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**Practices and Challenges of Indigenous Knowledge on Soil and Water  
Conservation in Central Ethiopia: The Case of Sebeta-Hawas District**

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**Abstract**

*Indigenous knowledge is unique to a given culture or society. The objective of this study was to identify indigenous knowledge of Oromoo on soil and water conservation practices and the existing challenges in the case of Sebeta-Hawas District in Special Zone of Oromia. A qualitative method was employed, whereby a total of 85 respondents participated during the period between March and April 2017. Focus group discussion, interviews and observations were the methods we employed for the study. The results were presented in a form of narration using quoted phrases and statements. Accordingly, numbers of soil and water conservation practices are identified. However, there are challenges that negatively impact the indigenous knowledge practices of soil and water conservation in the study area, such as the expansion of Finfinnee city and urbanization, globalization and nationalization, weakening of indigenous institutions, population growth, lack of Mass Media and lack of technical know-how of professionals. It is recommended that Indigenous knowledge management of soil and water conservation practices should be addressed in the study area in order to tackle the challenges identified.*

**Keywords** - Oromoo, indigenous knowledge, soil, water conservation, practices, Finfinnee, rural community, farmers

## Axerara

*Beekumsi xabboo aadaa fi hawaasaa tokkoof kan adda ta'edha. Kaayyoon qorannoo kanaa, beekumsa xabboo Oromoonni Godina addaa Oromiyaa Aanaa Sabbataa Hawaas akkaataa biyyeefi bishaaniif eegumsa godhaniifi rakkinaalee kanaan wal-qabatan adda baasuudha. Malli qorannoo akkamta yommuu ta'u, ragaan qorannichaa baatii Bitootessaa hanga Ebla 2017 walumaagalatti hirmaattota 85 irraa fudhatameera. Marii garee, afgaaffii fi daawwannaan maloota itti dhimma bahamanidha. Firiin qorannoo kanaa haala seenessuutin dhihaateera. Akkaataan itti biyyee fi bishaanif eegumsa godhan hedduun isaanii adda baafamaniiru. Haa ta'u malee, rakkooleen baay'een kan beekumsa xabboo kana daangessan bakka qorannoon kun itti taasifametti ni mul'atu. Isaanis: Babal'ina magaalaa Finfinnee fi hammayyummaa, dhiibbaa addunyummaa (globalization) fi biyyoolessummaa, dhaabbilee aadaa dadhabsiisuu, baay'ina ummataa, rakkoo xiyyeeffannoo sabaa-himaalee dhabuufi hir'ina ogummaa teeknikaa kan ogeessotaadha. Kanaafuu, bakka qorannoon kun itti gaggeefame kanatti, kunuunsi beekumsa xabboo akkaataa biyyeefi bishaan itti eegamanii fala dhahuu, rakkoolee adda baafaman ammoo furmaata waaraa itti barbaaduun dirqama.*

***Jechoota Ijoo:*** Oromoo, beekumsa xabboo, eegumsa biyyoo, bishaani, Finfinnee, qotee bulaa

### 1. Introduction

Knowledge is the most important instrument in today's world economy. According to Das (2011), knowledge is a part of culture to serve as a set of various facts and information traits. It can be categorized into indigenous knowledge (IK) and scientific knowledge. Scientific knowledge is non-traditional knowledge that indigenous people draw from their interaction with non-local people, different institutions, formal education, adoptions of western scientific thinking, philosophies and values, whereas indigenous knowledge is tacit knowledge that is orally communicated, trial and error process, stored in the minds of the people and practiced over a long time with the interaction of natural environment and geographical space by local communities (Ramata et al., 2017). In today's knowledge economy, the ability to recognize indigenous knowledge is unique to a culture or society. It denotes a type of knowledge that has evolved within the community and passed on from one generation to another (Lwoga and Ngulube, 2008).

IK refers to the knowledge, innovations and practices of indigenous groups in matters related to agriculture and environmental management, medicine and health, art and language (Nakata, 2002). Slade and Yoong (2014) classify IK into two. The first is explicit indigenous knowledge which refers to traditional knowledge that is easily articulated, expressed, communicated and recorded. An example is the explicit Samoan IK, such as the names of reef fish, the breeding times of birds or trends of using certain plants for medicinal purposes. As the erosion of explicit IK and indigenous communication is increasing, the need to transfer, store and retain this knowledge amongst indigenous communities is more important now than ever. The second is tacit indigenous knowledge which refers to the types of

traditional knowledge that cannot be easily expressed or articulated to outsiders. Tacit IK is largely based on an individual's emotions, experiences, insights, observations and perceptions. An example here is Samoan tacit IK which includes the deep respect that Samoan people have for their elders or the process of reaching a unanimous consensus within a village Fono (meeting).

Tesfahun (2016) stated that IK in Ethiopia is still underutilized resource in the development process, and special efforts are needed to understand, document and disseminate IK. Specifically, over the past years, Special Zone of Oromia surrounding Finfinnee is tremendously affected by Addis Ababa (a.k.a. Finfinnee), the capital city of Ethiopia and one of the fast expanding cities in Africa. The growth of its area has increased 30-fold from 18 km<sup>2</sup> in 1930s to 540 km<sup>2</sup> H 2000. Besides, its population has increased 25-fold from 100,000 to 2,495,000 in the respective time (Feyera, 2005). Thus, many farmers have been dispossessed of their agricultural lands (for Investment, Housing, Governmental services, etc.) from the basis of their livelihoods in Special Zone of Oromia surrounding Finfinnee. Geographically, it is expanding fast to all directions of the Special Zone, such as Sululta to the North, Burayu to the Northwest, Sebeta-Hawas to the Southwest, Akaki and Dukam to the Southeast and Laga Dadhi to the Northeast, in order to reconcile socio-economic problems of the city. Inversely, it affected the socio-cultural and economic conditions of the rural community of the Special Zone. According to Feleke (2003), rural communities around the Special Zone face problems of socio-cultural, economic challenges, environmental deterioration and land tenure insecurity coinciding with increasing number of population, increasing human needs for better life and the deterioration of natural resources. As a consequence, indigenous people are removed from their homelands in surrounding parts of the city; in such a way, their IK culture and their close tie with their environment were being lost.

Nonetheless, we can say with confidence that these indigenous practices are still functioning, but with inevitable changes. So, this study investigates continuity of these agricultural developments with special emphasis on the indigenous practices of soil and water conservation in Special Zone of Oromia surrounding Finfinnee inhabitants because it is typically embedded within cultural values and practices. It should be captured, recorded and documented as 'knowledge'; as a result, the IK of the community is on the verge of losing. For this reason, this study, identifies the types of IK of soil and water conservation practices and the challenges of IK practices in soil and water conservation practices in the Special Zone. Consequently, it promotes the indigenous knowledge among rural communities of the Special Zone which helps to easily understand IK concepts and to provide awareness on the status of IK practices, to empower rural communities' performance in their daily activities and that their knowledge is valuable and meaningful.

Indigenous knowledge of soil and water conservation practices has a considerable degree of sustainability in local environment. Because of this, they have been developed in line with the laws of the natural ecological system. They are within the scope of the farmers acquired or inherited culture, tradition and knowledge (Belay, 1998). Indigenous soil and water

conservation practices have relation with other forms of Indigenous knowledge (IK), and gained considerable attention (Reij, 1996). This is in part due to the failure of much modern soil and water conservation practices facilities, either as a result of poor design, construction or operation and maintenance (or some combination of all three). The majority of IK in soil and water conservation practices, such as contour plowing, crop rotation, fallowing, mixed cropping, surface mulching, water retention, etc., have been undertaken in Sub-Saharan Africa (Yeshambel, 2013). This study was initiated with the aim to identify indigenous knowledge of Oromoo on soil and water conservation practices and the existing challenges in the case of Special Zone of Oromia surrounding Finfinnee.

## **2. Materials and Methods**

Oromia is one of the Regional States in Ethiopia. Geographically, Oromia Regional State is located between 3°40' to 10' 46' north and 34° 08' to 42' 55' east. The Region is bordered with almost all Regional States of Ethiopia: Amhara, Afar, Southern Nations, Nationalities and People, Gambela, Benshangul Gumuz, Harare and Somali regions. It also has boundary with Kenya and South Sudan to South and South West respectively. Special Zone of Oromia surrounding Finfinnee/Addis Ababa is found in the central part of Oromia Regional State, and it is surrounded by North, East, West and South-West Shewa zones. Finfinnee is the capital city of Oromia Regional State and the Federal Government of Ethiopia. The IK management still remains an agenda and a problem, particularly in sustaining and resolving soil and water conservation practices in the region.

For the present study, a qualitative method, an approach to do research with the subjective assessment of attitudes, opinion and behavior (Kothari, 2004) was used. The total population of the study area, namely Sebeta-Hawas was 132,294 (CSA, 2007).

In this special zone, there are six Aanaas (Akaki, Berek, Mulo, Sebeta-Hawas, Sululta, and Welmera). Out of these Aanaas, the researchers purposefully selected one Aanaa, namely Sebeta-Hawas based on the recommendation of Sebeta-Hawas agricultural and natural resource office because there are a lot of mountains adjacent to the selected Gandas (Furii, Dieraa, Qochie Moglee and Wechecha, and also Sebeta River and its tributaries that cause soil erosion. In addition, a snowball sampling technique was used to locate other members who possess IK on soil and water conservation practices.

The researchers used the total sample size of eighty five, having seven Focus group discussions with at least seven members of elderly people, seven interviewed from each developmental agent/experts, indigenous knowledge institution and elderly people through snowball technique. For key informant, interviews were determined and suggested by focus group discussants. The age, experience, social statuses of the interviewees were taken into account. Moreover, two individuals from the Association for Promoting Indigenous Knowledge (APIK), and one Head of Sebeta-Hawas Agriculture and Natural Resource were interviewed. Fourteen key informants were selected from seven Gandaas. What is more, direct field observation was employed by the researchers to collect first-hand information.

Field observation was aimed at understanding indigenous practices; an indigenous way of resource/tool utilization and natural topography. In analyzing the data, the researchers employed qualitative data analysis techniques. The data collected in text form, such as audio, video and visual data were analyzed systematically using triangulation to increase the reliability, credibility and validity of the findings. As a result, the qualitative data collected were carried out in an inductive and analyzed by general procedure of data transcription, data organization for retrieval, coding, identification of themes and developing categories, analysis, incorporating theory from the literature, and writing a report (Creswell, 2013). The validity of focus group discussion was ensured through formulating relevant questions in the focus group discussion guide and pilot testing on a population almost similar to those intended in the research. Also, reliability of the interview and focus group discussion was censured by asking the same questions to different people to ensure the answers are more or less similar.

### 3. Results and Discussion

#### 3.1. Socio-demographic Characteristics of the Respondents

The respondents were farmers who practice in indigenous methods of soil and water conservation and stakeholders in soil and water conservation practices, like Indigenous institutions, Developmental Agents from governmental organization and Association for Promoting IK from non-governmental organization. Focus group discussions were held by selecting farmers from each “Gadaa”. The researchers conducted the group discussions with these farmers. Then, based on the objectives of the study, the data were analyzed by including the socio-demographic characteristics of the respondents.

The total number of respondents was eighty five (85), sixty eight farmers (Group discussions and key informant interview), seven members of Developmental Agents, seven individuals from Indigenous Institution and religion, two from association for promoting IK, and one Head of Sebeta-Hawas agriculture and natural resource office. The socio-demographic characteristic of the respondents is presented in table 1 below.

**Table 1: Socio-demographic background of the respondents**

Socio-demographic characteristics of respondents							
Age range Based On the Gadaa system		No	%	Sex		No	%
	≤48		5		5.88	Male	
49-56 Yuubaa I		3	3.53	Experien ce in years	Female	5	5.88
57-64 Yuubaa II		42	49.41		≤ 20	10	11.76
65-72 Yuubaa III		14	16.47		>20 ≤ 40	44	51.76
73-80 Gadamojjii		6	7.06		> 41	31	36.47
≥ 81 Jaarsa		15	17.65				
Education	Illiterate	47	55.29	Religion	Waaqeffataa	11	12.94
	Basic Education	16	18.82		Muslim	-	-
	Elementary	10	11.76		Orthodox	64	75.29
	High school	2	2.35		Catholic	-	-
	Diploma and above	10	11.76		Protestant	10	11.77

Marital status	Married	77	90.59		Divorced	1	1.18
	Widow	3	3.53		Single	4	4.70
Family size	≤5	11	12.94	Farm size	≤ 2.5Hectares	56	65.88
	>5 and ≤10	51	69.12		>2.5and ≤5 Hectares	15	17.65
	>10	23	27.94		> 5 Hectares	14	16.47

As shown in the table, the majority of the respondents, 47 (55.29%), were uneducated who practice IK of soil and water because they share IK orally and preserve in their mind. Moreover, the majority of the participants were elders. As a result, this has shown that the sex and age of the IK holders of soil and water conservation practices were elder males who have influence on their rural communities' agricultural development in general and on daily activities of IK in soil and water conservation practices in particular. As revealed by literature, elder males and males in general have high involvement and participation over IK in soil and water conservation practices and are high for decision making than their counterparts. Several sources also showed that age is considered as one factor for IK holding ability of people. For instance, Mundy and Compton-(1995) and Haverkort (1995) state that the level of indigenous knowledge one possesses varies greatly and is a function of age, gender, experience, profession and personality. Kora (2005) acknowledges that elderly people are custodians of indigenous knowledge. Furthermore, the recognition of IK as a useful tool in development programs demands an equality of participation and partnership with the 'ignorant' farmer (Kapoor, 2005). Battiste (2002) also stated that indigenous knowledge is both empirical (based on experience) and normative (based on social values and norms).

### 3.2. Types of Indigenous Knowledge for Soil and Water Conservation Practices

#### α. Water sources of the study area

According to the farmers of the study, the sources of water in the area are classified into four as illustrated in the table below

**Table 2: Source of Water**

No	Sources of water	Usage	Indigenous method of conservation	Examples
1.	<i>Bishaan Roobaa</i> (Rain water)	For seasonal plantations	<i>Daagaa ijaaruu, Boo'ii baasuu, fi Biqiltuu dhaabuu</i> (Terrace, Canal and Planting).	<i>Bokkaa Gannaa</i> (Winter Rain)
2.	<i>Bishaan Burqaa</i> (Spring water)	For household and irrigation	<i>Boo'ii baasuu fi Biqiltuu dhaabuu</i> (Canal and Planting)	<i>Burqaa Gammee, Burqaa Ballii</i>
3.	<i>Bishaan Eelaa</i> (Ground water)	For household and home gardening	<i>Boo'ii baasuu</i> (Canal)	Available per-household
4.	<i>Bishaan Lagaa</i> (River)	For household and irrigation plantation	<i>Daagaa ijaaruu fi Boo'ii baasuu</i> (Terrace and Canal)	<i>Sabbataa, Waajituu Ballii, Qocii, etc.</i>

(Source: Field survey, April 2017)

### b. Indigenous classification of soil

The rural community of the study area categorizes the soil into three types based on the color as described below:

- **Biyyee Kootichaa/Gurraachaa (Black soil):** It is a dominant soil type whose water logging is higher than the other types of soils. From the first week of July till end of August, *xaafii* (*Eragrostis tef*) and sometimes *baaqelaa* (Faba beans) and up to September 12/19 *missira* (Lentiles), *shumburaa* (Chickpeas), *qamadii* (Wheat), are sown to protect the soil and water, so there is appropriate use of water to minimize the washing away of the soil.
- **Biyyee Gumburii (Red soil):** It is a suitable soil for any agricultural practice in the study areas. The land should be plowed 5 up to 7 times so that the water penetrates to easily remix with manure (cattle dung). From May 19 up to the first week of July, crops, such as *qamadii* (Wheat), *baaqelaa* (Faba bean), *missira* (Lentiles) and *garbuu* (Barley) are plowed and planed. The most appropriate crop is *qamadii* (Wheat) by considering the protection of the soil. In the first rainy days, the farmers build *bo'ii* (a canal) to control from affecting the soil.
- **Biyyee Daalacha/Kaakkisaa/Calloo (Mixed soil):** According to the farmers, Biyyee Daalacha/Red soil covers a small part of the study area; water logging is low and most of it is swampy land (*lafa bishaanii*). It is used for irrigation practice. From May 19 up to July 5, the farmers plough and plant crops, such as *qamadii*, *baaqelaa*, *missira*, *boqqolloo*, *shumburaa*, *gaayyoo* and *nuugii* to protect the soil. Similar to the case of Mixed soil/Biyyee Daalacha type, they build *bo'ii*/canals in the first rainy days to control soil erosion. Biyyee Gumburii (Red soil) and Biyyee Daalacha (Mixed soil) have similar behavior in plowing and planting whereas Biyyee kootichaa (Black soil) radically differs from other types of soil. Therefore, indigenous soil classification has an impact on soil and water conservation practices. For instance, soil color and texture were commonly used by farmers to describe soil quality (Yifru and Taye, 2011). Understanding indigenous knowledge of soils has come to be seen as essential in understanding the local realities of farmers. The farming community in the study area has its own agricultural calendar whereby community members give due attention to the soil and water conservation practices. The calendar is presented in table 3 below.

**Table 3: Agricultural calendar of Anna Sebeta-Hawas, Special zone of Oromia surrounding Finfinnee**

No	Activities	Arfaasaa (Spring)	Indigenous soil and water conservation practices	Birraa (Autumn)
1.	<i>Lafa qopheessuu fi qotiisa</i>	March-June	<i>Wal barsiisuu</i> (Showing to peer/ community the mechanisms to resolve the problems and sharing IK)	February-April
2.	<i>Facaasaa</i> (Sowing)	June-August	Being frequently engaged and using the IK in the daily activity of the farms	March-April
3.	<i>Aramaa</i> (Weeding)	July-September	Being rarely engaged and using the IK	April-May
4.	<i>Haamaa fi Hoomishu</i> (Harvesting)	September-January	Identifying the problem, acquiring/collecting the IK to discuss and address the problems among themselves	July-August

**c. Types of grasses for soil and water conservation practices**

According to the participants, different types of grasses are used for IK soil and water conservation purposes based on the condition of the rainfall, and thus *Qaca/Citaa* and *Saardoo* are used if the rain is less to preserve the moisture and protect the soil. Similarly, *Coqorsa*, *Caffee*, *Ashuffee* and *Urorii/Qunnii* are used in high rainfall to preserve the soil and water. Generally, the grasses are called *Joroo* (table 4). For instance, farmers in Kerala and Kamataka states of India have used *vetiver* grass for more than a century in protecting Ponds from erosion (Warren, 1991).

**Table 4: Type of grasses used for soil and water conservation practices**

No.	Name	Function
1.	<i>Qaca/Citaa</i>	To preserve the soil from erosion and moisture for <i>Biqiltuu</i> (new plant). Moreover, it is used to cover the top of a house
2.	<i>Saardoo</i>	To preserve the soil, it covers a large land which is most of the time appropriate to rehabilitate the land
3.	<i>Coqorsa</i>	To preserve the soil, which is easily affected on soil degradation/washing away soil easily; it seems like a stone
4.	<i>Caffee</i>	To preserve the soil and water in swampy land
5.	<i>Ashuffee</i>	To preserve the soil and water around the river, impossible to cut its roots
6.	<i>Urorii/Qunnii</i>	To preserve the water and soil around Burqaa/spring and irrigation canals

**3.3. Planting Different Types of Plants/Trees for Soil and Water Conservation**

Farmers in the study area plant different types of indigenous trees, such as *Dhummuugaa*, *Eebicha/Rajii*, *Waddeessa*, *Laaftoo* and exogenous tree (*Baar-gamee*) since the soil erosion was a problem to conserve the soil and water. However, planted trees, such as exogenous tree consume large amount of water to preserve the soil. In general, these plants are drought tolerant, not edible by animals and therefore not are destroyed by animals in the area.



Another advantage is that farmers use these to mark the border between adjacent fields. In similar way, trees are planted above and below crop fields to decrease the intensity of soil erosion in Claveria, Philippines (Fujisaka, 1986). The occurrence of *manjanathi* trees (*Morinda tinctoria*) indicates high moisture content in the soil according to Tamil Nadu farmers (Fujisaka, 1986).

### 3.4. Using Different Indigenous Methods for Soil and Water Conservation

Crop rotation (*Sanyii jijjiiranii facaasuu*) is a common and simple practice in the study areas. All farmers are practicing crop rotation as a traditional way of indigenous soil and water conservation, and are aware of the fact that it helps to improve the soil fertility and replenish the exploited nutrients. Farmers choose which crops to grow in rotation according to how they adapt to the soil and the rainfall pattern. The main crop rotation practiced by the farmers in the study areas includes *xaafii– qamadii– xaafii* with *baaqelaa– atara– baaqelaa*. They have been doing this since a long time for better production of their agriculture works.

Mixed farming (*Waliin makaa facaasuu*) is rare and simple practice of growing two or more crops on the same piece of land either at the same time or within some intervals. All farmers are practicing to help crop rotation as a traditional way of indigenous soil and water conservation, and are aware of the fact that it helps to improve the soil fertility and to diversify the crop production from the same piece of land almost at the same time. The farmers practiced mixed farming most of the time for crops which include *baaqelaa– gaayyoo* and *qamadii– xaafii*. Other indigenous methods practiced by the farmers are presented in table 5 below.

**Table 5: Indigenous methods**

No.	Name	Function
1.	<i>Bo'ii baasuu</i>	To suit preservation of the soil and use of water.
2.	<i>Bulloo</i>	To harvest and minimize the speed of water and preserve the soil
3.	<i>Lafa baddaa</i>	The farmland is left empty for 3-5 years; it is the most common method of improving the soil fertility, but rarely applied now because the farmers have limited farmland
4.	<i>Daagaa</i> (Terraces)	It is built with stone and soil from top to bottom to retain the soil on each stage, minimize the speed of the water and preserve it accordingly
5.	<i>Dalga qotuu</i>	To protect the soil and retain water for its appropriate use
6.	<i>Hora</i>	To preserve the water for irrigation, animal watering and to calm down the soil from erosion
7.	<i>Laga hidhuu</i>	To preserve the water for irrigation and avoid soil erosion
8.	<i>Mukaan</i> <i>hallayyaa hidhuu</i>	It is built with any type of wood which is easily available to recover largely/widely affected farm land in order to preserve the soil

### 3.5. Indigenous Irrigation Practices for Soil and Water Conservation

According to the farmers of the study area, irrigation is one of the ways of indigenous soil and water conservation practices. There are two sources for irrigating the farmlands: Spring

water (*Burqaa Gamee* and *Burqaa Baallii*) and rivers, such as *Wajtuu*, *Biliqee*, *Moglee*, *Sanboo* and *Qocii*, which are the tributaries of Awash and River Sabbataa. The name Sabbataa, which is to mean a ribbon tied by women around the waist, is given due to these rivers.

- ***Burqaa Gamee***: The farmland at the tail of the spring water and the rivers were adjacent to *Burqaa* and *Bishaan lagaa* to irrigate the places, such as *Axaballaa*, *Diimaa Magonoo* and *Diimaa Guraandaa*. However, some part of these farmlands, which is adjacent to the rivers is affected by the industries such as Meta Brewery and flower farms, plastic factory, Liqueur factory and leather. In earlier time, there was a system in place on water use by the community. *Abbaa guyyaa*, a person who is assigned for water use and maintenance on a given day and *Abbaa herreegaa*, who is assigned for the overall water management, have control over both the spring water and the rivers. Moreover, there is *Jaarsummaa*, a group that resolves conflict among the community members by sitting under *Odaa/tree* through *Seera bishaanii* (water rule) based on the Gadaa system. The participants said that there are two types of soil and water conservation practices, namely *aadaa daagaa qotuu* (indigenous way of terrace) and *aadaa boraatii qotuu* (indigenous cutoff drains).
- ***Aadaa Daagaa Qotuu/Indigenous way of terrace***: It is a common practice that protects the farmland from being damaged by overflow of water. From the discussion and key informant interview, it has been generalized that the farmers have long years of experience in preparing the waterways based on the topography, but they could not practice this method on a flat area (when the slope of their land is at the same level). The *Daagaa* is built mainly by *Weedduu hojii* in which the farmers work in groups in the form of operation. In the group discussions, farmers also stressed working in groups (*Weedduu hojii*); as a result, there were a lot of advantages. The knowledgeable person, specially the *Jaarsaa* (elderly) leads the group work as he shares the knowledge. The *Daagaa qotuu* had two stages in the study area: *biyyee* (soil) and *marga* (grass) waterways. In the second stage, there is too little or no soil erosion whereas in the first stage, some soil is eroded. The grass waterway protects the damaging effect of water overflow, and as a consequence, it is taken as a full advantage of the agricultural development of the community.
- ***Aadaa Boraatii qotuu/Indigenous Cutoff Drain***: The second type of soil and water conservation practices, *aadaa boraatii qotuu*/indigenous cutoff drain is the most important and widely practiced indigenous soil conservation which is practiced in the study area. In the focus group discussions and key informant interview, farmers were asked about how to and when they build *boraatii qotuu*. They said that they build it across the indigenous waterways, which are prepared on farm plots parallel to the slope during rainy season. The idea was to change the flow of excess water coming from one known direction at the top of the farmland. In this way, the soil is preserved from being eroded as such a practice allows excess water to infiltrate easily and drain out of the

farmland. Most of the soil in the irrigated area is *Biyyee Calloo* (mixed soil) which comes through soil degradation from the mountainous area. The farmers are now planting different vegetation, crops and sometimes planting grasses due to the excess water which becomes threat because of railway infrastructure that accelerates the power of the water.

### **3.6. Challenges of Indigenous Knowledge of Soil and Water Conservation**

There are a number of challenges that affect IK in every part of the world, and thus the area that is addressed in this study is not an exception. Some of the challenges raised by the participants are presented below:

#### **a. Expansion of city and urbanization**

Private and governmental housing are in large scales for different services in the study area. At present, large scale condominium housing is the typical characteristic of the previous farmlands. Condominium buildings are clustered in groups in compound where communal facilities (open spaces, parking area and communal buildings) are provided; as a result, the IK of soil and water conservation practices by the rural community is being lost. As mentioned by SHFEDO (2015), more than 55% of the farmer households have owned less than 1.5 hectares of landholding per household size in the study area because of urbanization.

There were series of conflicts being observed between Finfinnee city and the surrounding farming communities, specifically the source of the conflict being land use issues. The following phrase, by Directorate of Government policy and research center [Ethiopian Broadcasting Corporation]- (2016) which was aired entitled “Good governance and fair distribution of wealth in Ethiopia” best explains the issue, which is quoted as follows:

**“የምን ማስትሬት የምን ደክትሬት ትንሽ ደብቃላ የሰበታ መሬት”**

It means “a piece of Sebeta land is more than enough of M.Sc. and PhD.”

Sebeta-Hawas shares border with Addis Ababa Administration, which affected the living conditions of the rural communities who practice land conversion, forest preservation, caring for spring water and rivers under threat, including the rural ecosystem. However, the IK for soil and water conservation is being lost because of the displacement of the rural communities.

#### **b. Globalization and Nationalization**

Globalization is the impact of western society in every way of the livelihood of the society in schooling, culture, industry, etc. In the context of this study, it greatly affects the IK of soil and water conservation practices. Moreover, nationalization, the modern establishment of Ethiopia deteriorates IK of soil and water conservation practices. Government bureaucracy represents its own custom and practice in recent times. Nowadays, it is imposed in different mechanisms from Federal government institutions and National/Federal government highways to farmland, construction of commercial buildings, residential houses, real estate development and industrial zones without considering its impact on the IK or without

consulting the public at large. According to Mazrui (2001), the term “globalization” is new whose actual process started centuries ago and fuelled by four major engines: empire building, economy, religion and technology. Cultural globalization tremendously affects the developing world, which can contribute to the erosion of people’s languages and culture. This may have an effect on IK, as the tendency is to be dismissive of undocumented and unscientific knowledge. Das (2011) stated that globalization is a “two edged sword”: on the one hand, it has opened up the world so that there is a free flow of ideas; on the other, however, a few voices and global corporations have drowned out other voices. It, therefore, comes as no surprise that IK is said to be under threat. In general, the expansion of Finfinnee city as well as industrialization is threatening IK of soil and water conservation practices in the study area.

Sebeta River is polluted because of the industries available in Sebeta-Hawas district. These are Meta brewery, leather factory, liquor factory, flower farms, etc. In addition, sewerage of Sebeta Municipality which is used to produce vegetation, crops, etc. through irrigation on the farmlands affects the livelihood of the farmers because the practice of ingenious knowledge of soil and water conservation practices could not be fully practiced any more.

### ***c. The weakening of indigenous institution/Gadaa system***

The farmers of the area confirmed that the Oromoo is known for age-grade organization known as the Gadaa system, and by religious institution known as *Waaqeffannaa*. Scholars confirmed that the Oromoo political culture is based on Gadaa system (Asmerom, 2000). Gadaa is a system of classes (Luba) in which male individuals succeed each other every eight years. The Gadaa has 11 age-grades: Dabballee (0-8), Foollee (8-16), Qondaala (16-24), Kuusaa (24-32), Raaba Doorii (32-40), Gadaa (40-48), Yuuba I (48-56), Yuuba II (56-64), Yuuba III (64-72), Gadamojjii (72-80) and Jaarsa (80 and above) (Asmerom 2000). The Oromoo believes in one Supreme Being known as Waaqaa, which literally means God. The people believe that Waaqaa is *Uumaa* (a creator) of all things; the created things are referred to as *Uumamaa* (creatures). The Oromoo believe that Waaqaa put everything in order and if anybody breaks his order, it results in sin, which in turn leads to punishment. They also believe that Waaqaa can punish anyone who commits sin because Waaqaa also guards the truth. Punishment can be in the form of a bad harvest, disease, famine and other hazardous natural events. The traditional Oromoo, also believe in life after death, upholding the idea that after death, the human soul goes to an abode that is regarded as holy (Asmerom, 2000).

The above two institutions control everyday life of the society, including soil and water conservation practices and agriculture as a whole. For example, soil and water conservation practices are deep rooted in the Gadaa system and *Waaqeffannaa*, so it is unthinkable among the community to cut down trees, pollute water and see degraded soil. In recent days, the Gadaa system plays a major role in IK soil and water conservation practices, based on the law and the norms of the society imposed sanctions on those who break the system. In the study area, it was observed that there are differences between the formal and the indigenous institution in IK soil and water conservation practices. However, the expansion of

Christianity, Islam, Civil war and the consequent repressive ruling for long time imposed on the society caused the IK of soil and water conservation practices to be greatly deteriorated.

#### ***d. Population growth***

Farmers of the area are too much aware about the population growth. They stated at first point that they have responsibility to share the farmland with their children. If this is not possible, the children have the right to receive a land from the Ganda communal land which should be Forest/grazing etc. Secondly, their own land is shrinking because different governmental projects, especially for housing and merging to nearby urban settlements. Thirdly, they addressed that there were new settlers through investment and government willingness to share the communal land. Therefore, it should have consequences of deforestation overgrazing, so there could be soil erosion. In line with these, it is impossible to practice the IK of soil and water conservation practices.

#### ***e. Mass Media***

Based on focus group discussion in the study area, there were no Radio transmission and publications in Afaan Oromoo, except one (Oromia Television in Afaan Oromoo). As a result, it limits IK specifically to acquire, share, store and use in soil and water conservation practices.

### **4. Conclusion**

Based on the findings in the study, a number of implications could be derived from IK of soil and water conservation practices. Fundamentally, the finding has also given direction for the general practice of IK for soil and water conservation practices including the present times. Oromia is the biggest Regional State in Ethiopia and has diverse types of IK. IK of soil and water conservation practices has enormous economic benefits. Despite the existing enormous potentials of production and subsequent benefits of these indigenous practices, no due attention has been given so far to improve their conservation, preservation and rehabilitations.

In the study area, IK of soil and water conservation practices were persuaded and influenced by the perception of both socio-cultural and religious. This has further implications that studying the typologies of the IK seeks to start from the purpose for which the IK of soil and water conservation practices is used by the farmers. On the other hand, it has the implication that assumes the researchers in this field face difficulty to put clear conclusions except providing trends of practices. The possession of the IK in soil and water conservation practices was mostly limited to farmers and natural resource experts who knew the process of conserving by acquiring the skills from older people. The skill was shared through involvement, and practice in conserving the soil, preserving the IK in soil and water conservation practices in their minds at individual level. The process of using IK was so systematic for the community.

IK is facing a number of constraints, such as, lack of Mass Media in Afaan Oromoo, population growth, weakening of Indigenous Institutions (the Gadaa System and

waaqefattaa), Globalization/Nationalization, Expansion of Finfinnee and urbanization, and lack of technical know-how that is expected to be provided by professionals, administrative bodies at the time. This has the implication that the farmers might have been ineffective in acquiring, sharing, preserving and using IK of soil and water conservation practices. Thus, it is important that the present generation takes a policy action which is proactive and comprehensive in its nature.

Despite the potential benefits derived from the practice of IK soil and water conservation, a sizable number of the rural community and the importance of the practice seem to have been ignored. There is limitation of coverage on the part of the government to the extent of potential socioeconomic benefits. There is also lack of interventions to improve the use of IK in soil and water conservation practices and to address the problems encountered by the community. Most importantly, there is failure to provide information to the rural communities on the Media outlets in their language, namely in Afaan Oromoo for IK of soil and water conservation practices in the study area. A comprehensive, sound and context-specific IK practice was not in place as implied from different studies.

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