Crediting centers were providing money without proper awareness creation about the advantages and disadvantages of credit and without regular follow-up. Due to this, communities are borrowing money from individuals with a high rate of interest and forced to pay back the loan by selling the assets they have and remain vulnerable at any time. This situation will be altered if local government intervene efficiently to increase the trust

of the communities on the value of formally established crediting institutions and marketing cooperatives.

The livelihood of the communities of the study area is subjected to various vulnerable factors regarding natural and human-induced problems (section 4.8). The ongoing key problems include weak management of capital, the weak working habit of community members, lack of efficient social institutions for income generating, expansion of the illegal crediting system, and weak human skill development. Intervention is vital to change the attitude of rural communities on the efficient utilization of the owned capital and compute the growing demand for livelihood in the globalization world. Skills and knowledge development through education, training, and regular awareness will empower the local community to diversify their livelihood options efficiently and enable an improved saving culture. The capacity building also will help reduce a male dominating culture and empower women's negotiation and decision-making power in household capital management. Rural communities' understanding and commitment to adapt government policy will increase as capacity building is fairly addressed to all community groups. These realities confirm that the existing functioning institutional arrangements are not strong enough to facilitate the transforming capability of the communities and it justifies the third conceptual hypothesis (H3) of this study.

To sum up the livelihood strategy of the study area, there is a change of power on access to livelihood assets from local to non-local communities due to a lack of efficient utilization of assets, lack of infrastructure facilities, and poor working culture of the local communities. This cannot be sustained under the growing population and scarcity of resources. So, appropriate policy intervention to increase the working tradition of the local communities and improving infrastructure development is important to absorb the growing population and sustain the livelihood of rural communities.

5.3 Contribution of forest in the livelihood of rural communities

Globally, the forest is contributing to the livelihood of people directly or indirectly as a source of subsistence, cash income, and safety net during times of risk (Leßmeister et al., 2015; Langat et al., 2016; Brockerhoff et al., 2017). Similarly, this study reveals that the forest is contributing significantly to economic, environmental, and

cultural perspectives (Figure 11), and has an important role in the livelihood of rural communities of the study area (Figure 15 and 16). The cumulative forest-based income is higher than the non-forest-based income of the communities (Figure 16) that witnessed the significant role of forest in the livelihood of the communities' subsistence and cash income which supports the fourth hypothesis (H4) of this study. This finding also echoes previous findings (e.g. Angelsen et al., 2014; Leßmeister et al., 2018; Langat et al., 2016; Steele et al., 2015). However, due to a lack of skill and infrastructure, the contribution of forest products is not well-diversified compared to other countries like India, where forest-based small-scale enterprises are an opportunity of employment and income source for the livelihood of rural communities (Rahangdale et al., 2018). The local communities have been collecting different forest products, especially NTFPs like forest coffee, spices, honey, fuel-wood, and edible products as a livelihood strategy. The harvesting of those products is contributing about 51.8% to the total household income and similar to figures identified by Melaku et al. (2014) which focused in Bonga, Southwest Ethiopia, which shows NTFPs contribute 47% of the household total income. Similarly, Pandey et al. (2016) study in India, reveal NTFPs as accounting for about 50% of the household income and 70% of the exported revenue. This reality shows the production level and benefit of NTFPs are shaped by market links, institutional arrangements, resource abundance, ecology, and the level of infrastructure and technology development (Belcherr et al., 2015) besides harvesting traditions of local people.

On the other hand, there are other studies by Langat et al. (2016) in Kenya, and Worku et al. (2014), in Southwest Ethiopia show forest-based income is contributing 33%, and 35% of the total household income respectively. The variation shows the contribution of NTFPs to the livelihood of forest dependents are not analogous between regions and studies because the NTFP types, utilization tradition, and skill varies between regions mainly and the perception of NTFPs among scholars (Angelsen et al., 2014; Steele et al., 2015). That is why Angelsen et al. (2014); Steele et al. (2015) and Pandey et al. (2016) explain the proportion of total household incomes contributed by NTFPs range from 10% up to 90%. Usually, poorer households are expected to benefit more from NTFPs than wealthier ones, but this is not the reality for the study area. The value of fuel-wood and forest

coffee is relatively similar for all ethnic classes but the relative forest coffee income benefits are gained by the better-off households directly or indirectly through cash crediting of the poor communities during vulnerable times (Belcher et al., 2015). This enforces the poor communities to be vulnerable every time by paying what they lend in the past while the better-off collect their money with high interest. Moreover, crediting money for the poor during vulnerable times and collecting the cost of their money at coffee harvesting time is a means of capital accumulation strategy for wealthier households.

Communities from the study area are highly valuing (100%) the forest coffee for its economic value, because it is contributing the highest cash income than the other NTFPs (section 4.9 and Figure 15). They are managing forest coffee intensively to benefit from the existing relatively better market price of coffee at the local, national, and global markets (Woyesa and Kumar, 2020). Even though the local producers have not efficiently benefited from the market due to biotic and abiotic factors (Tadesse et al., 2020), they have been producing intensively as a cash crop for income accumulation like most cash crops do in other sub-Saharan countries (Steel and van Lindert, 2017; Melaku et al., 2014).

The other NTFP which is harvested next to forest coffee is honey, but the production is reducing through time due to reduced traditional knowledge of the community. The current honey production is small and about 55% of the households are engaging in the production and 45% of the communities have no beehive at all (Table 3). The reason behind this is that elders are getting weak to climb a tree and the young generations are not committed to engaging in the hardship, rather they are motivated in forest coffee development to use the established market link as an opportunity. On the other hand, the attention given to beekeeping is weak both by the communities and local government as its market value and sustainability of production is considered. This is witnessed by the lower technological and technical support given to the communities on beekeeping while diversified technological input, follow up and awareness-raising has been provided on the production of annual crops including the intensification of forest coffee.

Harvesting of honey, edible forest products, spices, tree fruit, and traditional medicine represent a common tradition for rural communities, especially for local communities (Pandey et al., 2016), but this tradition is dwindling through time due to

weak value addition made on NTFPs and adaptation of modern living culture than consuming those forest products. Losing such knowledge on the value of the diverse forest products has reduced the opportunity for rural livelihood diversification strategy. This will aggravate the shifting of forest land to other land-use systems through intensive forest coffee development, settlement, and expansion of farming land. Sustainable conservation of natural forests will be maintained only if the economic benefit of the conservation site is capable to compensate the value of a conversion to other land-use systems (Woyesa and Kumar, 2020). This requires the commitment of stakeholders to diversify the economic value of the forest through the introduction of a niche market for scarce wild products. This also needs further investigation of the potentially marketable forest products, their market chain, advertising these products for buyers, and organizing the communities to harvest these products in a sustainable manner.

The potential benefit from harvesting forest products depends on the tradition/knowledge of the communities on NTFPs collection, accessibility of the forest, potential stock of products to be harvested, and availability of the niche market for these scarce products (Steele et al., 2015). The forest of the study area has an enormous range of NTFPs to be marketed but needs promotion and value addition because the stock of these products is small and needs sustainable harvesting to avoid threat of overutilization. Harvesting of those scarce products is labour intensive and will not become common practice unless promoting price is paid for the collectors. Currently, NTFPs have got the attention of scholars and governments for their value as a safety-net, cash income for the rural poor, and their contribution to sustainable conservation and development if the management is well harmonized (Pandey et al., 2016; Meinhold and Darr, 2019; Sacande and Parfondry, 2018; Adam et al., 2013). Harvesting NTFP has less impact on the forest as compared to timber logging and better matched with conservation objectives. So, attention should be given to empowering knowledgeable people to harvest those products in an ecological friendly manner and institutionalizing the collectors under the PFM process is important (Gupta, 2013), a practice identified commonly in this study.

The collection of construction wood, liana, and fuelwood by shared forest coffee collectors has a negative effect on the biodiversity of the area. These collectors are

harvesting different wood products for consumption as well as selling. The overutilization of forest products during forest coffee harvesting time is affecting the local women's fuel-wood harvest too. This overutilization of forest resources has adversely affected the Biodiversity (BD) and ecosystem service of the study area. The increased market price of forest products may benefit the poorer household's economic return for a short time but accelerate resource deterioration over time. Despite the diverse nature of NTFPs, sustainability of NTFPs management depends rarely on ecological (abundance and distribution), social (land tenure and social norms), and economic (alternative livelihood option, poverty level, market access) factors (Meinhold and Darr, 2019). The higher the interest on the economic value of forest coffee, the existence of a good market outlet, and the high level of dependency on a sole product (forest coffee) are all factors affecting the sustainability of forest management. Reducing the impact of forest coffee expansion on forest conservation is important both for the conservation of forest biodiversity and the risk of single product intensification (Woyesa and Kumar, 2020). This will require intensive work by the government and its partners in identifying potential NTFPs, assessing their market chain, and developing their niche market.

5.4. Contribution of PFM to the sustainable management of forest resource **and Livelihood**

Deforestation and forest degradation remained a challenge for Ethiopian forest and biodiversity for decades before the introduction of PFM because of the insecure land tenure system, population growth, and weak law enforcement (Kedir et al., 2017). PFM was started by NGO initiatives at pilot sites to mitigate forest degradation and secure the benefit of forest-dependent communities through sustainable forest management (Wood et al., 2019; Kedir et al., 2017; Mengist and Alemu, 2019). Its implementation in the study area was started by the Ethio-Wetlands and Natural Resource Association (EWNRA) and the University of Huddersfield (UoH) to fine-tune the approach for biodiversity conservation (Wood et al., 2019). PFM is a people-centered approach, which values the active participation of stakeholders including the marginalized forest-dependent poor and their customary forest use system (Wood et al., 2019; Ayana et al., 2017). Active participation

empowers the communities to form responsible institutional arrangements and devolving power on forest management. The community-based institution Forest Management Association (FMA) in this case, is responsible to motivate communities' participation to achieve their responsibility and negotiate with the government to increase the long-term economic benefit of the members. Thus, PFM follows a practical logic than government regulation, the approach will contribute best for sustainable forest management if active technical and legal support of a responsible government office is in place (Ayana et al., 2017), that is the adaptive nature of PFM. The approach is progressing in a different part of the country in reducing deforestation, increasing communities' economic benefit and sense of ownership improvement (Wood et al., 2019; Kedir et al., 2017; Ayana et al., 2017; Mengist and Alemu, 2019) which are basic for sustainable forest and its biodiversity management.

There is no sole institutional arrangement for PFM, which can address equity of power, resource, benefit, and traditional norms; some follow cooperative others association, some facilitate the establishment of the institutions at the kebele level others at sub kebele level (Wood et al., 2019). EWNRA and UoH have followed the combination of the two arrangements' to contribute to the sustainability of the forest communities' interaction because association and cooperative objectives are different.

The communities of the study area are implementing associations for sustainable forest management and cooperatives to generate benefit from the forest managed under PFM. The association is responsible for managing the conservation, development, and regulated utilization of the forest while the cooperative is responsible for marketing the NTFPs harvested from the PFM area to increase the economic benefit of members and to add to the value of the forest. Those arrangements have a regulating role to control over-exploitation of the forest resource while increasing the economic benefit of the communities to have a win-win situation between the local government and communities' interests. With the introduction of the PFM approach, the communities have got recognition to utilize the forest coffee they have developed in state-owned forests and other products in a sustainable manner following the agreement signed with the local government. It also reduces the cost of forest management demanded to control illegal forest

encroachment and the time needed to manage the case in the judiciary process which is to the benefit of the local government.

In the study area, the introduction of PFM has brought a significant change on the forest ecosystem, communities' benefit, and the relationship between the communities and the local government. Forest degradation has reduced due to active forest patrolling of the communities. The economic benefit of the communities has increased through NTFP collection and marketing, moreover, trust between the communities and government has increased (Wood et al., 2019). The triangulation of data between forest problems and sense of ownership confirm the above findings. Communities have explained that there was serious forest degradation and land grabbing before the introduction of PFM to convert the forest land into coffee land due to a lack of ownership filling, but the PFM approach has significantly changed (on average above 80%) their sense of ownership over the forest, sustainability of the conservation and the economic benefit from sustainable forest management (Figure 8, 9 & 11).Thus, PFM has significantly contributed to the sustainable management of the forest and its biodiversity which supports the fifth conceptual hypothesis of this study. This sense of ownership and commitment of communities has evolved from a number of negotiations on institutional arrangements and amendment of government forest proclamation to address the issue of tenure right and legal backup to the approach (Wood et al., 2019).
PFM is a social institution established by the willingness of the community to secure their common interest over the forest. It enables communities to have a say in negotiating their rights and power. Due to PFM, communities' commitment to sustainable forest management has increased and reduced forest degradation in a remarkable manner (Wood et al., 2019), meaning the intervention has improved the forest ecology and productivity. Health forest ecology is valuable for a rural livelihood because it has a regulative function to maintain a productive environment. Since the LH of rural communities is dependent on climatic conditions, maintaining the sustainable function of the forest through PFM has a long-lasting role in improving on-farm and the NTFPs productivity of the area. This will be the main benefit that communities are gaining from the implementation of PFM. Moreover, they have got a legal right to harvest the forest coffee they have developed traditionally. The marketing institution established by the members of PFM also enables them to sell

their production at national and international markets in an organized form. They have also got an opportunity to sell their forest coffee on the international market at a better price due to the organic nature of the coffee. The agreement document signed with the local government has also given them the right to complain about compensation payment if the government is obligated to take the forest for other services. PFM as a social institution has empowered communities to discuss challenges and make joint decisions on the sustainability of forest management. These are the visible benefit communities are gaining from the implementation of PFM and they have an opportunity to benefit from payment for environmental services if the international communities will recognize their contribution to carbon sequestration (Reduction of Emissions from Deforestation and Degradation).

5.5 Challenges in diversification of forest based income and sustainability of PFM

As discussed above, the economic contribution of potential NTFPs is at its infancy stage in the country compared to others (Meinhold and Darr, 2019; Langat et al., 2016). Most NTFPs are harvested for home consumption, except forest coffee and honey. Even these products are not efficiently benefiting the communities due to lack of quality control and adequate market price. No reasonable benefit has been generated from different NTFPs found in the PFM area due to a lack of experience in their market value. On the other hand, the government did not contribute to adding value to the forest. This rejects the conceptual hypothesis H6 and H7 of this study; that is forest based income is not diversified enough and the contribution of government in forest value-adding and promoting of the local knowledge is weak. The contribution of PFM to sustainable management of the forest is not well institutionalized in the government structure to give appropriate technical and legal support. That is why almost all communities are valuing the economic benefit of forest coffee than the other NTFPs. Unless forest-based income diversification is increased, the conversion of forest land to other land-use systems will continue because the forest is an easily accessible natural resource for all communities (Woyesa and Kumar, 2020). Unless stakeholders' intervention is improved to increase human skills, to add the value of NTFPs, to institutionalize the PFM approach into government structure, and to assess niche markets for scarce

resources, forest land conversion to other land-use systems will remain a challenge to sustainable forest conservation. Scientific studies on potential forest products that could be harvested sustainably (including the tourism value of the area) are significant to increase the economic return of the forest (Woyesa and Kumar, 2020).

5.6. Summary

The results discussed above reveal that LH diversification is inherent behaviour whatever capital is owned by the household. The on-farm livelihood diversification is obtained as the main diversification means of the communities, even though it is not well diversified. However, it has contributed a lot to the social interaction of the communities. Non-farm and off-farm activities are not well developed to absorb the growing unemployment due to a lack of infrastructure. The contribution of forest-based income of the communities is greater than the non-forest income while forest coffee is the dominant product. The role of forest coffee in the household income has both positive and negative contribution to forest conservation and needs the attention of the government to increase the economic value of other NTFPs which has an insignificant impact on the forest. Implementation of PFM has increased communities' sense of ownership and contributed to the LH of forest-dependent communities and sustainability of the conservation but need the commitment of the government to empower communities through technical and legal back-stopping. This discussion now informs the conclusions and recommendations of this study, which is provided in the following chapter**.**

CHAPTER 6. CONCLUSION AND RECOMMENDATION

6.1. Introduction

Given the rationale that forest is contributing directly or indirectly to the LH of human beings, this exploratory study is aimed to identify how the contribution of the forest will sustain under the existing challenges (chapter-1 section 1.5). The former sections have contributed to the fulfilment of this research aim. This chapter now presents the general conclusion of the study. The practical contribution of the study, potential recommendations, limitation of the study, and issues which need further study also listed.

6.2. Research Conclusion

This study focuses on the contribution of forest to the total income of forest-dependent communities' and factors affecting forest-based income diversification under the existing livelihood strategy of the communities.

The study began with reviewing the global and national socioeconomic and environmental value of the forest and potential challenges of its sustainable management emphasising the national and international value of the Southwest forest of Ethiopia (chapter-1).Those points enable the researcher to present the background on the forest-communities interaction and the associated challenges of the study area. Based on this, investigating the contribution of forest and PFM to the livelihood of rural communities is the aim of this study. The following research objectives were formulated to achieve the overall aim;

a) Investigate the strategies followed by Sheko woreda households in maintaining their livelihoods;

b) Understand the role of PFM in the financial contribution of forests to the total income of forest-dependent communities;

c) Identify key factors which are influencing income to be generated from Sheko woreda forests managed under PFM;

d) Provide PFM related management recommendations to improve livelihoods and sustainable forest management.

These research objectives are answered in chapter 4. The LH strategies followed by the communities are identified in (section 4.3, page 43) and elaborated in (section 5.2, page 70). As an agrarian community, all of them are engaged in on-farm activities; including cultivation of different cereals, fruit, vegetables, and forest coffee for subsistence and cash income-generation, but the on-farm activities are not diversified enough to accommodate the growing population. Feasible LH diversification strategy selection is governed mainly by human capital (skill and knowledge). However, communities are trying their best to use the available asset in a diversified way to secure their subsistence, avoid risks, and accumulate other forms of assets. Shared farming and a combination of on-farm activities with off-farm and non-farm activities are common means of diversification practiced to achieve LH subsistence.

On-farm livelihood diversifications represent the leading occupation of rural communities compared to non-farm and off-farm activities. The inadequate infrastructure and access to assets have influenced the economic competence of the whole communities in general and the indigenous ones specifically. On-farm activities are not well-diversified and are restricted to the production of similar crops. Due to this, the farm landholders have not used their opportunities efficiently compared to the others. Inefficient utilization of land by landholders has contributed to LH diversification for landless through shared farming. Shared farming also strengthens the social interaction between landholders and landless. The non-farm (e.g. selling of local drink and food) and off-farm (working on other`s farmland and selling of fuelwood) activities have continued seasonal livelihood diversification activities.

Diversifying livelihood using the present capital remains an ordinary phenomenon to subsistence and the wellbeing of the household, but its achievement has a difference between the underprivileged and well-off households. Livelihood diversification is governed by the right to access the different livelihood capitals which is a source of inequality in the communities. The better-off households are benefiting more than the poor since they have better accumulation of assets.

Therefore, government intervention is essential to improve the livelihood strategy of the community through capacity building and the introduction of new production technologies

The second research question, the role of forest and PFM in the LH income of Ethiopian rural communities is identified in (section 2.7 and 4.6) and elaborated in (section 5.3 and 5.4). These sections elaborate that forests have a social, economic, and environmental value to the livelihood of rural communities of developing countries, but it is threatened from unsustainable use and conversion. This shows forest value is not well recognized yet by the forest-dependent communities, the perceived value is not similar amongst community groups. Valuing of the forest depends on the knowledge they have on the diversified economic value of the forest, market information, and the working tradition of the communities.

Local communities of the study area are collecting different forest products and non-forest products for subsistence and income generation. Their forest-based income (51%.8) is higher than non-forest income but dominated by a single product (forest coffee) (section 4.9). Other potential NTFPs are collected in small amount especially spice collected from the forest for subsistence and local market. The traditional knowledge of the communities on the usage of NTFPs has received less attention from the current generation and government. The loss of local knowledge on the traditional utilization of different NTFPs, population growth, interest in forest coffee development, and lack of employment opportunities are threats to sustainable forest and biodiversity conservation. In general, despite increased recognition of the contribution of NTFPs to development, sustainable conservation, and employment, the profound understanding of factors affecting production, processing, and marketing remains poor.

Increasing the in-kind income of the forest contributes considerably to the maintenance of forest community interaction without significantly affecting the forest and its unique biodiversity. Forest value addition demands skill development on marketable NTFPs, promoting of a niche market, and institutional arrangements by the responsible body because communities will not be able to trade on an uncertain market due to a shortage of capital. Therefore, the government should assist with promotion of those small marketable products and should help to empower producers to increase the value of the forest ecosystem

PFM has been introduced to increase sustainable forest management and the economic benefit of the communities. Introducing PFM has enhanced the attitude and sense of ownership of communities (section 2.7 and 4.7) which make them decision-makers over the forest. It also enables communities to value the environment and the socio-economic value of the forest. Communities have recognized that PFM is the best approach to secure sustainable forest management and able to enhance their economic benefit, since economic benefit of the communities will be maintained in the presences of sustainable forest management. However, institutionalizing the approach and motivation of joint management needs further work.

Regarding the third research question, hindrance on forest-based income generating is outlined in (section 5.5) and the research result and discussion explained in chapters 4 and 5. This section summarized that forest has vital social, economic, and cultural value in the LH of rural communities, but the sustainability of its contribution has been affected by overutilization and land-use change. Even though, PFM has introduced as a means of sustainable forest management, its implementation is not institutionalized in the government organization.

PFM recognizes the value of NTFPs in sustainable forest management because they are potential resources that could increase the economic benefit of the communities without damaging the forest resource. However, market promotion and linkage have not been set properly for these products. The communities are not well informed of the market potential of forest spices. Establishing a sustainable marketing strategy for these scarce resources will increase the value of conservation than conversion of the forest to other land-use systems. This will need a commitment of stakeholders in empowering the communities and forest value addition through the establishment of a market chain for diversified forest products

Chapter 2 reviews the concept of LH that is the economic activities of people in a given area to ensure subsistence and better-off living condition. It elaborates forest community interactions. Elements of LH, which determine the LH strategy of a household, and the beginning of sustainable LHF as a tool of LH study was elaborated upon. The LHF was used to explore the LH strategy and challenges by centering the communities (section 2.3). The importance of LH diversification especially in developing countries was explained in section 2.4. Diversification is

vital and became a social norm to avert economic and environmental risk because the existing farming system is not able to accommodate the growing population. The beginning of PFM as means of sustainable forest management and its contribution in the LH of forest-dependent communities is also explained in section 2.6. It has been introduced in Ethiopia to secure sustainable joint forest management, mitigate forest degradation, and increase the economic benefit of the communities. This review outlined the theoretical concept on LH strategies, the role of forest and PFM, and the challenge of sustainable forest management for research design.

Chapter 3 outlines the methodology of this study. It starts by explaining the research philosophy (section 3.2) and is followed by data sources, which explain the value of quality data and the advantage of the selected data collection methods (section 3.3). Hypothetical research questions were set for research design. The value of systematic stratified sampling in avoiding bias is explained. In addition to these issues the value of pilot testing, the research process, ethical issues considered, data analysis method, method of data reliability and validity assurance are explained to define the research procedure.

Chapter 4 presents the results of quantitative analysis of data collected using semi-structured questionnaires. The results explain the LH strategies followed by communities (section 4.3). On-farm activities, cultivating of different cereals, fruit, vegetables, forest coffee, and livestock for subsistence and cash income generating is the dominant activity. However, farming actives are dependent on few activities and not diversified enough to accommodate growing populations. On-farm activities are combined with off-farm and non-farm activities to diversify the capitals of the household. Inefficient utilization of assets is a common problem of the communities. The problem raise/appear due to lack of skilled and knowledgeable human capital to select the appropriate LH diversification strategy. The off-farm and non-farm activities are not well established due to lack of infrastructure development and are used with a combination of on-farm activities to support subsistence. The role of social institutions for risk avoidance and support for each other has recognized and maintained their smooth relationship and respected by the communities as explained in section 4.4 page 45. The vulnerability of communities to different risk factors and the means they are coping from is

explained in section 4.8. The status of agricultural input utilization as means of on-farm diversification (section 4.10), accessibility and role of different social service (section 4.12), means of cash saving adopted by communities (section 4.13), communities understanding of government development policies, and source of new information (section 4.14 and 4.11) are elaborated as part of LH strategy of communities. The output of the LH strategy has been explained in terms of the capability of the communities in solving their LH challenges. The adopted LH strategy enables the communities to manage problems by themselves (sustainability), to have gradually improved living condition (progressive life), but not able to achieve higher living standard under existing different variables of Livelihood (section 4.15).

Chapter 5 elaborate upon and triangulate the analysis results (chapter 4) against the research objective (section 1.3) and the existing rural community-forest interaction and the contribution of forests in their respective LH (chapter 2). The LH strategy followed by communities and challenge of LH diversification is explained in section 5.2. The contribution of forest in the LH of rural communities and the role of PFM in securing sustainability of forest communities' interaction is outlined in section 5.3. Challenges that hinder the diversification of forest-based incomes are discussed in section 5.4.

6.3. Research contribution

Sustaining the direct and indirect value of the forest to LH of the communities is under threat due to population growth and land tenure problem. Different approaches including PFM are deployed to sustain the value of the forest. The approach should be designed with the active participation of the forest-dependent communities to address their interest and ground reality of the area. PFM as a forest management approach has got attention since it secure appropriate decision-making power, and ownership of the communities. However, still, forest encroachment exists under PFM areas. So, the result of this study gives direction on how to improve the role of PFM in sustainable forest management and the forest-based benefits of communities.

6.4. Practical implications

Social scientists and conservationists' have debated on how to harmonize the livelihood of forest-dependent rural communities and sustainable forest management. To date, they have given attention to the potential value of NTFPs and PFM to pick up sustainable forest-community interaction. Since forest-based income is contributing to the most significant percentage of the aggregate income of the household. The forest community interaction has threatened from inequality of residents to access different livelihood assets. Relatively, indigenous people are exposed to inequality because they possess a weak working tradition, and therefore, they are dependent on the labour of share producers, and they are selling their land during risk times. This tradition has forced native people to lose owned essential asset and made them be dependent on better-off individuals to access credit during harsh times. These inequalities of asset also enforce impoverished communities who lack saved financial capital for risk diversion and building of a LH. These problems are deep-rooted within indigenous people due to poor infrastructure development and knowledge gap to access government extension and new technology services.

As indicated above, communities have not over-valued the forest due to lack of awareness and poor extension service on the economic value of many NTFPs, lack of market link for valuable potential NTFPs. Additionally, the present generation is gradually departing from the utilization of diverse products. This will affect the sustainability of forest ecosystem services and require the effective intervention of stakeholders to maintain the win-win conditions of forest-community interaction. So, local government intervention should give attention to the following issues;

1. R**educe the conversion of forest to other land-use systems**. Sustainability of the forest and biodiversity conservation will be achieved only if the relative income generated from the forest biodiversity is competent to compensate for the benefit that could be generated from the conversion of the forest. This needs prioritizing of potential forest resources (including the NTFPs and tourism), analysis' of their market chain and promotion to harvest and generate income sustainably. Yet, there is a limitation in identifying those products and their market chain. Forests products were harvested traditionally for subsistence, and they have a potential market (e.g. spices). Introducing those scarce resources

to the market will increase the economic benefit and participation of the communities in sustainable forest and BD conservation. This will increase awareness of the communities on the market value of these products and reduces the risk of dependence on a single product. Dependence on a single forest product (ex. forest coffee), will have a risk both for the community and government. Because of this diversifying the forest-based income is essential for the community, government, and forest biodiversity conservation too.

2. **Address human capital development**. Human skill and knowledge represent the essential part of household livelihood asset. Skill perceives the ability of the household to combine the owned capital to contribute wellbeing of the household without biasness. Empowering the communities through education, practical training, and experience sharing will enable them to think out of the balloon. It improves the working culture of the communities to employ the present capital efficiently rather than depending on the labour of others. It also reduces urban to rural travelling of communities in search for LH diversification. This will be achieved via the cost of infrastructure development, human and financial resource allocation.
3. **Increase production per unit area**. Demand and supply of livelihood are incompatible because of population growth and resource depletion. The present extensive farming system of the rural community is not a long-lasting activity and should be altered into an intensive production system using improved technology of agriculture. This will alter the dependence of the communities on similar on-farm activities and enable them to utilize the present capital efficiently to accumulate other form of asset. The on-farm activities should be also supported with the promotion of non-farm activity to accommodate the growing population and to access market links for on-farm production. Intensive production per unit area, improved technology service, and intensifying of non-farm activities will reduce population pressure over the forest.
4. **Institutionalize and increase the presence of community-based Institutions**;

Institutions (community base or governmental) perform have a vital role in the communities' livelihood in accessing various services. Communities will get better service/support with the least cost through their institution than being acting privately. This will increase the social interaction, capital accumulation, and sustainable natural resource management than conversion to contribute to the well-being of the household. So, government should work on strengthening and scale-up of forest management and marketing institutions (FMA & Cooperatives) to reduce deforestation and forest degradation and increase the economic return of the forest jointly. Therefore, establishing and strengthening community-based institutions in a transparent way will bridge communities to access potential markets for their production and delivery of services.

Since skill, knowledge and financial resource are limited; government and potential NGOs should work jointly on the allocation of resources to secure a market link. Infrastructure development and empowering of local institutions on market negotiation should be done jointly. Strengthening and increasing community-based institution cover will diversify forest-based income and add forest value to sustain the conservation of this hotspot forest area.

6.5. Limitations

As far as the scope of the study is concerned, it is unsecured to conclude that the current study will apply in all Southwest Ethiopia forests because it lacks data from the non-forest coffee areas. Hence, it is applicable only to forest coffee areas. In addition to this, the language barrier also had a negative impact on data collection; because language translation is not as perfect as direct communication. As a result, there could be some missed information during data collection.

6.6. Further study

The role of forests in the life of rural communities is enormous. Forest product demand and supply are not compatible due to population growth and result in a rapid rate of forest degradation. Traditional knowledge on NTFP consumption is also

deteriorating through time and escalates forest conversion to another form of land use. Therefore, further study is vital to identify and promote potentially marketable and sustainably harvestable forest products. This will increase the economic return of the forest and secure sustainable conservation of the remaining forest. Moreover, the approach to be followed to improve the economic advantage of honey production also requires further study.

6.7. Summary

This study shows the contribution of forest in the livelihood of forest dependent communities and influencing factors which need practical intervention from responsible institutional bodies that is the aim of the study. In addition to this, limitation of the study and issues which need further investigation are mentioned.

References

Abab, S. (2018).Understanding the emerging dynamics in forest governance in Ethiopia. Paper presented at World Bank Conference on land and poverty, *The World Bank* - Washington DC.

Abate, M. (2020). Review of opportunities, challenges and future directions of forestry development and conservation in Ethiopia. *Agricultural research & technology: 24*(5),doi: 10.19080/ARTOAJ.2020.24.556286

Adam, Y., Pretzsch, J., & Pettenella, D. (2013). Contribution of non-timber forest products livelihood strategies to rural development in dry lands of Sudan: Potentials and failures. *Agricultural systems, 117*, 90–97,DOI:10.1016/j.agsy.2012.12.008

Ahmed, B.& Daba, N.(2018). Rural households livelihood strategies and its impact on livelihood outcomes: The case of Eastern Oromia, Ethiopia. *Agris on-line Papers in Economics and Informatics*. Vol 10. 93-103.doi:10.7160/aol.2018.100209.

Akaranga, SI. & Makau, BK. (2016). Ethical considerations and their applications to Research: A case of the University of Nairobi." *Journal of Educational Policy and Entrepreneurial Research. Vol.3*(12),1-9.

Akhtar, I. (2016). Research design. In *Research in Social Science: Interdisciplinary Perspectives* (1st ed.pp.17).

Alakwe, K. (2017). Positivism and knowledge inquiry: From scientific method to media and communication Research. Journal of Humanities and Cultural Science, Vol.2(3), 38-46.

Alooni, K. B. (2002). *Participatory Forest Management in India ḤḤ An Analysis of Policy Trends amid ' Management Change ' ḤḤ*. 88–113.

Ameha, A., Larsen, H., & Lemenih, M. (2014). Participatory forest management in Ethiopia: Learning from pilot projects. *Environmental Management Journal, 53*,838–854. DOI 10.1007/s00267-014-0243-9

Angelsen, A., Jagger, P., Babigumira, R., Belcher, B., Hogarth, N. J., Bauch, S., & Borner, J. (2014). Environmental income and rural livelihoods: A Global-comparative analysis. *World Development Vol. 64*, pp. S12–S28,

Ango, T. (2018). Medium-scale forestland grabbing in the Southwestern highlands of Ethiopia: Impacts on local livelihoods and forest conservation *Land* 7(1),24. DOI.org/10.3390/land7010024

Asfir, S. (2016). Determinants of rural households livelihood strategies: evidence from Western Ethiopia. *Journal of Economics and Sustainable Development*, *7*(15), 103-109

Ashley, C., & Carney, D. (1999). Sustainable Livelihoods Analysis: Lessons form early experience. Department for International Development, 55

Awas, T. (2013).Baseline on the vegetation of Sheko forest, Southwestern Ethiopia, Biodiversity report (5a). Submitted for UOH

Awoke, T. (2014).Unique forest ecosystem under threats. *International Journal of Agricultural Research and Review: Vol. 2*(3), pp 038-048.

Ayana, A. N., Vandenabeele, N., & Arts, B. (2017). Performance of participatory forest management in Ethiopia: institutional arrangement versus local practices. *Critical Policy Studies, 11*(1), 19–38. https://doi.org/10.1080/19460171.2015.1024703

Baffoe, G. & Matsuda1, H. (2018). An empirical assessment of rural livelihood assets from gender perspective: evidence from Ghana. *Sustain Sci 13*(3*)*:815–828, DOI.org/10.1007/s11625-017-0483-8.

Baffoe, G., & Matsuda, H. (2017). Why do rural communities do what they do in the context of livelihood activities? Exploring the livelihood priority and viability nexus. *Community Development, 48(*5), 715-734, doi.org/10.1080/15575330.2017.1366927

Baskent, E. Z. (2020). A framework for characterizing and regulating ecosystem services in a management planning context. *Forests*, *11*(1), 1–20. https://doi.org/10.3390/f11010102

Bazezew, A., Bewket, W., & Nicolau, M. (2013). Rural households livelihood assets, strategies and outcomes in drought-prone areas of the Amhara Region, Ethiopia: Case Study in Lay Gaint District. *African Journal of Agricultural Research, 8*(46), 5716–5727. https://doi.org/10.5897/AJAR2013.7747

Belcher, B., Achdiawan, R., & Dewi, S. (2015). Forest-based livelihoods strategies conditioned by market remoteness and forest proximity in Jharkhand, India. *World Development* Vol. 66, pp. 269–279. DOI.org/10.1016/j.worlddev.2014.08.023.

Bennett, N. (2010). Sustainable livelihoods from theory to conservation practice: An extended annotated bibliography for prospective application of livelihoods thinking in protected area community research. *Protected Area and Poverty Reduction Alliance working paper No. 1*. Victoria, Canada.

Brockerhoff, E.G., Barbaro, L., Castagneyrol, B. *et al.* (2017). Forest biodiversity, ecosystem functioning and the provision of ecosystem services. *Biodivers Conserv* 26, 3005–3035 https://doi.org/10.1007/s10531-017-1453-2

Brocklesby, M., & Fisher, E. (2014). Community development in sustainable livelihoods approaches-an introduction. *Community development journal Vol. 38*(3).

Bryman, A., & Bell, E. (2015). *Business research method*. Oxford university press

Buchenrieder, G., and Balgah, R. (2013). Sustaining livelihoods around community forests. What is the potential contribution of wildlife domestication? *The Journal of Modern African Studies, Vol. 51*, pp. 57-84, doi:10.1017/S0022278X12000596

Central Statistical Agency (2013). Agriculture sample survey of farm management practice

Chambers, R., and Conway, G. (1992).'Sustainable rural livelihoods: practical concepts for the 21st century, *IDS Discussion Paper no. 296*. Brighton: Institute of Development Studies, UK

Chao, S., (2012) Forest peoples: Numbers across the world. *Forest people programme*.

Code of ethics and conduct (2018), The British Psychological Society.

Cronoy , R. (2018). *Sample size. A rough guide*. Semantic scholar.

Deforestation in Ethiopia Retrieved from https://en.wikipedia.org/wiki

Denscombe, M.(2017). *The good research guide*. Open University Press, 6th Edition. London, England

Dereje, M., & Mulugeta, A. (2019). Community based participatory forest resources management practices in Chilimo forest, Dendi District, West Shewa Zone, Oromia Regional State, Ethiopia. African Journal of Agricultural Research, 14(35), 2119–2134. https://doi.org/10.5897/ajar2019.14389

DFID, (1999). Sustainable Livelihood Guidance Sheets. London, UK.

Downie, B. K., Dearden, P., & King, L. (2018). Exploring paradoxes in the search for sustainable livelihoods: a case study from Tanzania. *Environment, Development and Sustainability*, *20*(2), 527-542.

Duguma, L., Atela, J., Minang, P., Ayana, A., Gizachew, B., Nzyoka, J., & Bernard, F. (2019). Deforestation and Forest Degradation as an Environmental Behavior: Unpacking Realities Shaping Community Actions. *Land*, *8*(2), 26. https://doi.org/10.3390/land8020026

Easterby-Smith, M., Thorpe, R. Jackson, P. & Jaspersen, L.(Eds.). (2018). *Management and business research (*6th ed*.).*SAGE Publications Ltd.

Ellen, W. (2011). Participatory Forest Management , Practices and Experiences. SFE Technical paper*:FAO Sub-regional Office for Eastern Africa (SFE), Ethiopia.* 58

Endamana, D., Angu1, K. A, Akwah, G.N., Shepherd, G., & Ntumwel, B.C. (2016). Contribution of non-timber forest products to cash and non-cash income of remote forest communities in Central Africa. *International Forestry Review Vol.20(10).*

Eshetu, A. (2014). Forest resource management systems in Ethiopia: Historical perspective. *International Journal of Biodiversity and Conservation. Vol 6,*121-131, DOI:10.5897/IJBC2013.0645

Ethiopia's Forest Reference Level Report (2016) Ethiopia's Forest Reference level submission to the UNFCCC

Ethiopia CSA map (2013) https://reliefweb.int/map/ethiopia/ethiopia-administrative-map-27-mar-2013

Ethiopia Population (2019). https://www.unfpa.org/data/world-population/ET

FAO (2020). Global forest resource assessment report, Ethiopia. Rome. http://www.fao.org/3/ca9991en/ca9991en.pdf

FAO, (2014).The State of Food Insecurity in the World. FAO, Rome. http://www.fao.org/3/i4646e/i4646e.pdf

FAO, (2017). Global report on crises. FAO,Rome. http://www.fao.org/emergencies/resources/documents/resources-detail/en/c/876564/

Fekadu, G., Tebarek, A., Megento, L., & Gurmessa, F. (2021). The extent of livelihood diversification on the determinants of livelihood diversification in Assosa Wereda , Western. *GeoJournal*, *5*(1992). https://doi.org/10.1007/s10708-021-10379-5

Fisher, M., Reimer, J. J., &Carr, E. R. (2010). Who should be interviewed in surveys of household income? *World Development 38*(7)

Fouka, G., & Mantzorou, M. (2011). What are the major ethical issues in conducting research? Is there a conflict between the research ethics and the nature of nursing? *Health Science Journal, 5*(1), 3-14.

Gabler, S., & Hader, S. (2016). *Sampling in Theory*. GESIS Survey Guidelines. Mannheim, Germany: GESIS – Leibniz Institute for the Social Sciences. doi: 10.15465/gesis-sg_en_009.

Galvani, A. P., Bauch, C. T., Anand, M., Singer, B. H., & Levin, S. A. (2016). Human-environment interactions in population and ecosystem health. *Proceedings of the National Academy of Sciences of the United States of America*, *113*(51), 14502–14506. https://doi.org/10.1073/pnas.1618138113

Gatiso, T. (2017). Households' dependence on community forest and their contribution to participatory forest management: evidence from rural Ethiopia. *Environmental Development 21*:181–197

Gautam, Y., and Andersen, P. (2016). Rural livelihood diversification and household well-being: Insights from Humla, Nepal. *Journal of Rural StudiesVol.44* PP,239-249, doi.org/10.1016/j.jrurstud.2016.02.001

Gebru, G., Ichoku, H., & Phil-Eze, P.(2018). Determinants of livelihood diversification strategies in Eastern Tigray region of Ethiopia. *Agriculture & Food Security 7:62,*doi.org/10.1186/s40066-018-0214-0

Geremew Worku Kassie, G., Sangho Kim & Francisco P. Fellizar Jr. | Benjamin Ho (Reviewing Editor) (2017). Determinant factors of livelihood diversification: Evidence from Ethiopia, *Cogent Social Sciences, 3*:1, DOI: 10.1080/23311886.2017.1369490

Gobeze, T., Bekele, M., Lemenih, M., & Kassa, H. (2009). Participatory forest management and its impacts on livelihoods and forest status: The case of bonga forest in Ethiopia. *International Forestry Review*, *11*(3), 346–358. https://doi.org/10.1505/ifor.11.3.346

Guha, S., Mandla, V. R., Barik, D. K., Das, P., Rao, V. M., Pal, T., & Rao, P. K..(2018). Analysis of Sustainable Livelihood Security: A Case Study of Allapur Srurban Cluster. *Journal of Rural Development, Vol. 37*(2), pp. 365-382.

Gupta, Bindia. (2013). Role of Non Timber Forest Products in Local Livelihoods in India: Prospects & Problems (Published in the journal PURSUITS ISSN 2322-0643 Print Version). 2. 64-69.

Hertwig, R., & Pleskac, T. (2010). Decisions from experience: Why small samples?.Vol. 115(2), 225-37, DOI 10.1016/j.cognition.2009.12.009.

Hurlimann C. (2019) Research Philosophy and Ethics. In: *Valuation of renewable energy investments*. Sustainable Management, Wertschöpfung und Effizienz. Springer Gabler, Wiesbaden. https://doi.org/10.1007/978-3-658-27469-6_3

Jahanifar K., Amirnejad H., Abedi, Z., Vafaeinejad, A. (2017). Estimation of the value of forest ecosystem services to develop conservational strategy management (strengths, weaknesses, opportunities and threats). *Journal of forest science, 63*(7): 300–312, doi: 10.17221/137/2016-JFS

Jilcha, K. (2019). *Research design and methodology*.DOI: 10.5772/intechopen.85731. Intechopen.

Kassa, W. (2019). Determinants and challenges of rural livelihood diversification in Ethiopia: Qualitative review. *Journal of Agricultural Extension and Rural Development, Vol11*(2), 17-19*,* DOI: 10.5897/JAERD2018.0979

Kedir, H., Negash, M., Yimer, F, & Lemenih, M. (2017). Contribution of participatory forest management towards conservation and rehabilitation of dry Afromontane forests and its implications for carbon management in the tropical Southeastern Highlands of Ethiopia. *Journal of Sustainable Forestry. Vol.37*, 1-18,doi 10.1080/10549811.2017.1414614.

Khatiwada, S. P., Deng, W., Paudel, B., Khatiwada, J. R., Zhang, J., & Su, Y. (2017). Household livelihood strategies and implication for poverty reduction in rural areas of central Nepal. *Sustainability (Switzerland), 9*(4), 1–20,doi.org/10.3390/su9040612

Klepeis, P., Orlowska, I. A., Kent, E. F., Cardelús, C. L., Scull, P., Eshete, A. W., & Woods, C. (2016). Ethiopian Church forests: A hybrid model of protection. Human Ecology Vol.44,715–730 DOI 10.1007/s10745-016-9868-z

Kusters, K., Achdiawan, R., Belcher, B., & Ruiz Perez, .M. (2006). Balancing development and conservation? An assessment of livelihood and environmental outcomes of nontimber forest product trade in Asia, Africa, and Latin America. *Ecology and Society, 11*(2),pp-22

Langat, D. K., Maranga, E. K., Aboud, A. A., & Cheboiwo, J. K. (2016). Role of forest resources to local Livelihoods: The case of East Mau forest ecosystem, Kenya. *International Journal of Forestry Research*, *2016*. https://doi.org/10.1155/2016/4537354

Lemenih, M., Allan, C., and Biot, Y. (2015). Making forest conservation benefit local communities: participatory forest management in Ethiopia. *Farm Africa technical review process,* London EC2Y 5DN, United Kingdom.

Leßmeister, A., Heubach, K., Lykke, A.M., Thiombiano, A., Wittig, R., & Hahn, K. (2015). The contribution of Non-Timber Forest Products (NTFPs) to rural household

revenues in two villages in South-eastern Burkina Faso. *Agroforestry Systems, 92*, 139-155.https://doi.org/10.1007/s10457-016-0021-1

Liu, Z., Chen, Q., and Xie, H. (2018).Influence of the farmer's livelihood assets on livelihood strategies in theWestern mountainous area, China. *Sustainability*, *10*(3), 875. DOI:10.3390/su10030875

Lobe B, Morgan D, & Hoffman KA. (2020). Qualitative data collection in an Era of social distancing. *International Journal of Qualitative Methods*. Vol 19, doi:10.1177/1609406920937875.

Loison, S. (2015). Rural livelihood diversification in Sub-Saharan Africa: A literature review, *The Journal of Development Studies, 51*(9),1125-1138, DOI:10.1080/00220388.2015.1046445

Makoudjou, A., Levang, P., & Tieguhong, J.C.(2017).The role of forest resources in income inequality in Cameroon. *Forests, trees and livelihoods, 26*(4), 271–285. DOI 10.1080/14728028.2017.1297258

Manlosa, A., Hanspach, J., Schultner, J. Dorresteijn I.. & Fischer, J. (2019). Livelihood strategies, capital assets, and food security in rural Southwest Ethiopia. *Food Security* 11(1),167–181. https://doi.org/10.1007/s12571-018-00883-x

Masiero, M., Pettenella, D., Boscolo, M., Barua, S.K, Animon, I., & Matta, J.R. (2019). Valuing forest ecosystem services: a training manual for planners and project developers. *Forestry Working Paper No. 11*,216. FAO. Rome,

Meijaard, E, Abram, NK, Wells, JA, Pellier, A-S, Ancrenaz, M, et al., (2013). People's Perceptions about the importance of forests on borneo. *plos one* 8(9),e73008. doi:10.1371/journal.pone.0073008.

Meinhold, K. & Darr, D. (2019). The processing of non-timber forest products through small and medium enterprises—A review of enabling and constraining factors. *Article in Forests. Vol, 10(*11),1026*,* DOI: 10.3390/f10111026.

Mekonen. A., Gebreegziabher, B., Wassie, W., Tsegay, B. (2019). Review: Church forests; the green spots of Ethiopian highlands*. Asian Journal of Forestry 3*(2): 45-53,doi: 10.13057/asianjfor/r030201

Melaku, E., Ewnetu, Z., & Teketay, D. (2014). Non-timber forest products and household incomes in Bonga forest area, Southwestern Ethiopia.*Journal of Forestry Research 25*(1): 215–223,DOI 10.1007/s11676-014-0447-0

Mengist, D., & Alemu, M. (2019). Community based participatory forest resources management practices in Chilimo forest, Dendi District, West Shewa Zone, Oromia Regional State, Ethiopia. *African Journal of Agricultural Research, 14*, 2119-2134.

Miah Md., Chakma S., Koike M., & Muhammed, N. (2012). Contribution of forests to the livelihood of the Chakma community in the Chittagong hill tracts of Bangladesh. *Jornal for Forest Research, 17*(6*),*449–457. doi 10.1007/s10310-011-0317

Millennium Development Goal Report (2015). Final assessment of progress toward achieving the MDGs. UN, New York.

Milner-Gulland, Eleanor. (2012). Interactions between human behavior and ecological systems. Philosophical transactions of the Royal Society of London. *Series B, Biological sciences. 367*. 270-278, Doi:10.1098/rstb.2011.0175.

Mohajan, H. K. (2017). Two Criteria for Good Measurements in Research: Validity and Reliability. *Annals of Spiru Haret University. Economic Series*, *17*(4), 59–82. https://doi.org/10.26458/1746

Munanura, I., Backman, K., Hallo, J., & Powell, R.(2016). Perception of tourism revenue sharing impacts on Volcanoes National Park. *Journal of Sustainable Tourism, 24:*12, 1709-1726, Dol:10.1080/09669582.2016.1145228

Onyas, W.I., McEachern, M.G., & Ryan, A.(2018) Co-constructing sustainability: Agencing sustainable coffee farmers in Uganda. *Journal of Rural Studies*, 61 , pp. 12-21.

Pandey, A., Tripathi, Y.C., & Kumar,A. (2016). Non Timber Forest Products (NTFPs) for sustained Livelihood: Challenges and strategies. *Research Journal of Forestry, 10(1),1-7,***DOI:** 10.3923/rjf.2016.1.7

Peng, W., Zheng, H., Robinson, B., Li, C., & Wang, F. (2017). Household livelihood strategy choices, impact factors, and environmental consequences in Miyun reservoir watershed, China. *Sustainability, 9*(2), 175,DOI 10.3390/su9020175

Pessu, T. (2019). Understanding research paradigms: An ontological perspective to business research. *Journal of Research & Method in Education Vol.9(4), PP 38-40.*

Quandt, A. (2018). Measuring livelihood resilience: The Household Livelihood Resilience Approach (HLRA). *World Development Journal, 107*, 253–263. DOI: 10.1016/j.worlddev.2018.02.024

Rahangdale, C.P. & Bisen, Neelam & Upadhyaya, S.D. & Parte, Dharmendra. (2018). Role of Forest in Upliftment of Rural Livelihood in India. India

Rahi S (2017) Research design and methods: A systematic review of research paradigms, sampling issues and instruments development. *International Journal of Economics & management science 6(2)*,1-5, doi: 10.4172/2162-6359.1000403.

Rahman, Md. (2016). The advantages and disadvantages of using qualitative and quantitative approaches and methods in Language "Testing and Assessment" research: A literature Review. *Journal of Education and Learning; Vol. 6*(1), doi:10.5539/jel.v6n1p102

Reichhuber, A., & Requate, T, (2012). Alternative use systems for the remaining Ethiopian cloud forest and the role of Arabica coffee. A cost-benefit analysis. *Ecological Economics* 75 : 102–113,DOI: 10.1016/j.ecolecon.2012.01.006.

Ryan, G. (2018). Introduction to positivism, interpretivism and critical theory. *Nurse Researcher, 25*(4),41-49, DOI: 10.7748/nr.2018.e1466

Sacande, M. & Parfondry, M., (2018). Non-timber forest products: from restoration to income generation. Rome, FAO. Pp 40

Sajjad Kabir, S.,M. (2016). *Basic guidelines for research an introductory approach for all Disciplines.* Mohammad Javed Rahim Book Zone

Samy, M and Robertson, FA (2017). *From positivism to social constructivism: an emerging trend for CSR researchers. In: Handbook of research methods in corporate social responsibility.* Edward Elgar Publishing, UK, pp. 437-462. ISBN 9781784710910 DOI:https://doi.org/10.4337/9781784710927.00036.

Saunders, M., Lewis, P., & Thornhill, A. (Eds.) (2019). *Research Methods for Business Students. Understanding research philosophy and approaches to theory development (*8th ed.).Pearson Education Limited.

Scoones, I. (1998). Sustainable rural Livelihoods: A framework for analysis, *IDS Working Paper 72.*

Scoones, I. (2009) Livelihoods perspectives and rural development, *The Journal of Peasant Studies, 36*:1, 171-196, DOI: 10.1080/03066150902820503

Segers, K., Dessein, J., & Nyssen, J. (2005). The Sustainable Livelihoods Approach as an impact assessment tool for development interventions in rural Tigray , Ethiopia : opportunities & challenges. (May 2014).

Serrat O. (2017) *The sustainable livelihoods approach. in: knowledge solutions*. Springer, Singapore. https://doi.org/10.1007/978-981-10-0983-9_5.

Sime, Getachew & Anne, JB. (2019). Rural livelihood vulnerabilities, coping strategies and outcomes: A case study in central rift valley of Ethiopia. African Journal of Food Agriculture Nutrition and Development. Vol. *19*(3), 14602–14621, doi.org/10.18697/ajfand.85.16815

Solomon, N., Teferi, Hadgu & Annang, Ted & Pabi, Opoku & Asante, Isaac & Birhane, Emiru. (2018). Forest Cover Change, Key Drivers and Community Perception in Wujig Mahgo Waren Forest of Northern Ethiopia. *Land. 7* (1),DOI:10.3390/land7010032

Steel, G., & Van Lindert, P. (2017). (Rep.). International Institute for Environment and Development. Retrieved from http://www.jstor.org/stable/resrep02726

Steele, M., Shackleton, C., Shaanker, R., K N, G., & Radloff, S. (2015). The influence of livelihood dependency, local ecological knowledge and market proximity on the ecological impacts of harvesting non-timber forest products. *Forest Policy and Economics. 50*,285-291, DOI10.1016/j.forpol.2014.07.011.

Sutcliffe, J., Wood, A., & Meaton, J. (2012). Competitive forests – making forests sustainable in South-west Ethiopia, *International Journal of Sustainable*

Development & World Ecology, 19(6),471-481, DOI: 10.1080/13504509.2012.740510

Sykes, B., Verma, A., & Hancock, B. (2018). Aligning sampling and case selection in quantitative-qualitative research designs: Establishing generalizability limits in mixed-method studies. *Journal ofEthnography, 19*(2),227-253,DOI10.1177/1466138117725341.

Tadesse, S., Woldetsadik, M., & Senbeta, F. (2018). Attitudes of forest users towards participatory forest management: The case of Gebradima forest, Southwestern Ethiopia. *Small-scale forestry 17*:293–308

Taherdoost, Hamed. (2016). Validity and Reliability of the Research Instrument; How to Test the Validation of a Questionnaire/Survey in a Research. International *Journal of Academic Research in Management. 5*. 28-36. 10.2139/ssrn.3205040.

Tang,Q., Bennett, S., Xu, Y., & Li, Y. (2013). Agricultural practices and sustainable livelihoods: Rural transformation within the Loess Plateau, China, *Applied Geography 41*, 15-23

Tesfamariam, K. (2015). Cooperative movement in Ethiopia: development, challenges and proposed intervention. *Journal of Economics and Sustainable Development Vol.6* (5).

Tadesse,T., Tesfaye, B., Abera, G., & Yildiz, F. (Reviewing editor) (2020) Coffee production constraints and opportunities at major growing districts of southern Ethiopia, *Cogent Food & Agriculture, 6(*1), DOI: 10.1080/23311932.2020.1741982

Tesfaye, Y. (2011). Participatory forest management for sustainable livelihoods in the Bale Mountains, Southern Ethiopia. In Management. *Retrieved from http://pub.epsilon.slu.se/8275*/

Teshome, M.(2014). Population growth and cultivated land in rural Ethiopia: Land use dynamics, access, farm size, and fragmentation. *Resources and Environment, 4*(3),148-161,DOI: 10.5923/j.re.20140403.03

Tilahun, A., Terefe, H., & Soromessa, T. (2015). The contribution of Ethiopian Orthodox Tewahido Church in forest management and its best practices to be scaled up in North Shewa zone of Amhara Region, Ethiopia. *Agriculture, Forestry and Fisheries. 4.* 123-137,DOI: 10.11648/j.aff.20150403.18

Turker, M, Ozturk, A, & Pak, M. (2010). Total Economic Value of Forest Resources in Turkey. *African Journal of Agricultural Research, Vol-5*

UNEDP (2015). Summary report on Millennium Development Goal Achievement.

UNEP (2014). The value of forests; Payments for ecosystem services in a Green Economy. Geneva timber and forest study paper 34, Geneva, Siwtzerland

Wang, C. (2018). An analysis of rural household livelihood change and the regional effect in a Western impoverished mountainous area of China. *Sustainability, 10(6)*, 1738; doi:10.3390/su10061738

Wassie, S. (2020). Natural resource degradation tendencies in Ethiopia: a review. *Environmental system research, 9(*33),DOI.org/10.1186/s40068-020-00194-1

Wood, A., Tolera, M., Snell, M., O'Hara, P. & Hailu, A. (2019). Community Forest Management (CFM) in south-west Ethiopia: Maintaining forests, biodiversity and carbon stocks to support wild coffee conservation. *Global environmental change. Vol.59*, doi.org/10.1016/j.gloenvcha.2019.101980

Woyesa, T., & Kumar, S. (2020). Potential of coffee tourism for rural development in Ethiopia:a sustainable livelihood approach. *Environment, development and sustainability*, doi.org/10.1007/s10668-020-00610-7

Wright, G., Andersson, K., Gibson, C., and Evans, T. (2016). Decentralization can help reduce deforestation when user groups engage with local government. *Proceedings of the National Academy of Sciences vol.113*(52), 14958-14963

Wunder, S., Angelsen, A, and Belcher, B. (2014). Forests, livelihoods, and conservation: *Broadening the empirical base world development. Vol.64*, doi.org/10.1016/j.worlddev.2014.03.007

Yenesew, A. & Debeb, D. (2019). Challenges and prospects of cooperatives in Ethiopia with reference South Gondar Zone- Ethiopia. *European Journal of Business and ManagementVol.11*(34), DOI: 10.7176/EJBM/11-34-03.

Zhang, D. & Pearse, P. (2011). Forest economics. *UBC Press*, doi.org/10.14288/1.0108017

Appendixes

Appendix-1 Information sheet

University of Huddersfield Business School

Individual Participant Information Sheet

Research Project Title: The Economic contribution of Forest for Livelihood of Forest dependent Households

Introduction

You are being invited to take part in a research project about the livelihood of forest dependent communities. Before you decide to take part it is important that you understand why the research is being undertaken and what it will involve. Please do not hesitate to ask if there is anything that is not clear or if you would like more information.

What is the purpose of the study?

The purpose of this study is to understand the livelihood strategy of forest dependent communities, what factors have been affecting their livelihood and how they have been managing it.

Why I have been approached?

You have been asked to participate because you are a member of the communities, selected randomly and your practical experience on livelihood strategy will contribute a lot for the study

Do I have to take part?

Participation in this study is entirely voluntary, so please do not feel obliged to take part. If you decide to take part you will be asked to agree either verbally or by signing a consent form, and you will be free to withdraw at any stage without reasoning. A decision not to take part, will not affect your relationship with me or the CCWC project working with you.

Are there any disadvantages to taking part?

The survey is face to face interview that will last approximately 1:30 hour, will be digitally recorded to listen to it latter to make sure that I have understood correctly what is said. No disadvantages are likely to happen to your participation. If you are unhappy or have further questions at any stage in the process, please address your concerns.

Will my identity be disclosed?

All your information will be maintained confidential and anonymised before the data is presented in any work. If you are not happy, you can ask me to delete any of your information within one month after being interviewed.

What will happen to the information?

All information collected from you during this research will be kept secure and any identifying material, such as names will be removed in order to ensure anonymity. It is anticipated that the research will, at some point, be published in a report and academic journal. Your anonymity will be ensured, although it may be necessary to use your words in the presentation of the findings, your permission for this is included in the consent form.

Who can I contact for further information?

If you would like to know more about the research, please be free to communicate me at any time with this contact address

Desyalew Fantaye

e-mail- shekobuna@gmail.com

Mobile number 0976051272

Are there any more questions? Is it ok to start the discussion now?

Appendix-2 Consent form

University of Huddersfield, Business School

Consent Form for Participation in interview

Name of Researcher; Desyalew Fantaye

Title of Research Project; The Economic contribution of Forest for Livelihood of Forest dependent Households.

For participants to complete and sign

- I confirm that I have read and understood the participant information sheet related to this research, and have had the opportunity to ask questions

- I understand that my participation is voluntary and that I am free to withdraw until one month after interviewing without giving any reason

- I understand that all my responses will be anonymised

- I give permission for the researcher to have access to my anonymised responses and to record the process

- I agree to take part in the above study

Name of Participant _____

Signature _____

Date _____

Name of Researcher _____

Signature _____

Date _____

Appendix-3 Data collection Questionnaire

University of Huddersfield, Research data collection Questionnaire

The objective of this data collection is to analyse the livelihood strategy and the contribution of forest to the livelihood of the rural communities

This questionnaire is developed by the researcher to collect field data from the sampled households. It has no political, government and non-governmental interest. So, the information you /the interviewee give to the researcher is confidential, not shared with any other party and is only for the benefit of the researcher. You are kindly requested to respond as best you can. Your permission is also asked to allow recording of the process for cross-checking the data analysis.

Get consent from the interviewee to proceed.

Kebele/ got_____ Date_____

1. Household characteristics and human capital of the household

<table>
<tr><td>Attributes</td><td colspan="10">Responses</td></tr>
<tr><td>Respondent No</td><td colspan="10"></td></tr>
<tr><td>Sex</td><td colspan="10"></td></tr>
<tr><td>Age</td><td colspan="10"></td></tr>
<tr><td>Ethnicity</td><td colspan="10"></td></tr>
<tr><td>Education level</td><td colspan="10"></td></tr>
<tr><td>Yourrole in the PFM</td><td colspan="10"></td></tr>
<tr><td>Lived here since</td><td colspan="10"></td></tr>
<tr><td>Family size</td><td colspan="10"><table><tr><td>Male</td><td>Female</td><td>Total</td></tr><tr><td></td><td></td><td></td></tr></table></td></tr>
<tr><td>Educational status of the family members, (only for these who edge is greater than seven)</td><td colspan="10"><table><tr><td colspan="2">Illiterate</td><td colspan="2">Primary 1-6</td><td colspan="2">Secondary 7-12</td><td colspan="2">Higher Education</td></tr><tr><td>M</td><td>F</td><td>M</td><td>F</td><td>M</td><td>F</td><td>M</td><td>F</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table></td></tr>
<tr><td>Distance to school (km)</td><td colspan="10"></td></tr>
<tr><td>Age class of the family (yrs)</td><td colspan="10"><table><tr><td colspan="2"><18</td><td colspan="2">19-55</td><td colspan="2">>56</td></tr><tr><td>M</td><td>F</td><td>M</td><td>F</td><td>M</td><td>F</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table></td></tr>
</table>

2.1 What are the activities you and your family members are engaged in to support your household livelihood?_____

_____

3.Social Capital of the Household

3.1 Is there any institutions in your kebele and are you a member? Who are affected by the institutions?

No	Name of the institution	Is there? Yes/No	Are you a member? Yes/No	Value of the institution
	Association (FMGs or other informal network)			Formal & informal non-profit making institution/ network/ link
	Edir			Local cooperation to support each other especially when the HH has got problem
	Equb			Local cash saving system
	Cooperative			Formal organization to collect and market products jointly, profit making organization
	Kebele administration network			Formal, lower form of government administration
	Others (list out if any)			

3.2 Do you know the details of these institutions/ informal arrengements?

Name of the institution	Objecti	Right	Respon	Does it	Is it strong	Remark

	ve		sibility	has Norm/ regulation	enough to maintain smooth relation	
	Y/N	Y/N	Y/N	Y/N	Y/N	
Association						
Edir						
Equb						
Cooperative						
Kebele administration network						
Others (list out if any)						

3.3 How could be the service of these institutions improve and sustain? _____

_____

_____

_____

4. Natural Capitals of the Household

4.1 List out natural assets you have access to?

No	Natural Assets	Unit	Use-right			Distance in (km)	Who is responsible to manage it
			Certi-fied	Norm/byelaw	Open access		
	Farmland	ha					
	Coffee forest	ha					
	Natural forest (communal)	ha					
	Beecolony	No					
	Developed water	No					
	Rented land in/ out	ha					
	Forest land/ privet	ha					
	Grazing land	ha					
Remark							

4.2 Could you please list out potentialforest products your household or community have been harvesting from natural forest area?

No	List of forest products	Rank the objective of your harvest (1^{st} /2^{nd})		Distance in Km from your village	Who is responsible for harvesting (male/female/ both)	Who manages the benefits (male/female/both	
		Consumption	Income generation			At home consumption	On sold income

Remark

4.3 Do you think availability of forest products have been changing through time? Yes/No How/what cause the change? _____

_____

4.4 What factors will affect your forest product harvesting? (law /norm/ other users/ market/distance…) How? _____

_____

_____

4.5 Do you think the availability of NTFPs have an impact on Natural forest conservation? Yes/No How? _____

_____

_____

4.6 How do you express the value of the natural forest around your residence (please score using scale from 0 to 5: 0 = no value: 1 very low; 2= low; 3=moderate 4; high, and 5 very high

Value of the forest	Ranking result/(score them
1. As economic resource	
2. As a keeper of natural balance	
3. As climate regulator	
4. As storehouse of biodiversity	
5. As heritage	
6. Others (to be specified)	

4.7 Do you think you are the owner of this forest? Yes/No How? _____

_____

_____

4.8 Do you think PFM is contributing for sustainable forest management? Yes/ No
How? _____

_____

_____

4.9 Are Community Based Organizations (PFM &Coop) contributing to your livelihood? Yes/No

How? _____

_____

_____

4.10 What are the main expenditures you experience throughout the year? _____

_____

4.11 What is the source of your cash income for these expenditures? Prioritize them___

_____

___

4.12 Have you encountered with a shortage of income to accommodate your annual costs? Yes/ No. How will you manage that?_____

_____

_____

4.13 Which income sources are increasing/ decreasing through time?

Why? _____

_____

4.14 Please provide quantitative estimates of harvest and price for each of the following income source (first ask for the income sources.)

1. Income (total income)	**Unit**	**Value**
1.1. Agriculture (crop) produced/yr		
Crop volume produced (all crop type)	kg/yr	
Crop volume sold (all crop type)	kg/yr	
Average price of all crops (birr) (all crop type)	Birr/kg	
1.2. Livestock asset owned		
Total No. of livestock owned (cattle, goat, sheep, etc)	No.	
Total No. of livestock sold in the year	No.	
Total cash income generated from sale of livestock	Birr/yr	
Livestock products produced (e.g. Milk, Butter etc)	kg	
Livestock products sold and income generated (e.g. Milk, Butter etc) (kg)	Birr/yr	

Total No. of hens owned	No	
Total No. of hens sold in the year	No	
Egg sold & income generated	Birr/yr	
1.3. Forest/ wood products produced	Unit	
Fuel wood produced	Kg/hh/yr	
Fuel wood consumed in the household	Kg/hh/yr	
Price of fuel wood	birr/kg	
Charcoal produced	Kg/hh/yr	
Charcoal consumed	Kg/hh/yr	
Price of charcoal	birr/kg	
Timber produced	No/hh/yr	
Timber consumed	No/hh/yr	
Timber price	Birr/unit	
1.4 Non Timber/ wood/ Forest Products produced	Unit	
Honey annual production	Kg/hh/yr	
Honey volume sold	Kg/hh/yr	
Honey average price	birr/kg	
Forest coffee produced	Kg/hh/yr	
Forest coffee sold	Kg/hh/yr	
Average price of forest coffee	birr/kg	
Wild coffee produced	Kg/hh/yr	
Wild coffee sold	Kg/hh/yr	
Average price of wild coffee	birr/kg	
Spices produced annually	Kg/hh/yr	
Spices sold	Kg/hh/yr	
Average price of spices	birr/kg	
Other NTFP produced	Kg/hh/yr	
Sold	Kg/hh/yr	
Average price	birr/kg	
1.5. Petty trade income	Birr/yr	
1.6. Wage income (per month and year)	Birr/yr	
1.7. Dividends from coop/yr	Birr/yr	

1.8. Other incomes (e.g. pension; house rent; land rent out, remittance, etc)		

4.15 Do you think gender equality and participation is existing in supporting yourhousehold livelihood? Yes/ No_____

4.16 Where will you sell your products?

	List of marketable products	Marketing place			Main marketing problems
		In the village	Nearby market <7km	At a distant market >7km	

5 Physical Capitals of the Household

5.1 Do you have enough production tools/inputs Yes/No

no	List of production inputs/ tools	Yes/No
	Oxen	
	Ploughing tools	
	Improved seed	
	Fertilizer	
	Irrigation	
	Transport	
	Labour	
	Others (List out)	

- House type _____ How long can it serve you?_____. What is the source of your construction cost _____
- Do you have radio/tape/ TV/phone? Yes/No.

	Physical asset	Yes/No
	Radio	
	Tape	
	Television	
	TelePhone	

5.2 Which infrastructure / service is available to you?

No	Infrastructure Type	Accessible at km	Service status poor/ good/ best
	Market		
	School		
	Health centre		
	Development extension		

5.3 What is your source of new information? Do you think you lack information? (social/ Governmental/technology…)_____

_____

5.4 Does any of your family use the health centre? Yes/ No. How often_____

_____

5.5 List out main food types you are using _____

_____

5.6 Do you have enough food for your family throughout the year? Yes/No

5.7 If there is scarcity for how long and how you will pass it?_____

_____

6 Financial Capital of the Household

6.1 How do you save your cash income and why? (equb/ account/ physical assets…)

_____

_____

6.2 Do you have access to credit (financial service) to support your livelihood? Yes/No. Are you crediting from that? Yes/ No. if not why?_____

_____

_____

7 Vulnerability context of the Household

7.1 Have you encountered any external environment conditions which affected your livelihood? (availability of resources, over population, civil unrest…)Yes/No.

7.2 Do you have institution/ local norm to support your livelihood during such unpredicted stresses exist? Yes/No. Explain it _____

_____

_____

8 Transforming structures of the Household

8.1 Is there any institution/structures which govern your livelihood (rules/law/norm…)? Yes/ No

8.2 Can you describe how these institutions have affected your livelihood (reduce vulnerability, access to asset, address poor's, outcome)? _____

_____

_____

_____

8.3 Are these structures appropriate to support your livelihood? Yes/No.

Do you have any problems in accessing them? _____

_____

_____

_____

8.4 Do you think you are well informed on government development policy and strategy that has designed to improve the livelihood of local communities? Yes/ No. How you explain that_____

_____

_____

9. Livelihood strategy of the Household

9.1 What activities have been combined to diversify your livelihood? (on-farm, off-farm, trade, migration,…) _____

9.2 Is your strategy successful to sustain your livelihood? Yes/No. How? _____

_____

_____

9.3 Have you made any investment to improve the availability of your assets? Yes/No. On which of them_____

_____

9.4 Have you experienced any challenges in diversifying your livelihood? Yes/ No.

9.5 Have you failed to achieve any of your livelihood goals? Yes/ No. What was the reason?

_____

_____

9.6 What support did you receive from the government to achieve your livelihood goal?__

_____

_____

10. Outcomes of the Household

10.1 How can you describe the change of your livelihood through time, is it progressing? Yes/ No. (Production, saving, readiness under stress…) _____

_____

_____

10.2 Are you satisfied with your life? Yes/ No. How?_____

_____

_____

10.3 Do you think your regular activities will sustain your livelihood in the future? Yes/No

11. This is the time for you to tell me anything left and comment on the surveying process.

Thank you for your cooperation and commitment.