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# Assessing the Constraints of Watershed Management Practices of Smallholder Farmers Evidennce from Hidabu Abote Woreda of North Shewa Zone in Oromia Region, Ethiopia

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## Abstract

Natural resources have been degrading due to intensive agricultural activities in many developing countries. To rehabilitate the degraded natural resources watershed management practices has become the key approach to minimize loss of such resources. The study examined the contraints of watershed management practices on smallholder farmers' livelihood in Hidabu Abote Woreda, North Shewa, Oromia regional State, Ethiopia. The study employed a mixture of qualitative and quantitative methods. Data was generated through household (HH) survey, key informant interview and focuses group discussion. The quantitative data were generated from 266 household, where the sample sized detrained by standard method. Tables and narrative method, was used to examine the contraints of Watershed Management practices of smallholder farmers. The study results revealed different factors constrained the Watershed Management practice that include lack of training and low quality of trainings given either for extension or farmers, lack of appropriate technology, open grazing, deforestation, limited maintenance of SWC structures, inadequate extension services, insufficient (small) farmland holding, shortage of cash income to cover agricultural input costs, poor (traditional) agricultural practices, fearing reduction of farmland size due to land closure for conservation. The policy makers and actors emphasize on the solving the limitation through providing technical or action oriented training and awareness creation through considering indegineus knowledge, allocation of extension service and provide materials (tools) used Soil Water Conservation are the key reccomondation finded.

**Keywords:** Hidabu abote woreda; Contraints of watershed management practices; Smallholder farme

## Introduction

In developing countries like Ethiopia watershed management became key approach since 1970s to manage human activities toward natural resources degradation and its effects on their environment. Watershed management practices implemented to conserve natural resources like water, land and biophysical resources to improve the livelihood of smallholder farmers. Watershed management practice is requiring in environmental aspect, socio-economic values, insure food security of community with in watershed and enable smallholder farmers to cope from impact of climate change that drives water scarcity through adaptation and using mitigation strategies [1].

The main objective of watershed management practice is to enhance water quality and quantity and to control torrent come from hillside and to restore and rehabilitate the degraded natural resources. In connection to this, Ethiopia has experienced to natural resource degradation because of overgrazing, concurrent drought, climate change, inappropriate land use and overcapacity of human and livestock population in particular area [2]. However, starting from 1970s the watershed management practices has been started on farmlands and sloppy areas to reduce soil erosion, water scarcity, impact of flood through rehabilitating degraded natural resources by implementing watershed management practices since 1970´s [3].

The practices of watershed management effective in Ethiopia and elsewhere is associated with farmers' livelihood and maintain natural resources like water, land and forest which enhance income even if holding small farmland plot and to attain benefit like energy saving, livestock production, nursery site and gain environmental service [4]. Consequently, community based watershed management approach was established in Ethiopia with different guidelines and criterion. According to guidelines and criterion, firstly identifying site and implement practices provided by this approach with communities using local tools to alleviate impact of flood, water scarcity and soil erosion that contribute for the productivity of smallholder farmers [5]. Furthermore, in northern and central part of Ethiopia watershed management activities has been practicing in rural areas to improve deteriorated of water, vegetation and soil fertility particularly in highland areas. With this concept, in Oromia region, North Shewa Zone, Hidabu Abote *Woreda*, land degradation, fertile soil erosion and loss of natural resources have been viewed and to conserve degraded resources several challenges or constraints faced either farmers or expertises to emplement the practices. Although this *woreda* experienced with good watershed management practices, it is not achieve until expected result [6]. Therefore, the objective study was to identified the factors constraints of watershed management practiced in the study area before 2021; Hidabu Abote *woreda*.

## Method and Materials

### Description of study area

**Location and geography:** Hidabu Abote *woreda* is located in North Shewa Zone, Oromia regional state, Ethiopia. In geographical

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term the *woreda* is located between 9°48'30" –10°4'40"N latitude and 38°24'00"– 38°40'12" E longitude at about 147 km from the national capital, Addis Ababa to north direction and 42 km from zonal capital, Fitche (Figure 1). The town of the *woreda* is Ejere and the *woreda* has 19 rural and 1 urban *kebeles*. Namely, the study kebeles include Yaya Marami and Yaya Dhaka Bora.

**Agro-ecology and topography**: The agro-ecological zone of the *woreda* stretches between *dega* (cool, humid highlands, 2300 to 2963 m a.s.l.), *weyna dega* (mild, sub-humid highlands, 1500 to 2300 m a.s.l.), and *kola* (warm, semi-arid, lowlands, 1110 to 1500 m a.s.l.) that cover about 12.9%, 73.4% and 13.7%, respectively (Figure 2). Digital elevation Model (DEM) data based analysis, the study *woreda* has very diverse slope, ranging from flat lands (<3%, mostly physical SWC not required) slope that account 8% up to very steep (>60%) slope although the proportion is too small (<0.1%). Area having slope from 3-8%, 15% - 30% and 30% - 60% account about 45.9%, 17%, 23% and 6% (Figure 2). From theses we can learn that majority of study *woreda* need proper watershed management and implementation of SWC practices (DEM data analysis using ArcMap).

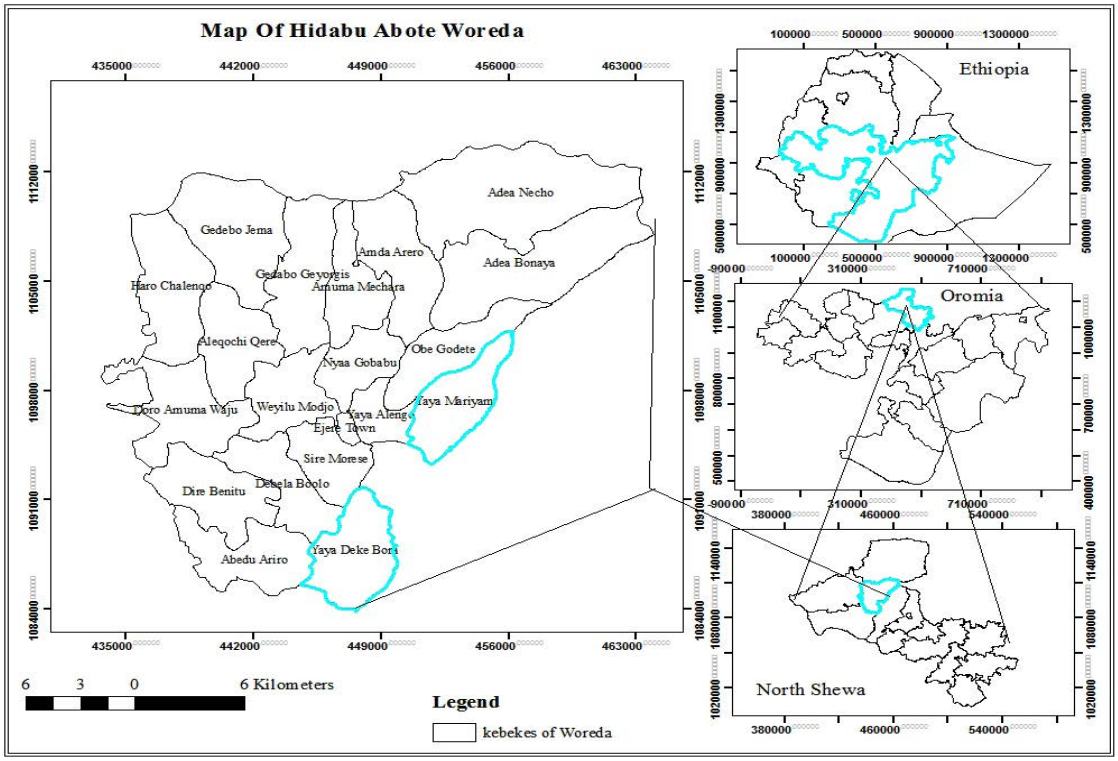
The topography of the *woreda* is rugged and up and down feature that contain several sub watersheds which contribute to major rivers. High land part of the *woreda* provided water for downstream and more eroded than the middle part. Middle part of this *woreda* is potentially productive, less soil erosion visible and it contribute huge yield of crops productivity either for consumption or for market. Lowland part of the *woreda* following Jemma River extensively covered with bushes, shrubs and some agricultural plots and grazing land which is less productive due to the large amount of soil erosion (HAWANRO, 2019).

**Land use land cover and economic activities:** According to the report of HAWLAUO (2020), the total area of this *woreda* is 50,381.9 ha and four major watersheds stretched from south direction to north ward aspect that contributes to Jemma River. The major watersheds of this *woreda* are *Indiris* and *Aleltu* river watershed, while *Bite* and *Lega Bofa* is the minor river watershed. The major land use/land cover (LULC) of the *woreda* include farmlands (rainfed and irrigated), forestlands (plantation and natural), shrublands, grazing/grasslands, settlements, bare lands and other miscellaneous land uses/covers. According to woreda Land Administration and Use Office (2018) report, the proportion of land under different LULC varies ranging from 58.4% (covering 29,428 ha) in cases of farmlands to 0.7% (that covered 355 ha) in cases miscellaneous LULC types. The second LULC next to farmlands are settlements that covered 8,446.5 ha or account about 16.8% of the overall LULCs and followed by shrublands (4,236 ha), forest lands (4,032 ha), grazing/grasslands (2,868 ha) and bare lands (1,016.4 ha).

## Method of data collection

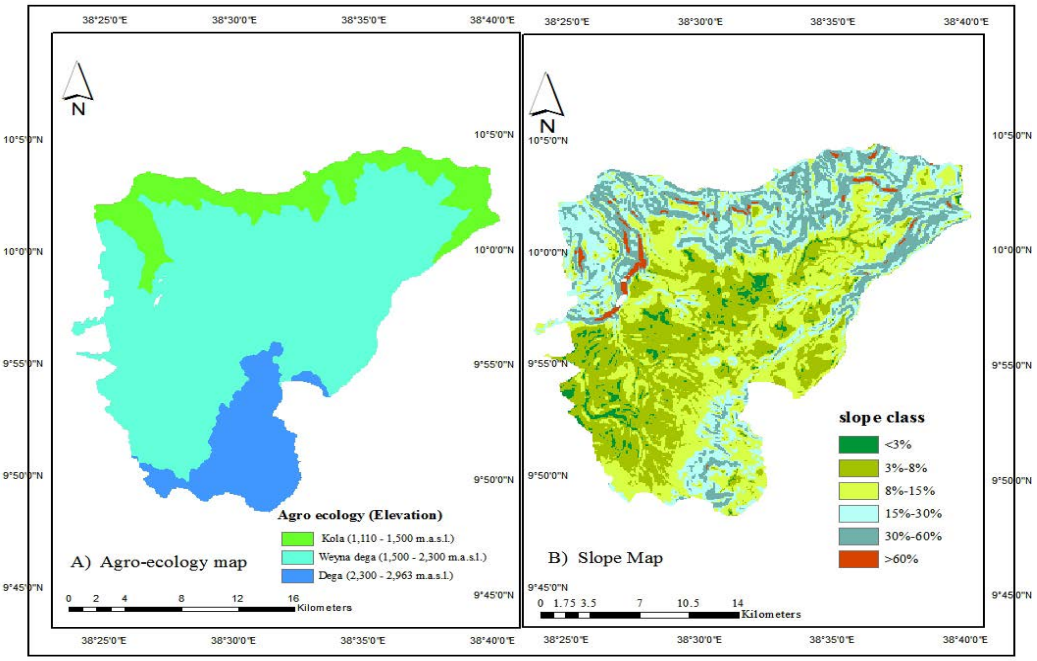
**Sources of data:** A source of data for this study was the primary and secondary data sources. Primary quantitative data were gained from household survey focusing on watershed management practiced by smallholder farmers and concerned expertise. Additional information tracked through focused group discussion (FGD), Key informant interviews (KII) and field observation. On the other hand, secondary data were also gained from different reports which helpful to address the objective of the study and explored implemented activities, identify constraints and examine role of watershed management in smallholders' livelihood.

**Sampling procedure and techniques:** In the study, a multi-stage sampling technique was applied. Therefore, firstly the *woreda* was purposively selected and then from 19 rural *kebeles* of the *woreda* two *kebeles* were purposefully selected. Selection of sample *kebeles* based on criteria, i.e., agro-ecology and experience in WSMP. As more WSM intervention exist in *weyna dega* and *dega*, one *kebele* selected from each




Source: Ethio-GIS, 2013

**Figure 1:** Location map of the study area.




Source: Generated from DEM data

**Figure 2:** Agro ecology (A) and slope class (B) maps of the study area.

**Table 1:** Survey household sample size by kebele.

| No | Sampled Kabeles | Total HH | Sampled HH | Per cent(%) of sampled |
|---|---|---|---|---|
| 1 | Yaya Daka Bora | 645 | 145 | 54.5 |
| 2 | Yaya Marami | 540 | 121 | 45.5 |
| **Total** | | **1185** | **266** | **100** |

with due consideration to geographic distribution (Figure 2). Sample of households of two *kebeles* were selected by using simple random sampling technique using community list of the *kebele*. In this process, sampling interval was established and then survey respondents were randomly selected using the interval with 10% reserve so as to replaces those who were not around during interview.

**Survey households sample size determination**: To determine sample size, firstly consider as the good number of sample size is 200-500 (Glenn 1992). In this study, to get representative sample size, the formula adopted by Kothari (2004) was employed to determine the study sample size. In the study 5% precision level, i.e., 95% confidential level was applied. As shown in Table 1, their estimation yielded 266 sample sizes using the formula given below. In order to ensure sufficient data collection, large number of sample size considered to minimize error occurs in the study. From the total of HHs of 1185 in the two *kebeles*, sample size determined using the following formula.

$$n = \frac{z^2 pq}{d^2} \quad \text{.....Kothari (2004)}$$

n = Desired sample size

z = standardized normal variable at required level of confidence of 95% CL (1.96)

p = the proportion of sampled HH to target population (0.224)

q = it is the result of: 1-p value (0.224) which is (0.776)

$d^2$ = degree of precision level (0.05)

In the above, sample size has determined by using the given formula and from these 266 sample size of both *kebele*, researcher has determined the sample size proportion of population for each *kebele* by using the following formula.

$$Pi = \frac{ni}{N}$$

where, Pi is proportion of sample size in each *kebele,*

ni is sample size

N is total number of target population

Then, $Pi = \frac{266}{1185} = 0.2244$

Therefore, for *Yaya Dhaka Bora*; sample size is 645 x 0.2244 = 144.7 ≈ 145

For *Yaya Marami*; sample size is 540 x 0.2244 = 121.2 ≈ 121

## Methods and tools of data collection

**Household survey:** These are designed to collect and record information from many people, groups or organisations in a consistent way [7]. In the household survey, open ended and close ended questionnaire was prepared for sample HHs. The questionnaire were first prepared in English and it was critically reviewed to adjust with objective of study and secondly all prepared questions translated into the local language (*Afaan Oromo*) so as to facilitate clear understanding between data collectors and respondents. This questionnaire enabled the researcher to obtain relevant information from respondents regarding the socioeconomic characteristics of respondents, watershed management practices, to identify the practice implemented for watershed management, perception of community toward watershed management practice. Furthermore, information concerning the constraints of watershed management practices also included since

it is basically applicable for the study. These constraints related with community participation in watershed management practices.

**Key informants' interview (KII:)** An interview is the most common tool used in in the study with one person at a time (individual interviews) or groups of people [7]. In addition to questionnaire, key informant interviews (KIIs) were employed. KII participants were Development Agents (DAs) of *kebeles*, Agricultural and Natural Resource Office and Environmental Protection, Forest and Climate Change Authority expertise and leaders of *kebeles* to get more accurate data. In total, 13 KII were conducted, i.e., with 4 DAs, 4 from Agriculture and Natural Resource Office and Environmental Protection, Forest and Climate Change Authority Office, 2 *kebele* leaders, 1 from *woreda* leader and 2 from leader of watershed commitees. The KII were guided using checklist prepared for this purpose, which include issues that need further elaboration that can't covered through survey and FGDs. The KII checklists were prepared differently for each mentioned above interviewees according to their capacity to explain and understanding more detail to explore more knowledge. Means that, the interview question prepared for farmers, expertise and sectors head have distinguished as per their knowledge and qualification to explain broadening pertinent issues.

**Focus group discussion (FGD):** Focus group discussions (FGDs) are discussions that held with a small group of people who have knowledge or interest in a particular topic. They are used to find out the perceptions and attitudes of a defined group of people to get more detail information [7]. The study used focus group discussion as primary qualitative data sources. In total, 4 FGDs conducted in the two sample *kebeles*, the FGDs conducted in each *kebele* were one woman and one men group. Each FGD were organized from different age and social status group (poor, rich, community leaders) and imployed from different community groups representing *kebele* administration, religious leaders, elderly adults, youths and community elder. Due to COVID-19, the number of participants in each FGD was limited 6 to 8. FGD was guided by checklist that focuses on watershed management (WSM) practices contraints. The data generated through FGDs were properly noted and transcribed using template prepared for this purpose.

## Data analysis

After the accomplishment of data collection and data entry to computer it was proceed to data analysis and interpretation through different ways. Accordingly, non-numeric data (qualitative data) obtained from interview, focus group discussion and numeric related data collected was analyzed and interpreted through narrative and tabular.

# Result and Discussion

## Factors constraining of watershed management practices

The analysis identified different factors constraining watershed management practices and the contribution of the factors have variation. According to households survey data analysis the factors include: constraining vary which include lack of training, lack of appropriate technology, problem of open grazing, deforestation, destruction of SWC structures, lack of bylaw for natural resources conservation, inadequate extension services, insufficient (small) farmland holding, shortage of cash income to cover agricultural input, poor (backward) agricultural practices and fear of farmland size reduction to land closure. Detailed explanation and discussion of the different constraints are given in the following subsections

### Lack of training

The result of this study concerning the constraints of smallholder farmers toward implementing WSM practices were clearly specified in Table 2 below. According to these result, all respondents (100%) reported that neither have training nor have enough knowledge concerning WSM. The majority (94.4%) survey respondents ranked this constraint as high ($2^{nd}$) and the remaining 5.6% ranked it as moderate problem to practice and implemented WSM activities.

The result of KII with *woreda* expertise and *kebele* leaders substantiated so as the whole farmers of the *woreda* did not get enough training on WSM. FGD and KII participants indicated that few *kebele* leaders and small number of farmers obtained trainings. The trainings were focused about the general service provided in their respective *kebele*, but farmers did not obtained capacity building training concerning WSM practices. Moreover, FGD participants also indicated that the trainings have number of shortcomings in building knowledge and understanding of farmers on WSM activities. Although WSM practice essential to improve livelihood considerable proportion farmers did not practiced due to lack of awareness, knowledge and carelessness toward natural resources conservation. Study conducted by Ali [1] and Negasa [8] reported that some extension experts and farm households at local level don't have enough professional capacity due to lack of training.

### Lack of appropriate technology

Table 2 shows, entire participants (100%) replied as they don't

**Table 2:** Factors constraints WSM practices.

| Factors | Yes | | No | | Low | | Moderate | | High | | Rank |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | count | % | count | % | count | % | count | % | count | % | |
| Lack of training | 266 | 100 | 0 | 0 | 0 | 0 | 13 | 5.6 | 251 | 94.4 | 2 |
| Lack of appropriate technology | 266 | 100 | 0 | 0 | 0 | 0 | 12 | 4.5 | 254 | 95.5 | 1 |
| Open grazing | 266 | 100 | 0 | 0 | 11 | 4.1 | 14 | 5.3 | 241 | 90.6 | 5 |
| Deforestation | 173 | 65.1 | 93 | 35 | 3 | 1.7 | 13 | 7.5 | 157 | 90.8 | 6 |
| Destruction of SWC structures | 25 | 9.4 | 241 | 90.6 | 0 | 0 | 5 | 20 | 20 | 80 | 8 |
| Lack of bylaw for natural resources conservation | 16 | 6 | 250 | 94 | 2 | 12.5 | 9 | 56.2 | 5 | 31.3 | 10 |
| Inadequate extension services | 266 | 100 | 0 | 0 | 2 | 0.8 | 15 | 5.6 | 249 | 93.6 | 3 |
| Insufficient (small) farmland holding | 266 | 100 | 0 | 0 | 0 | 0 | 12 | 4.5 | 254 | 95.5 | 1 |
| Shortage of cash income to cover agricultural input | 266 | 100 | 0 | 0 | 5 | 1.9 | 13 | 4.9 | 248 | 93.2 | 4 |
| Poor (backward) agricultural practices | 55 | 20.7 | 211 | 79.3 | 0 | 0 | 12 | 21.8 | 43 | 78.2 | 7 |
| Fearing reduction of farmland size due to land closure | 26 | 9.8 | 240 | 90.2 | 0 | 0 | 14 | 53.9 | 12 | 46.2 | 4 |

have appropriate technologies applicable for WSM practice. From these respondents about 95.5% and 4.5% ranked (1st) the problem (constraints) associated with WSM related technology as high and moderate, respectively. In addition, KII and FGD mentioned as this problem have been seriously challenging WSM practice be it performed in group or individual base. KII with *woreda* leader and Agricultural and Natural Resources Office expertise showed that the expertise don't have adequate knowledge about the technology used in WSM analysis. Similarly, farmer level FGDs also indicated absences or shortage of important tools/material like gabion, hoe, water level, shovel and water pump generator to use irrigation are the main problem. KIIs indicated that lack of researches to investigate the main problem and new results like improved plant seed suitable for respective agro-ecology and soil type, grass and to identify the new knowledge how to practice WSM activities. In relation to this, Walie, [9] indicated that lack of technology is the major threats of SWC practices in the means of difficulty to tillage, need much labor, need incentive to implement and reduce farm size.

**Open grazing**

In the study area, the problem of open/free grazing and releasing livestock to field was common problem. All of the survey respondents (100%) answered as the problem exist (Table 2). The great majority (90.6%) survey households rated (5th) the extent of the problem as high and the remaining 5.3% and 4.1% rated as moderate and low respectively. KIIs and FGDs also confirmed the finding of household survey that livestock allowed to freely graze on areas with WSM practice destroy biological, physical SWC and agronomic measurements. In relation to this study conducted by Wondatir, [10] showed that most farmers in developing countries release livestock to freely graze on fields that result in over grazing and degrading the environment.

**Deforestation**

As shown in table 2, 65.1% of survey respondents revealed that deforestation is among other environmental problem in study area. People cut trees for the purpose of timber production, charcoal production and other construction purposes. The respondents who acknowledged presences of deforestation ranked (6th)the severity of problem as high (90.8%), moderate (7.5%) and low (1.7%). KII and FGD show that, in the study area deforestation/cutting trees without any consent has been vied as farmer use the forest product to generate income and other constructions.

FDRE, (2011) report emphasized that deforestation rates in Ethiopia basically for the purpose of agricultural land expansion, fuel wood consumption and formal and informal logging and continuously increased the expansion of crop land which essentially ensures food security and poverty reduction. As the projection shows, the amount of crop land that taken from forest expected to increase over the next twenty (20) years which lead to high amount of deforestation rate. In line with this, agricultural expansion activities have negatively affect woodland, forest and bush and shrubs (FDRE, 2011). Regarding this, the increasing of demands for construction materials, fuel wood and charcoal as well as expansion of resettlement and livestock grazing negatively affected the forest resources (Eshetu, 2013).

**Destruction of SWC structures**

The survey households were asked about the role of community on sustainability of SWC intervention and accordingly 9.4% of respondents indicated that few farmers destroy constructed SWC structures, whereas the majority (90.6%) respondents reported that such act (destruction of SWC structures by farmers) has not been happening this days (Table 2). Among respondents who reported intentional SWC structures destruction ranked (8th) the problems as high (80%) and moderate (20%). Likewise, FGD participants also indicated as there is no pronounced problem of intentional SWC structure destruction in the study area. However, the study area farmers don't have proper awareness for maintenance so as to support the sustainability of constructed SWC structures particularly on communal lands. Gubrebiyaw, (2019) study is the same with this result shows that farmer are reluctant to maintain the constructed SWC structures on the communal land, thus the structures are destroyed during cultivation and open grazing.

**Lack of bylaw for natural resources conservation**

The analysis indicated in the table 2 shows that 94% participants indicated that lack of bylaw for natural resources conservation is not problem for sustainability of the SWC and WSM practices, while few (6%) acknowledged that lack of bylaw (traditional law) possibly negatively affected sustainability of natural resources conservation interventions in the study area. Among survey respondents reported absences of bylaw as problem for sustainable WSM and SWC intervention 31.3%, 56.2% and 12.5% ranked the problem as its effect was high, moderate and low to constraint practice respectively. The majority of survey households who disregarded the effect of absences of bylaw for sustainability of WSM practice, they ranked the effect nearly last (10th) as it minimally constraining WSM interventions in the study area. In addition to this, KII and FGD also indicated that, this problem was too minimal in the study area because the local community established few activity based bylaws, which also indirectly applied on the broader natural resources conservation. However, few farmers disregarded, don't obedient with the bylaw, thus they cutting trees in hidden way and refuse to participate in conservation activities. In this regard, Ali, (2012) boldly underlined that traditional administration and social institution plays crucial contribution to encourage social linkage and cooperative labor in environmental protection.

**Inadequate extension services**

Table 2 shows, entire respondents (100%) indicated that the lack of extension service is among largely reported constraints or problem hindering community participation in WSM interventions. The survey households rated the problem as high, moderate and low as reported by 93.6%, 5.6% and 0.8% respondents, respectively. Thus, low extension service stand the (3rd) most important problem constraining implementation of WSM activities in the study area. FGDs and KIIs also confirmed that inadequate extension services jeopardized adoption of WSM. As per *wareda* level KII the standard number of development agents (DAs) per *kebele* is three (3) who specialized in three fields namely: natural resources, animal science and plant science. However, adequate DAs did not allocated to the *kebeles* due to budget shortage to employ skilled experts. FGD participants also indicated that farmers are not getting adequate extension service particularly on WSM due to limited number of DAs. FGD participants also indicated that frequent contact with extension agents matter impact on agricultural technology and practices adoption like WSM activities implementation as extension workers give technical advice and information to farm households. In connection to this, [10] research finding articulated that extension services with less qualification negatively affect agricultural practices and farming method among local community. Similarly, the study of [8, 10] revealed that the frequency of extension agent's contact with farmers enables them to understand the problem of soil erosion and benefit of WSM practices, thus enhance adoption and implementation of WSM practices. Therefore, this study investigated as the lack of adequate extension service was among the major problem for adoption and sustainability of WSM practices in study area.

**Insufficient (small) farmland holding**

Table 2 indicated that entire respondents (100%) responded reported as they have small land holding and thus farmers shay to implement WSM and SWC practices fearing that the practices took space from their agricultural land. The survey households rated the problem as high and moderate important problem respectively reported by 95.5% and 4.5% of respondents respectively that constrained implementation of WSM activities. The survey households rated land shortage (small land holding) as it stand in first (1st) rank constraining adoption and implementation of WSM activities. Farmers fear to implement WCS and WSM practices as the interventions particularly physical SWC measures reduce size of effective farmlands. The KII and FGD result also revealed that, majority of smallholder farmers don't have adequate farmlands and grazing lands so they refrain to implement WSM practice. This aligned with Abera *et al*., (2016) finding which indicated that small size farmland holding negatively affected the land use type and farmers repeatedly cultivating without any land restoration measures. The authors added that, farmers who have large farmland size are effectively participated in SWC practices.

**Shortage of income**

Table 2 shows that, lack of cash income seriously affects the ability to bought agricultural input like fertilizer, improved seed and herbicide and pesticide to improve productivity. Accordingly the respondents (100%) reported that they don't have enough cash income to cover agricultural inputs. They ranked the extent problem as high (93.2%), moderate (4.9%) and low (1.9%) in constraining implementation of WSM and the problem stands fourth (4th) among all other constraining factors. The FGD results also indicated as farmers lack cash to cover agricultural tools and inputs. Thus it can infer that shortage of cash income negatively affects implementation of WSM practices of in the study area. Likely, poverty is the fundamental socioeconomic problem that mostly constraint to the success of WSM activities [5].

**Poor agricultural practices**

The analysis result depicted in table 2 shows, 20.7% respondents indicated that their agricultural practices is traditional (backward), but the rest (79.3%) considered as they shifted to modern. The majority of farmers applied traditional practices to control runoff like traditional ditch construction on farmlands. Consequently, from respondents classified their farming practice as poor (backward) rated the problem as it has been highly (78.2%) and moderately (21.8%) constraining adoption and implementation of WSM practices. The survey households put backward agricultural practice at seventh (7th) ranking constraining practice and implementation of WSM activities. Similarly, FGD indicated that some farmers still using backward farming like ploughing parallel to runoff and pulverize the farm which aggravates erosion. Inappropriate land use and farming practices primarily accelerate soil erosion. This study revealed although majority of farmers practiced appropriate agronomic practices that few farm households are still inappropriate agronomic practices while the.

**Fearing reduction of land size due to land closure**

Few (9.8%) respondents fear that implementation of closure practice reduce lands for other purposes and they rated this fear as this is high (46.2%) and moderate (53.9%) problem constraining implementation of WSM practice in the study area (Table 2). As per respondents that fear the closure reduce size of other land uses, ranked as 9th problem constraining implementation of WSM practice. KII and FGD discussants also indicated that some farmers refrain implementation of closure fearing that the practice reduces land for other uses like livestock grazing.

Currently, WSM practices following holistic approach to success sustainable natural resource management and utilization primarily for the purpose of farmers' livelihood improvement inhabited within watershed. However, in different parts of the country (Ethiopia) intended plan did not success due to lack of awareness, knowledge, training (capacity buildings), financial resources, appropriate linkage among stakeholders and institution and modern technologies and materials [5].

## Conclusion

Currently, watershed management practices are key approach in natural resources conservation and rehabilitation particularly in degraded areas, which is true for Ethiopia. The factors constraining of the participation and emplement of smallholder farmers in watershed management practices identified by the study include: lack of training, provided trainings have had low quality, lack of appropriate technology, problems of open grazing, deforestation, destruction of constructed physical SWC structures, inadequate extension services, insufficient (small) farmland holdings, shortage of cash income to cover agricultural input costs, poor (backward) agricultural practices, farmers fear that physical SWC structures and closure reduce effective agricultural land size. Therefore, even though it is difficult to solve all problems in short time, development actors and policy maker shall give emphasis on identified constraints to solve the limitations through providing action oriented trainings, awareness creation and providing input. This study could be contributed to the descipiline that concerned to the finding and pave the ways for further study.

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