Indonesian Journal of Environmental Management and Sustainability
e-ISSN:2598-6279 p-ISSN:2598-6260

IJEMS

Research Paper

# Assessment of Households' Perception Towards Participatory Forest Management the Case of Heban Arsi Woreda, Ethiopia

Gonche Girma[1]*

[1]*Ethiopian Forestry Development, Addis Ababa, 24536, Ethiopia*
***Corresponding author e-mail**: gonchegirma90@gmail.com

**Abstract**
Understanding communities perceptions and attitudes towards participatory forest management (PFM) is crucial to successful PFM improvement. However, there is a lack of research evidence on the perception of local communities for PFM program intervention. The purpose of the study was to exmine local community perceptions and attitudes towards PFM intervention. In this study, 131 households were surveyed and data were collected through the household survey; key informant interviews (KIIs), focus group discussion (FGD). Descriptive statistics were used to analyze the data. Results show that the households perceived that there is no deforestation after PFM intervention. This increased species diversity, forest coverage, productivity of the forest, number of valuable species and address environmental degradation. Respondents that PFM program has opportunities to change a negative attitude to a positive through giving of power to the local community, enables to exclude non-PFM members, and creates a sense of belongingness to use and conservation of forest. The finding demonstrated that households generate their incomes from different sources and the share of forest income is the second. The different actions such as better protection of existing forests, access to alternative livelihood, access to better knowledge were suggested to increase the existing benefits and management of PFM. The finding of the study suggests further improvement of local communities' perception and attitudes as well as providing alternatives to improve forest conditions and livelihood.

**Keywords**
Community, Forest Conservation, Forest Degradation, Participatory Forest Management, Perception

Received: 7 September 2022, Accepted: 10 December 2022
https://doi.org/10.26554/ijems.2022.6.4.143-150

## 1. INTRODUCTION

Forest is crucial for different ecological, economical, and socio-cultural benefits. Forest contributes to the protection of biodiversity, mitigating climate change, provisions fresh water, reduced soil erosion and improves soil fertility, maintenance of the hydrological cycle (Tesfaye, 2017; Degnet et al., 2020; Nzau et al., 2020). Worldwide rural communities mainly depend on forests for their livelihoods, cash resources, and safety nests during time of shortage. In a similar way, forests are essential components of livelihood for rural communities of Ethiopia (Mebrat and Gashaw, 2013). Many communities in Rural Ethiopia depends on the forest to meet their needs such as energy, livelihood diversification, construction material, and farm tools (Amare et al., 2016). However, forest resources are showed a declining trend across the world due to different factors such as commercial logging, conversion of forest land to cropland, lack of community participation, and so on (Tadesse and Teketay, 2017).

In the same way, the status of forest resources have been continuously declining from time to time regarding change in the forest land size and quality such as species composition and structure. This is due to that forest resources in Ethiopia are managed through government control and without consultation and participation of local communities that inhabited in the forest resource area and its surrounding in the past years (Tadesse and Teketay, 2017; Tesfaye, 2017). The centralized forest management system is dismissing of local communities' capacity to manage and use forest resources on sustainable bases (Degnet et al., 2020). Centralized control restricts regulations that prohibit the use of forest resources (Tadesse and Teketay, 2017; Tesfaye, 2017; Degnet et al., 2020). One of the negative outcomes of the centralized forest management approach is the loss of local control of forests and ignoring local institutions, indigenous knowledge, and use rights of the local communities over the forest resources (Purnomo et al., 2017; Tesfaye, 2017; Walle and Nayak, 2021). However, local communities have ample knowledge and respect for the forest and other natural resources. As a result of rapid economic, population

growth, lack of benefit-sharing mechanisms, and lack of public awareness among the local people contribute to losses of forest resources in Ethiopia (Tesfaye et al., 2012; Ameha et al., 2014; Tadesse and Teketay, 2017; Tesfaye, 2017).

To respond and minimize the problem of forest sustainability, different organizations such as the government and non-governmental organizations (NGOs) have introduced the PFM approach in different parts of Ethiopia since the 1990s (Winberg, 2010; Defere, 2022a). The concept of PFM is an approach to attain sustainable forest management that takes to account local communities' advantage and perceptions (Tadesse and Teketay, 2017; Duguma et al., 2018; Nzau et al., 2022; Defere, 2022a). This approach allows the involvement of local community to conserve and protect forest resources as well as link them with their economic needs (Nzau et al., 2020; Defere, 2022a). In recent times, PFM is an accepted way of sustainable forest management and provides a dual purpose to improve the forest conservation and livelihoods of the local communities (Tesfaye, 2017). Besides to PFM, various community-centered forest management strategies such as community forestry, and joint forest management (JFM) have been practiced in many developing countries including Ethiopia (Nath, 2009; Islam et al., 2016). These strategies are a set of arrangements with a various degrees of power-sharing between the government and local communities in the decision-making processes and related activities of forest resources and their management (Okumu, 2017). The overall goal of such shifts in forest resources management is to ensure sustainability through enhancing community participation in forest management, improving the welfare of locals, and addressing market, institutional and policy failure associated with ill-defined property rights, externalities, and market imperfections (Okumu, 2017).

The success of PFM conservation relies on the perception and attitudes of local communities through their involvement (Tesfaye et al., 2012; Ameha et al., 2014; Siraj et al., 2018; Tesfaye, 2017). Various previous evidence demonstrated that the benefits and values of forest resources were influenced by the conservation attitudes and perceptions of local communities (Ameha et al., 2014; Siraj et al., 2018). Therefore, it is expected to bring positive attitudinal changes to local communities regarding the management of the forest. The integration of local communities' understanding and perception of forest conservation and management is an essential component for the effectiveness of forest management and livelihood improvement from PFM in a sustainable manner. More importantly, consideration of local communities' attitudes and beliefs are an important element of PFM sustainability (Tadesse and Teketay, 2017). The responses regarding these perceptions and attitudes can be positive or negative toward forest-related activities (Tesfaye et al., 2012). The perceptions of communities on PFM may be negative or positive that influence their participation in forest management (Ameha et al., 2014; Siraj et al., 2018). However, in many ways, communities' perceptions of PFM efforts are rarely studied regarding different PFM activities such as the decision-making process, conservation, benefit sharing, planning, etc. (Tesfaye, 2017).

Therefore, understanding how the perception of community affects the conservation and management as well as utilization of forest resources through PFM is important in a country where many local communities dependent on forest resources for their livelihood. Previous scholars demonstrated that community perceptions and attitudes toward PFM were influenced by various demographic and socio-economic factors (Tesfaye et al., 2012; Ameha et al., 2014; Tadesse and Kotler, 2016; Tesfaye, 2017). However, community perception regarding the contribution and management of PFM is less researched. Accordingly, assessing and understanding community perception towards PFM is essential for the sustainability of PFM. Until, studies regarding community perception towards PFM are lacking in the country in general, in Heban Arsi district in particular. This study therefore conducted in Heban Arsi woreda, Ethiopia to access local communities' perception towards the current status and future sustainability of PFM.

## 2. METHODS

### 2.1 Study Area

Heban Arsi district is the study area which is located at the eastern part of Lake Langano and located 226 km from Addis Ababa. Geographycaly, the study area located ranges from 7°9'N to 7°42'N latitude and 38°25'E - 38°54'E longitude. The altitude of the district ranges from 1500 to 3000 m above sea level and the total area of the district is about 35,613.6 hectares (HADADO, 2020).

The topographic nature of the district is characterized by mostly flat and undulating landscape. The district classified in to three agro-ecological zones namely highland, midland, and lowland. These agro ecological zones are different by altitude and rainfall distribution. The rainfall distribution is bimodal and the short rainy season occurs from March to May while long rainy season is from July to October. The annual average rainfall is 825 mm with ranges from 500 to 1150 mm as well as the average annual temperature is 19°C with a ranges from 10°C to 27°C) (HADADO, 2020). The soil type is dominantly derived from volcanic activities in the Rift Valley which are characterized as Mollic Andosols (Lemenih, 2004). The drainage systems are also Gedemso, Guracho, Delate and Lepis also pass through the district including Lake Langno (HADADO, 2020).

The physical feature and altitude difference results variation of climate, soil, and vegetation cover that caused the change of various plant species with a large diversity. The district was covered by natural forests, but currently covered by only 19.19% forest area out of the total land area including natural forest, community forest, and private forest before 20 years ago (HADADO, 2020).

The district has a total of 75831 people who are settled and organized under the district (41,103 men and 34,728

women (Authority, 2015). The population density of the district has 213 persons per square kilometer (Authority, 2015). The district has characterized by crop production and livestock rearing in the form of mixed farming system. Major corps are maize, wheat and barley which are widely grown in the district (HADADO, 2020).

### 2.2 Sampling Techniques

In this study a sampling was conducted using multistage stage random sampling technique to select sample kebeles and households. Firstly, the sample district was identified based on the potential of PFM. After that, the three PFM kebeles of the woreda were selected based on their potential. The selected kebeles share similar socio-economic activities, agroecological characteristics and biophysical settings based on information getting from consulting of Heban Arsi agricultural office. Then, sample households were selected from selected kebeles using a simple random sampling technique with a random number method. The lists of households were obtained from the kebele administration and district office of PFM-intervention areas. The sample sizes of households were determined using intensity of 20% from the total household following Kumar (1999). Based on this a total of 131 household heads were randomly selected (Table 1).

**Table 1.** Number of Respondents Selected from Sample Kebeles in the Woreda

| Sample kebele | Total households | Sample households | % of sample households |
|---|---|---|---|
| Degaga | 270 | 54 | 41.3 |
| Sambaro Rogicha | 280 | 56 | 42.7 |
| Shopa | 104 | 21 | 16.0 |
| Total | 654 | 131 | 100 |

### 2.3 Data Collection And Analysis Methods

In this study, both qualitative and quantitative data were used. Data were collected from primary and secondary sources. The primary data were collected from the semi-structured household survey; personal observations, focus group discussions (FGDs), and key informant interviews (KIIs). These primary data were supplemented by data from secondary sources collected from different published and unpublished sources. Data collection tools were developed through reconnaissance surveys and literature reviews for constructing relevant characteristics of local communities' perceptions. After that quantitative data were collected using a household survey with a semi-structured questionnaire. For qualitative data collection, both FGD and KIIs were performed. The number of participants in each FGD was purposively selected in discussion with experts, kebele administration chairperson, and development agents. Participants were selected from different age groups, genders, and social statuses. FGD was held separately with men and women and with groups of different well-being ranks. Two FGDs were conducted per kebele and the discussions were held with aiming of documenting local knowledge regarding PFM practices, and livelihood activities as a result of the PFM approach. Similarly, KIIs were selected from different individuals at different levels. Accordingly, community elders, chairperson, development agents, forestry experts, and officials have participated. Apart from these, personal observation was also made in the selected study area with local community elders and development agents, and other experts who are familiar and knowledgeable about the area.

The collected data were analyzed using quantitative and qualitative data analysis approaches. Before data analysis, data entry, data editing, and management were performed. The quantitative data were analyzed using descriptive statistics (percentages, mean, standard error, and frequency) with SPSS version 26. On the otherhand, the qualitative data that were collected through KII, FGD, and transect walk observation was summarized qualitatively.

## 3. RESULTS AND DISCUSSION

### 3.1 Socio-Economic Characteristics Of Respondents

In the study area, the majority (77.9%) of respondents were male and 22.1% of them were female. Regarding the marital status of sample households, 80.9% of them were married and followed by a single (13%), divorced (3.8%), and widowed (2.3%). The educational status also showed that majorities (72.7%) of respondents were educated and the remaining 27.3% were illiterate. The result shows that about 84.7% have access to training on different livelihood improvement activities. Regarding credit access, about 84% of PFM groups had access (Table 2).

**Table 2.** Summary of Categorical Socio-Economic Characteristics of Respondents

| Variables | Category | Frequency | Percent |
|---|---|---|---|
| Sex | Female | 29 | 22.1 |
| | Male | 102 | 77.9 |
| Marital status | Single | 17 | 13 |
| | Married | 106 | 80.9 |
| | Divorced | 5 | 3.8 |
| | Widowed | 3 | 2.3 |
| Education level | Illiterate | 26 | 27.3 |
| | Literate | 105 | 72.7 |
| Access training | No | 20 | 15.3 |
| | Yes | 111 | 84.7 |
| Access to credit | No | 21 | 16 |
| | Yes | 110 | 84 |

Table 3 presents the continuous socio-economic variables of sample respondents are presented. The average age of the study respondents was 44 years and the average family size of the total sample households was 6.9persons per household. Regarding dependency ratio, households had 3.8 persons per household. Regarding household resources, the mean land holding and mean livestock holding in tropical livestock unit (TLU) were 3.3 ha and 7.9, respectively. The average walking distances (measured in minutes) to market and forest from the residence of study households were 94.4 and 67.3 minutes, respectively.

**Table 3.** Summary of Continuous Socio-Economic Characteristics of Respondents

| Variables | Mean | Std. Error |
|---|---|---|
| Age | 44.0 | 1.0 |
| Family size | 6.9 | 0.3 |
| Dependency ratio | 3.8 | 0.2 |
| Total land holding | 3.3 | 0.3 |
| Livestock holding (TLU) | 7.9 | 0.6 |
| Distance to market (minutes) | 96.4 | 5.1 |
| Distance to forest (minutes) | 67.3 | 4.1 |

### 3.1.1 Perception of Local Communities on the Contribution of PFM to Forest Conservation

The majority of respondents (55.7%) perceived that there is no deforestation due to the intervention of PFM. About 44.3% of respondents also indicated that there is some deforestation due to some shortcomings of existing PFM access. Only 3.1% of respondents perceived that deforestation is going on (Table 4).

**Table 4.** Community Perception on the Status of Deforestation after PFM Intervention

| Status deforestation | Frequency | Percent |
|---|---|---|
| Deforestation going on | 4 | 3.1 |
| There is some deforestation | 58 | 44.3 |
| There is no deforestation at all | 73 | 55.7 |

The indicators of forest improvement were assessed in PFM areas following the implementation of the program (Table 5). The finding from the household survey revealed that about 25.4% of respondents reported that there is an increment in species diversity followed by increasing in forest coverage (22.9%), increased productivity of the forest (20.8%), address environmental degradation (17.5%) and increased the number of valuable species (13.4%) due to introduction of PFM. During FGD, participants stated that PFM encouraged all of its participants to plant trees in degraded environments by collecting naturally grown seedlings from the natural forest. Similar works were also reported on the significant conservation of PFM to the forest and other environmental resource degradation (Tadesse and Teketay, 2017; Kedir et al., 2018; Mawa et al., 2021). Defere (2022b) demonstrated that the PFM system is more useful for forest sustenance compared to state-controlled forests.

**Table 5.** Improvements of Forest Components after PFM Intervention

| Indicators of forest improvements after PFM program | Frequency | Percent |
|---|---|---|
| Increase of forest area | 30 | 22.9 |
| Species diversity | 31 | 25.4 |
| Increase number of valuable species | 11 | 13.4 |
| Address environmental degradation | 22 | 17.5 |
| Forest productivity | 37 | 20.8 |

The PFM program has many opportunities that are awarded to local communities to change their negative attitude to positive following the program (Table 6). The result showed that the introduction of the PFM program gives power to the local community and accounts for 26.8%. Similarly, the PFM program enables bounded members by forest block association (21.4%), brings the right to exclude non-PFM members (19.8%), creates a sense of belongingness (16.3%), encourages the right to use the forest products (8.5%) and means of reduced deforestation (7.4%). In line with this finding, community-based forest management (CBFM) gives access to rights, responsibility, empowerment, and ownership opportunity to local communities for sustainable management of forests (Tadesse and Teketay, 2017; Schürmann et al., 2020; Teucher et al., 2020; Mbeche et al., 2021).

**Table 6.** Community Perception on Opportunities of PFM for Conserving the Degraded Environment

| Indicators | Frequency | Percent |
|---|---|---|
| It gives power to the community | 35 | 26.8 |
| Enables to develop options for reducing deforestation | 10 | 7.4 |
| It creates feeling a sense of belongingness | 22 | 16.3 |
| Encourage the right to use the forest products | 11 | 8.5 |
| Due to exclusive use right | 26 | 19.8 |
| Due to bounded members by forest block association | 28 | 21.4 |

FGD and KIIs response: Implementing PFM-based on the agreement, the implementation of the forest management

plan with its different activities was started by stakeholders. The government agency supported PAs as well as FUGs technically and materially whenever necessary. The management plan as well as the agreement can be revised when it is agreed by the stakeholders after monitoring and evaluation. The majority of the respondents indicated that the reason for the establishment of PFM at the site was the need to reduce the ever-increasing deforestation. Even to minimize conflicts among the community and the stakeholders by realizing the need to involve communities in conservation, and the hindsight of experience, it has become clear that an alternative approach is necessary. These changes represented a change of emphasis within forest conservation from fences and fines approach to one in which more holistic strategies or approaches were adopted. A comprehensive PFM program has been established and is advocated as a solution to the past shortcoming in forest management (Nzau et al., 2022).

Most of the FGD participants explained that before PFM the level of deforestation was severe, but now associations are protecting their respective plantations and planting sites where the concessions area is open. They agreed that the plantation has increased both in volume as well as in total land coverage when compared to the time before PFM. Moreover, they indicated that PFM was one of the tools that reduced deforestation and improved the management of the plantation. According to the district office, the conventional way of managing the forest was not able to protect the plantation. Because of this, the participation of the local community became decisive to conserve this plantation. After PFM the forest user members started to understand their rights and obligations. The user groups were protecting and planting most parts of the open area as per the management plan. As a result of this, the plantation is improved.

The local communities' perception on the contribution of PFM regarding prevention of environmental degradation was assess and presented using Likert scale method (Figure 1). The result shows that 52% of respondents in the PFM highly agreed on the contribution of PFM program intervention regarding forest improvement and environmental conservation. The remaining 34% and 14% of respondents moderately agreed and low, respectively (Figure 1). Thus, the result demonstrated that majority of households agreed on the contribution of PFM program as a means of forest management (Figure 1).

In addition to household survey results, FGD and KII participants selected from the sample kebeles confirmed through interview that PFM program contributed to forest regeneration and conservation. The participants further stated that the PFM program was introduced with the community in the surounding forest to manage and use their forest resource in sustainable manner. Furthermore, the result obtained from FGD and KIIs participants showed that expansion of agriculture, settlements, grazing land, and extraction of forest products under the forest user group

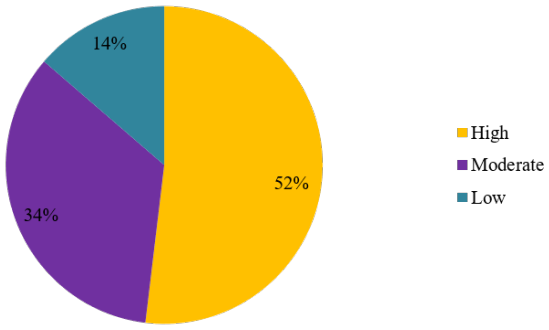


**Figure 1.** Community Perception of the Role of PFM on Environmental Conservation

slightly decreased currently compared to the initial establishment due to involvement of new members in PFM. Similarly to this finding, Kedir et al. (2018) reported that PFM is an important program to contribute to the improvement of forest conservation. In addition to this, the PFM program can create environmental awareness to rehabilitate the degraded forest area (Mengistu and Assefa, 2020; Mbeche et al., 2021).

#### 3.1.2 Contribution of Forests to Household Income

Households in the study area depended on four major income sources. Those income sources are crop income, livestock income, non-farm income, and forest-related income (Table 7). Crop income was the major household income source followed by forest income, livestock income, and non-farm income. Crop income accounts for about 50% of the total household income. Forest income was the second most important source of income accounting for 20.7% of the total household income. Livestock and non-farm income are also important income sources which account for 19.6% and 9.7%, respectively. The result is in line with observation, Mawa et al. (2021) reported that forest income was the second most important income source to forest adjacent communities that are members and non-members of community-based forest management. In addition, PFM is important to enhance the livelihoods of local communities in terms of providing forest-friendly alternative income sources (Defere, 2022a). From an income perspective, PFM helps to diversify income sources, increase household income levels and build household assets in forest-dependent communities (Defere, 2022b). Income and level of poverty affect local communities toward forest conservation (Nzau et al., 2022).

### 3.2 Perception of Local Community on the Level of Forest Product Importance, Dependency and Forest Management Options

The study showed that majority (55.7%) of respondents perceived that the forest products are moderately important

**Table 7.** Average Annual Income from Major Income Sources (Birr)

| Income source (000 Birr) | Mean±SE (Standard Error) | Share (%) |
|---|---|---|
| Crop income | 25.55±3.70 | 50.0 |
| Livestock income | 10.02±1.53 | 19.6 |
| Non-farm income | 4.98±0.45 | 9.7 |
| Forest income | 10.57±0.99 | 20.7 |

to households (Table 8). Importantly, the percentage of people who thought that the level of forest product estimated at 32.8% stated as very important. The remaining 10.7% of respondents perceived that the level of forest product importance was less important. The FGD and KII participants also point out that the levels of forest products from PFM have a moderate contribution to local communities during a time of income shortage. The finding is agreed with previous studies that demonstrated that the majority of PFM participant communities perceived forest products were very important to the household economy and fewer respondents claimed that the forest did not have any importance regardless of protection (Tesfaye, 2017; Tadesse and Teketay, 2017).

**Table 8.** Community Perception on the Level of Forest Product Importance

| Indicators | Frequency | Percent |
|---|---|---|
| Very important | 43 | 32.8 |
| Moderately important | 73 | 55.7 |
| Less important | 14 | 10.7 |
| Not important | 1 | 0.8 |

The level of local community dependency on forest products is presented in Figure 2. The result showed that the majority (48.1%) of respondents stated that they were fully dependent on their livelihoods. On the other hand, about 30.5% of respondents revealed that there were partially dependent on forest products. The remaining 16% and 5.3% of respondents respond that they were not much dependent and less dependent. Literatures demonstrated that forest adjacent communities are highly dependent on forest products to meet their household needs, especially during the time of income shortage (Amenu et al., 2022; Defere, 2022b). This indicates that forest products are a means of a safety net during times of drought and the lack of other alternatives.

The different actions were suggested to increase the existing benefits from the forest presented in Table 9. The result showed that about 39% of sample respondents stated that better protection of existing forests to avoid overuse is

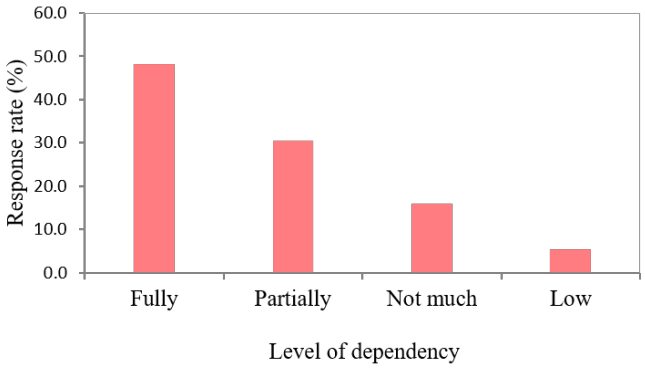


**Figure 2.** Level of Local Community Dependency on Forest Products

**Table 9.** Actions Needed to Increase Benefits from the Forest

| Actions | Frequency | Percent |
|---|---|---|
| Better protection of forests to avoid overuse | 85 | 39.0 |
| Better skills and knowledge on how to collect and use products | 16 | 7.3 |
| Livelihood diversification to reduce dependency on forest | 64 | 33.9 |
| Better access to market | 28 | 12.9 |
| Reforestation | 15 | 6.9 |

one of the actions used to generate benefits from the forest sustainably. The result also indicated that 33.9% of respondents revealed access to alternative livelihood diversification to reduce dependency on forests followed by better access to market (12.9%), access to better skills and knowledge on the collection and use of forest products (7.3%) and reforestation (6.9%). Pieces of evidence showed that a high percentage of the local community having a positive attitude toward conservation indicates forest conservation success (Islam et al., 2016; Tesfaye, 2017). Another study also demonstrated that implementation of locally specific conservation actions needs to be developed and applied for keeping the sustainability of PFM (Mbeche et al., 2021; Amenu et al., 2022; Nzau et al., 2022).

## 4. CONCLUSIONS

The findings of the study provide information about local communities' perception on the existing PFM concerning its contribution and management system. Results indicated that the households perceived that PFM intervention provides an increment in species diversity, increasing of forest coverage, increased productivity of the forest, addresses environmental degradation, and increased the number of valuable species. Respondents also perceived that the PFM

program has opportunities to change a negative attitude to a positive by providing power to the local community, enables bounded members, bring the right to exclude non-PFM members, creates a sense of belongingness, encourage the right to use the forest products and means of reduced deforestation. The finding demonstrated that among household income sources, the share of forest income is second. Respondents also suggests different actions such as better protection of existing forests to avoid overuse, access to alternative livelihood diversification, better access to market, and access to better skills and knowledge on the collection and use of forest products and reforestation were suggested to increase the existing benefits and management of PFM. To cope with the demand of rapid population growth, various alternative income sources should be designed to improve asset accumulation and reduce their over-dependency on the forest. So such kinds of interventions are taken, which might reduce the pressure of over-exploitation of forest resources from the rapidly increasing population adjacent to forest areas.

## 5. ACKNOWLEDGMENT

The author acknowledges IWMI for supporting the research. The author also thanks all participants involved in the household survey, key informant interview, and focus group discussion as well as experts at the district and kebele levels for participating and supporting the fieldwork.

## REFERENCES

Amare, D., W. Mekuria, T. Wold, B. Belay, A. Teshome, B. Yitaferu, T. Tessema, and B. Tegegn (2016). Perception of Local Community and the Willingness to Pay to Restore Church Forests: The Case of Dera District, Northwestern Ethiopia. *Forests, Trees and Livelihoods*, **25**(3); 173–186

Ameha, A., H. Larsen, and M. Lemenih (2014). Participatory Forest Management in Ethiopia: Learning from Pilot Projects. *Environmental Management*, **53**(4); 838–854

Amenu, B., G. Mamo, and B. Amamo (2022). Factors Determining Participatory Forest Management Practices in Dawro Zone Essera District, Ethiopia. *Ukrainian Journal of Ecology*, **12**(3); 11–20

Authority, E. R. (2015). The Federal Democratic Republic of Ethiopia. *Addia Ababa*

Defere, G. (2022a). Contribution of Participatory Forest Management Practices for Sustainable Livelihood Improvement of Local Communities: A Review from Sub-Saharan Africa. *Ethiopian Journal of Governance and Development*, **1**(1); 52–58

Defere, G. (2022b). Contribution of Participatory Forest Management Practices for Sustainable Livelihood Improvement of the Local Community: A Review from Sub Saharan Africa. *Ethiopian Journal of Governance and Development*, **1**(1)

Degnet, M. B., E. van der Werf, V. Ingram, and J. H. Wesseler (2020). Do Locals Have a Say? Community Experiences of Participation in Governing Forest Plantations in Tanzania. *Forests*, **11**(7); 782

Duguma, L. A., J. Atela, A. N. Ayana, D. Alemagi, M. Mpanda, M. Nyago, P. A. Minang, J. M. Nzyoka, D. Foundjem-Tita, and C. N. Ntamag-Ndjebet (2018). Community Forestry Frameworks in Sub-Saharan Africa and the Impact on Sustainable Development. *Ecology and Society*, **23**(4)

HADADO (2020). *Heban Arsi Disrict Agriculture Development Office, the Annual Report 2020 Heban Arsi, Ethiopia*. Heban Arsi Disrict Agriculture Development Office

Islam, K., M. Tani, K. Asahiro, M. Z. Rahman, K. Hyakumura, T. Fujiwara, and N. Sato (2016). Analysis of Power Dynamics and Livelihood Assets in Participatory Forest Management: Experience from Bangladesh. *International Journal of Natural Resources and Ecological Management*, **1**(3); 88–98

Kedir, H., M. Negash, F. Yimer, and M. Limenih (2018). 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*, **37**(4); 357–374

Kumar, P. (1999). The Impact of Long-Term Client Relationships on the Performance of Business Service Firms. *Journal of Service Research*, **2**(1); 4–18

Lemenih, M. (2004). *Effects of Land Use Changes on Soil Quality and Native Flora Degradation and Restoration in the Highlands of Ethiopia*, volume 306

Mawa, C., D. M. Tumusiime, and F. Babweteera (2021). Are Community Forests Delivering Livelihood Benefits? Insights from Uganda. *Forests, Trees and Livelihoods*, **30**(2); 133–150

Mbeche, R., J. Ateka, R. Herrmann, and U. Grote (2021). Understanding Forest Users' Participation in Participatory Forest Management (PFM): Insights from Mt. Elgon Forest Ecosystem, Kenya. *Forest Policy and Economics*, **129**; 102507

Mebrat, W. and T. Gashaw (2013). Threats of Woody Plant Species Diversity and Their Conservation Techniques in Ethiopia. *European Journal of Botany, Plant Science and Phythology*, **1**(3); 10–17

Mengistu, F. and E. Assefa (2020). Towards Sustaining Watershed Management Practices in Ethiopia: A Synthesis of Local Perception, Community Participation, Adoption and Livelihoods. *Environmental Science & Policy*, **112**; 414–430

Nath, T. K. (2009). *Participatory Forest Management and Livelihoods of Ethnic People*. Nova Science Publishers

Nzau, J. M., E. Gosling, M. Rieckmann, H. Shauri, and J. C. Habel (2020). The Illusion of Participatory Forest Management Success in Nature Conservation. *Biodiversity and Conservation*, **29**(6); 1923–1936

Nzau, J. M., W. Ulrich, M. Rieckmann, and J. C. Habel

 

(2022). The Need for Local-Adjusted Participatory Forest Management in Biodiversity Hotspots. *Biodiversity and Conservation*, **31**(4); 1313–1328

Okumu, B. (2017). *Economic Analysis of Participatory Forest Management in Kenya*. University of Cape Town

Purnomo, B., S. Anggoro, and M. Izzati (2017). Analysis of Perception and Community Participation in Forest Management at KPHP Model Unit VII-Hulu Sarolangun, Jambi Province. In *IOP Conference Series: Earth and Environmental Science*, volume 70. IOP Publishing, page 012034

Schürmann, A., J. Kleemann, C. Fürst, and M. Teucher (2020). Assessing the Relationship Between Land Tenure Issues and Land Cover Changes Around the Arabuko Sokoke Forest in Kenya. *Land Use Policy*, **95**; 104625

Siraj, M., K. Zhang, W. Xiao, A. Bilal, S. Gemechu, K. Geda, T. Yonas, and L. Xiaodan (2018). Does Participatory Forest Management Save the Remnant Forest in Ethiopia? *Proceedings of the National Academy of Sciences, India Section B: Biological Sciences*, **88**(1); 1–14

Tadesse, S. A. and B. P. Kotler (2016). Attitudes of Local People Towards the Mountain Nyala (*Tragelaphus buxtoni*) in Munessa, Ethiopia. *African Journal of Ecology*, **54**(4); 488–499

Tadesse, S. A. and D. Teketay (2017). Perceptions and Attitudes of Local People Towards Participatory Forest Management in Tarmaber District of North Shewa Administrative Zone, Ethiopia: The Case of Wof-Washa Forests. *Ecological Processes*, **6**(1); 1–16

Tesfaye, S. (2017). Assessment of Local Community Perception of and Attitude Towards Participatory Forest Management (PFM) System and its Implications for Sustainability of Forest Condition and Livelihoods: The Case of Chilimo-Gaji Forest in Dendi District, West Shewa Zone, Oromia, Ethiopia. *Journal of Earth Science & Climatic Change*, **8**(1)

Tesfaye, Y., A. Roos, and F. Bohlin (2012). Attitudes of Local People Towards Collective Action for Forest Management: The Case of Participatory Forest Management in Dodola Area in the Bale Mountains, Southern Ethiopia. *Biodiversity and Conservation*, **21**(1); 245–265

Teucher, M., C. B. Schmitt, A. Wiese, B. Apfelbeck, M. Maghenda, P. Pellikka, L. Lens, and J. C. Habel (2020). Behind the Fog: Forest Degradation Despite Logging Bans in an East African Cloud forest. *Global Ecology and Conservation*, **22**; e01024

Walle, Y. and D. Nayak (2021). How do Local Communities Valuate Forest Conservation Through Participatory Management? a Case of Amhara Region, Ethiopia. *International Journal of Global Environmental Issues*, **20**(1); 80–99

Winberg, E. (2010). Participatory Forest Management in Ethiopia, Practices and Experiences. *Forestry Volunteer Food and Agriculture Organization Sub Regional Office for Eastern Africa, Addis Ababa*

 