JIMMA UNIVERSITY
COLLEGE OF NATURAL SCIENCES
DEPARTMENT OF INFORMATION SCIENCE

The Exploration of Indigenous Knowledge of Soil and Water Conservation Practices for Agricultural Development: The case of Finfinnee Special Zone Rural Community Oromia Region, Ethiopia

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A Thesis submitted to the Department of Information Science in partial fulfillment for the Degree of Master of Science, in Information and Knowledge Management

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July, 2017
Jimma, Ethiopia

Authentication certificate

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Title of the Thesis:

The Exploration of Indigenous Knowledge of Soil and Water Conservation practice: The case of Finfinnee Special Zone rural communities Oromia Region, Ethiopia

Degree Awarded: (M.Sc.) / PhD. (Encircle one)

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Declaration

I declare that this thesis is my original work and it has not been presented for a degree in any other Universities. All the material sources used in this work are duly acknowledged.

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July, 2017

Jimma

Dedicated

I dedicate this paper to my father Gemechu Gerba for all the sacrifice he made for peace and safety of his people!!

Acknowledgement

ABOVE ALL PRAISE TO GOD "ወዲ ድንግል ማርያም ክርስቶስ"!!

My greatest appreciation goes to my Principal advisor Worku Jimma (PhD.) and Co-advisor Mr. Chala Diriba (Ass.Professor) for their guidance, continuous follow up and prompt response in the entire process of this thesis work.

I want to extend my thanks to all the participants like Farmers, Sebeta-Hawas agriculture and natural resource staffs (Development agents) and the Association for Promoting Indigenous Knowledge for their willingness, directions, time and knowledge during data collection for this research. I am forever grateful for my uncle Obbo Wendwosen Bekelle and all, people I meet through you, Dr. Lawrence Abraham Gojeh and my brother Binyam Debela for their patience and unreserved support.

I am so glad to thank Department of Information Science staffs', Jimma University, Guest lecturers Dr. Million M., Dr. and Tibebe B. from Addis Ababa University, Dr Hagos W/Gebriel, Tewelde T.(M.Sc.) and Zewdu Meresa from Mekelle University, Elsabet Wedajo (M.Sc.) and Lata Lachisa (M.Sc.) and my classmates IKM 2008 of Jimma University, who were optimistic all times to help me and for all the ideas and knowledge we shared. Finally, I would like to cordially thank my beloved Family and my Friends who constantly inspired me and supported me in every possible aspect to complete the thesis.

Yonatan Gemechu, 2017

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Acronyms and Abbreviations

APIK	=	Association for Promoting Indigenous Knowledge
CSA	=	Central Statistics Authority
FDRE	=	Federal Democratic Republic of Ethiopia
FGD	=	Focus Group Discussion
FSZ	=	Finfinnee Special Zone
IK	=	Indigenous Knowledge
KM	=	Knowledge Management
OBFED	=	Oromia Bureau of Finance and Economic Development
SHFEDO	=	Sebeta-Hawas Finance and Economic Development Office
SWC	=	Soil and Water Conservation
UNESCO	=	United Nation Education, Science and Culture organization

Abstract

Indigenous knowledge is a local knowledge that is unique to a given culture or society. Soil and water conservation practice using indigenous knowledge is a successful practice since they got tremendous benefit. The objectives of the study were the exploration of the indigenous knowledge in soil and water conservation practices for agricultural development in rural communities of the Finfinnee special zone. The study used cross-sectional design. Data was collected from 85 respondents relevant to the study during the period between March and April 2017. Focus group discussion, interviews and observations were the instruments of the study. The results were presented using quoted phrases/statements, bar chart, percentage, pictures and brief explanations. The finding showed that, people in the study area have good perception; There were types, tools and mechanisms to acquire, share, store and use indigenous knowledge which were weedduu sabaa, seenaa faaruu, walaloo, suunsuma, hibbo-hibbaka, geerarsa, oduu durii odeessii, jigii, ciigoo(sabooka-soorgo- soorko), mammaaksa and sirbba, and the developed framework clearly transformed common sense of the farmers' engagement with their own indigenous institutions (Gadaa system and Waaqeffanna) However, there were factors affected the indigenous knowledge practice such as the expansion of Finfinnee and urbanization, globalization and nationalization, weakening of indigenous institutions, population growth, lack of mass media and lack of technical know-how of professional and administrative bodies. The study concludes the sense that improves Indigenous knowledge in soil and water conservation practice in acquiring, sharing, storing and usage. The study recommends that all sectors should be involved in institutionalizing the Indigenous knowledge in soil and water conservation practice that may reflect for farmers' bottom to top practice and future study should consider incorporating various technologies like knowledge based system, case based system, hybrid system for effectiveness and efficiency of Indigenous knowledge in soil and water conservation practices.

Keyword*: Indigenous knowledge, soil and water conservation practices, agricultural development, tools*

CHAPTER ONE
INTRODUCTION

1.1 Background of the study

Knowledge is the most important in the today's world economy. Stewart, (1997) describes that Knowledge has become the most important factor in economic life. Since the effect of the change from an information age to a knowledge age, knowledge has been recognized as the most significant aspect of the human life. Individuals and organizations have started to realize and appreciate the knowledge as the most treasured asset in the emerging viable environment (Syed Ikhsan and Rowland, 2004). According to Das, (2011) Knowledge is a part of culture and works 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).

There are about 300 million Indigenous people in the world, over 90% of these Indigenous people lived in Africa and Asia in more than 70 countries and it has been estimated that about 80 percent of the world's population still relies on IK (Nakata, 2002). Indigenous knowledge is understood as the common sense ideas and cultural knowledge of local peoples concerning the everyday realities of living. It encompasses the cultural traditions, values, belief systems, and world views that, in any indigenous society, are imparted to the younger generation of community elders. It also refers to world views that are products of a direct experience of nature and its relationship with the social world and reveals that these forms of knowledge are connected to the axes of social difference (e.g., these knowledge forms are generated) whereas scientific knowledge is generated by universities, research institutions and private firms (Dei, *et al*., 2000).

Warren *et al.*, (1995) stated that Indigenous knowledge is mainly practiced by rural communities in developing countries as a basis for local level decision-making in day-to-day activities of society, like agriculture, health care, education; natural-resource management. In similar way Lowga, (2011) rural communities in the developing countries have a broad base of widely available knowledge which is IK. There is developing views of IK, Warren, (1987) defined IK as a local knowledge that is unique to a given culture or society while Warren and Rajasekaran, (1993) opined that IK is the systematic body of knowledge acquired by local people through the accumulation of experiences, informal experiments and intimate understanding of the environment in a given culture. In an extensive way Emeagwali, (2014) states that indigenous knowledge as "the cumulative body of strategies, practices, techniques, tools, intellectual resources, explanations, beliefs and values accumulated over time in a particular locality, without the interference and impositions of external forces" as stated in the developing view of scholars locality and the culture the core of their definition.

For many years, drought has been the worst challenge of which most African rural people experience great suffering to come up used their Indigenous knowledge of their local environments to sustain themselves. The potential role of IK in improving agricultural performance is widely recognized in developing countries (Hart & Mouton, 2007).

In Ethiopia a study done by Mulatu, (2013) Indigenous Knowledge Practices in soil and water conservation at Konso people, many technological solutions taken to preserve the soil, but failed because they have not taken into account the local culture, and conditions, particularly society's preferences, skills, knowledge and economic background to sum up their indigenous knowledge which increases cultural pleasure and motivation to solve local problems with local community and resources, indigenous values, customs, know-how and practices will be eroded as the effect Indigenous knowledge extinction emerged. Fanthun, (2016) stated that IK is still underutilized resource in the development process of Ethiopia and special efforts are needed to understand, document and disseminate IK and same is true Abay *et al.,* (1999) made recommendation IK and its development in Ethiopia is not sufficiently researched and documented. As you might expect IK is still unrecorded, not documented well while most of those who possess it are an elder person to overcome to the points it needed to capture, record and document the IK.

1.2 Statement of the problem

In today's knowledge economy the ability to recognize Indigenous knowledge has become a more crucial issue. Rural people have been effectively employed Indigenous knowledge and local resources to secure their different needs harmoniously (Lwoga, 2004). Indigenous, rural communities practiced IK in their daily activities of livelihood. Hence, among the practice agriculture in general and the SWC in particular, there were and still are IK and practices for agricultural development.

> *"Indigenous knowledge is a new focus in development circles. A growing number of scientists and organizations are recognizing that it offers cheap, locally adapted solutions to development problems, or that it can be melded with scientific knowledge to boost productivity and living standards (Mundy & Compton, 1995)."*

Whereas Grenier, (1998) argued that indigenous knowledge is not in a position to withstand the influence of wider economic and social forces and Langil, (1999) puts the solution as IK on the edge of loss due to economic, social and political reasons advise researchers to document and disseminate it to others. He also suggested raising the awareness of indigenous communities so as to enable them to record their indigenous knowledge and work on how the intellectual rights on their indigenous knowledge should be respected.

There is a notable increase in the recognition of the significance of indigenous knowledge in sustainable development in the developing world (Warren, 1991). Notwithstanding the serious erosion of IK over decades in many countries in Africa, they are still relevant for promoting sustainable development (Lwoga, 2011) as a result; it provides opportunities for environmental conservation, improvement of livelihoods and well-being of rural communities and benefit to national economies. She states rural communities in the developing countries have an extensive base of widely available knowledge which is indigenous knowledge.

Specifically, over the past years Finfinnee Special Zone is tremendously affected by Addis Ababa. It is the capital city of Ethiopia one of the fast expanding city in Africa the growth of its

land has increased 30-fold from 18 km^2 in the 1930s to 540 km^2 in 2000, its population increased 25-fold from 100,000 to 2,495,000 in between the same time (Feyera, 2005). Thus Many farmers in the nearby which is Finfinnee Special Zone have been dispossessed of their agricultural lands (for Investment, Housing, Governmental services etc.) from the basis of their livelihoods. Geographically, it is expanding fast to all directions of the Finfinnee Special Zone such as Sululta to the North, Burayyu 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 true it affected the socio cultural and economic conditions of the rural community of the Finfinnee Special Zone. According to Feleke, (2003) rural communities around the Addis Ababa face problems of socio-cultural, economic challenges, environmental deterioration and land tenure insecurity as well as 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.

Even though, today 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 Finfinnee Special Zone inhabitants because it is typically embedded within cultural values and practices and it should capture, recorded and documented as 'knowledge' as a result, the IK of the community is on the verge of losing. For this reason, this study, inquire about the exploration of the indigenous knowledge of soil and water conservation (SWC) practice of the Finfinnee Special Zone (FSZ) rural communities of Oromiya, Ethiopia.

1.3 Research questions

The study will attempt to answer the following questions**:**

- What is the perception of the rural community in the IK practices of SWC?
- What are the types of IK of SWC practices in the rural community of Finfinnee special zone?

- What are the practices, mechanisms of IK SWC in acquiring, sharing, preserving and using in the rural communities?
- What are the factors affecting the IK practices for SWC of rural communities?
- What are the available frameworks that exist in rural communities to help Indigenous knowledge practice of SWC?

1.4 Objectives

1.4.1 General Objective

- The general objective of this research is the exploration of Indigenous knowledge of SWC practices for agricultural development in rural communities of the Finfinnee Special Zone.

1.4.2 Specific Objectives

The specific objectives of the proposed study are:-

- To determine the perception of IK practices of SWC among the rural communities of Finfinnee special zone;
- To identify the types of IK of SWC practices in the rural communities of Finfinnee special zone;
- To examine the contemporary status of acquiring /creating, sharing, preserving and using IK in SWC practices of the Farmers of the Finfinnee special zone;
- To make out the factors affecting IK practices in SWC for Farmers of the Finfinnee special
- To develop a framework that helps IK of SWC practice of the Farmers of the Finfinnee special zone.

1.5 Significance of the study

The research helps to investigate the Indigenous knowledge among rural communities of the Finfinnee special zone which helps to easily understand IK concepts and mechanisms. Specifically the study will have the following significance

- It will provide awareness on the status of IK practices of rural communities in SWC and provide the framework to preserve it, which could otherwise be lost.
- It helps to empower rural communities' performance in their daily activities through knowledge exchanges among the research participants
- It contributes to rural communities in terms of narrowing or reducing the gap by investigating the IK practices among themselves.
- Participants become more conscious that their knowledge is valuable and meaningful. Thus, the study is motivational to the rural community of the study area.
- Also, it covers the way for further study on Indigenous knowledge practices in rural communities.

1.6 Scope and limitations of the study

The scope of this research was the exploration of indigenous knowledge of SWC practice for agriculture development in the FSZ Oromia regional state, Ethiopia. The focus of the study was restricted to a single site (Sebeta-Hawas), in the seven Gandas. For this study cross-sectional research was used. The participants of the study were dominantly farmers sampled from the seven Gandas of Sebeta-Hawas from elder types of age categories and Developmental agents. The interview and focus group data collection method was employed.

The study was conducted by knowledge management approach while many fields can study on IK like computer science, Sociology, Agriculture, Management and Anthropology. In addition, the main issue of this study was to investigate indigenous knowledge of SWC practices without considering knowledge of modern agricultural of SWC. However, it is difficult to demonstrate

the boundary between the two knowledge systems. Indeed, this is the challenge across indigenous knowledge researches.

Even though, the researcher was achieved all most all, the objective of the study, it is difficult to extract hundred percent (100 %) of indigenous knowledge of one community. Because, such like research on IK it would have been too wide, time consuming and expensive. Therefore, if the researcher gets more time and budget may be able to get more new findings.

1.7 Definition of terms

Indigenous knowledge: Indigenous knowledge (IK) is the local knowledge; knowledge that is unique to a given culture or society. The terms "local" and "traditional" are frequently interchangeably used with indigenous.

Indigenous people: are people who have lived for generations in a geographic area and have created their community based on their local conditions.

Indigenous Soil and Water Conservation (ISWC); this is conservation strategy of soil and water which greatly practices indigenous knowledge of local farmers to minimize the effect of land degradation.

Knowledge: When information is analyzed, processed, and placed in context, it becomes knowledge.

Rural community: is a society that is in a rural area (country side) and people living in specific area having common interests and aspirations.

CHAPTER TWO
LITERATURE REVIEW

2.1 Overview of Knowledge

Knowledge may be defined as 'the state or fact of knowing something with familiarity, awareness, or understanding added through experience or association' (Merriam-Webster, 2016). In today's world, knowledge it is essential for the survival and competences of the rural communities. In the present information and knowledge era, knowledge has become a key resource. Knowledge is the mental aspect of saved ideas, realities, concepts, data and techniques in human memory. Its source is human mind and it is based on the information which is obtained through experience, beliefs and personal values. It is transformable in association with decisions and actions and would become mature and fruitful (Allameh *et al.*, 2011).

2.1.1 Knowledge Management

Knowledge management (KM) is a broad concept that it is about acquiring, sharing, dissemination, storing and using of knowledge. But there is no single definition, which means different scholars define it differently as follows.

The principle of KM is defined as "the reuse of lessons learned", it becomes the focus of collection, transfer and reuse of knowledge (Duffy, 2001). According to Barquin, (2001) knowledge management is the process through which an enterprise uses its collective intelligence to accomplish its strategic objectives. To sum up KM can enable the management of tacit and explicit knowledge.

As Lwoga & Ngulube, (2008) stated that KM can be used to manage and share IK in communities that desire to achieve development agendas. Through the above explanations of the scholars indigenous knowledge has integrated with KM to be the solution and decision making in rural communities specially developing country like Ethiopia where indigenous knowledge practices available.

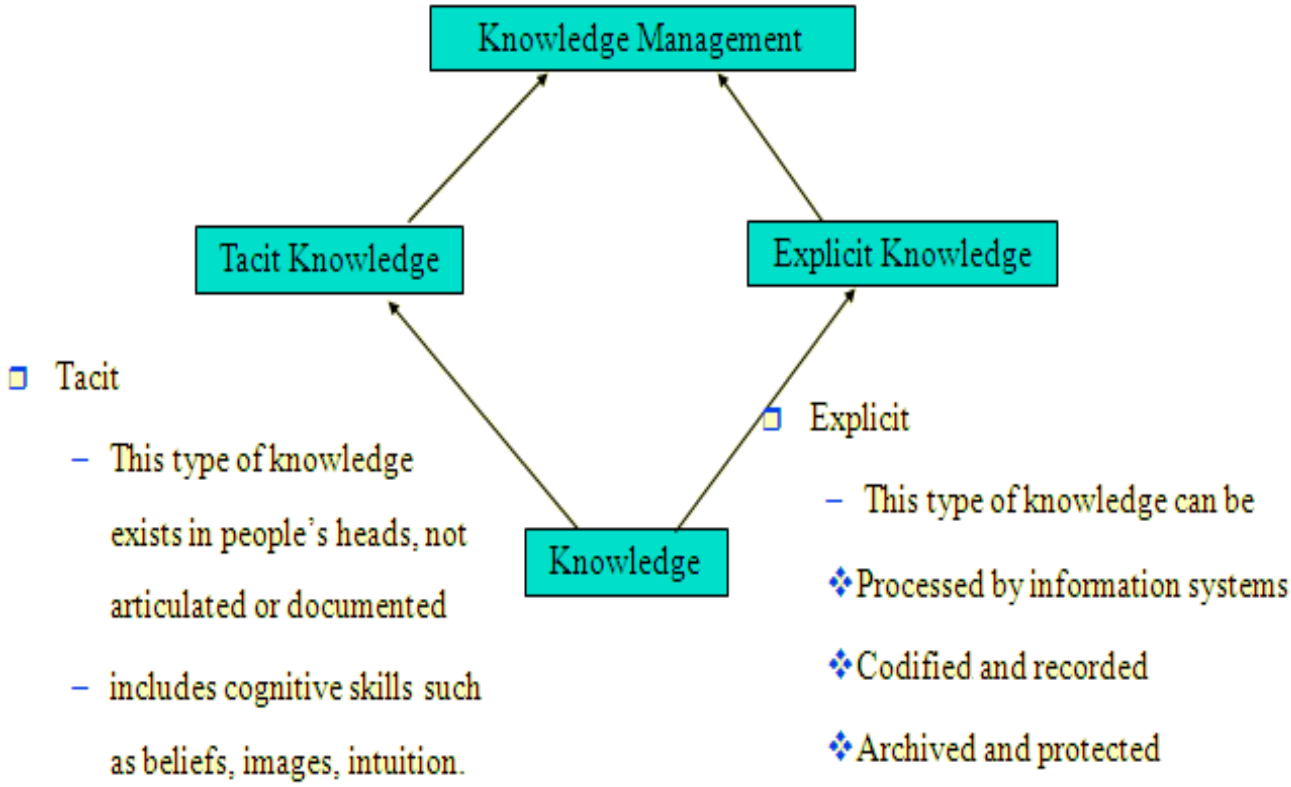


Figure 2.1 Knowledge Management hierarchy (Nonaka, 1996)

2.2 Indigenous Knowledge

2.2.1 What is Indigenous Knowledge?

In today's knowledge economy the ability to recognize Indigenous knowledge is unique to a culture or society and it denotes a type of knowledge that has evolved within the community and has been passed on from one generation to another (Warren, 1991; Lwoga & Ngulube 2008).

The first definition is that of Warren, (1991) the term indigenous knowledge (IK) is used synonymously with 'traditional' and 'local' knowledge to differentiate the knowledge developed by a given community from the international knowledge system sometimes also called the 'western system', generated through universities, government research centers and private industry. In similar way Indigenous knowledge, also called traditional or local knowledge, results from the long-standing traditions and practices of certain regional, indigenous, or local

communities; it encompasses the wisdom, knowledge, and teachings of these communities (World Bank, 2005).

The definition of IK gives an emphasis on culture and society to address those concepts according Hofstede *et al.*, (2007) culture is a system of values and norms that are shared among a group of people and that when taken together constitute a design for living and they determine through religion, social structure, education, economic and political philosophy. In another dimension Macionis, (2007) stated that Culture is the ways of thinking, the ways of acting, the material objects that together form a people's way of life and variation in between different cultures, but all have common elements which are Symbols, Language, Values, Beliefs, Norms, Ideal and Real Culture.

According to Hofstede *et al*., (2007) a society is a group of people who share a common set of values and norms that is people bound by a common culture. The society is characterized by variety of interaction, feeling of solidarity, total culture, social organization and functional differentiation. In another dimension Macionis, (2007) stated that Society refers to people who interact in a defined territory and share culture. As Das, (2011) knowledge, society and culture are integrated through stating knowledge as part of culture and human like many other organisms stay in society and human in cultural life have crossed the bar of savagery and barbarism and then become civilized.

2.2.2 Characteristics of indigenous knowledge

According Johnson, (1992) and Minang and McCall, (2006) outlined some characteristics of indigenous knowledge. It is locally bound and 'owns' the knowledge, i.e. indigenous to a specific area that develops from the close relationship between local people and their land and natural resources, orally spread, informal experiments, intimate understanding of nature, accumulation of generation wise experiences, traits tested on "religious laboratory of survival", interactional and not individualistic, empirical, functional (open-ended IK), culturally embedded (close-ended), technical with non-technicality, rational with non-rationality, repeating with time, asymmetrically distributed, shared by many Members of the community are expert repositories to different categories of data, according to their experience and social status, cost-free (low cost) and attractive to outsiders in form of global public service. Such type of knowledge is not

completely associated with aboriginal or indigenous commonalities it is dynamic and adaptive, not static, changing as the society changes socially, economically, culturally, etc., but peoples in a wider periphery due to their association with traditional way of living. Whereas weaknesses when conditions are new or changed; deficiencies in ways that information is stored and communicated; and little quantification of information for analysis in general, IK have become an important and valuable input in the management of sustainable development programs (Ngulube, 2002). Furthermore, reviews the conceptions of people who describe the characteristics of indigenous knowledge as personal, oral, experiential, holistic, local and conveyed in narrative or metaphorical language (Hart, 2010).

2.2.3 Type of Indigenous Knowledge

IK refers to the knowledge, innovations and practices of indigenous groups in matter related to agriculture and environmental management, medicine and health, art and language (Nakata 2002). Additionally, as Slade and Yoong, (2014) does classify IK into two which are explicit indigenous knowledge and tacit indigenous knowledge.

2.2.3.1 Explicit indigenous knowledge

Explicit knowledge is one approach of knowledge management and it emphasizes processes in articulating knowledge held by individuals, the design of organizational approaches for creating new knowledge, and the development of systems (including information systems) disseminate articulated knowledge within an organization (Sanchez, 2000).

Explicit knowledge is academic knowledge or knows-what that is described in a formal language, print or electronic media, often based on established work processes, as people-to-documents approach. Most explicit knowledge is technical or data or academic information that is described in a formal language, like manuals, mathematical expressions, copyright and patents. This systematic knowledge is readily communicated and shared through print, electronic methods and other formal means (Smith, 2001).

According to Choo, (1996) explicit knowledge is formal knowledge that is straightforward to transmit between individuals and groups. It is frequently articulated in the form of mathematical

formulas, rules, specifications, and so on. The author also explains that explicit knowledge does not appear spontaneously, but must be nurtured and cultivated from the seeds of tacit knowledge.

Explicit indigenous knowledge refers to traditional knowledge that is easily articulated, expressed, communicated and recorded. According to Slade, and Yoong, (2014) examples of explicit Samoan IK include the names of reef fish, the breeding times of birds or the way in which to use certain plants for medicinal purposes. As the erosion of explicit IK and indigenous communication are increasing, the need to transfer, store and retain this knowledge amongst indigenous communities is greater now more than ever before (Mehta, *et al.*, 2013; Slade, and Yoong, 2014).

Therefore, explicit knowledge is tacit knowledge which is codified, documented and stored in manuals, databases and others in order to be shared, communicated and transferred among individuals, groups and communities as a whole. Explicit knowledge makes life easy in this world because if there is documented materials on how things done there may not be challenges of knowing how things done for everyone.

2.2.3.2 Tacit indigenous knowledge

According to Nonaka, (1996) the concept of tacit knowledge is a cornerstone for any organization and covers the knowledge that is unarticulated and tied to the senses, movement skills, physical experiences, intuition, or implicit rules of thumb. He also provides examples of tacit knowledge, such as knowledge of wine tasting, crafting a violin, and interpreting a complex seismic printout of an oil reservoir. Tacit knowledge differs from explicit knowledge that is expressed and captured in drawings and writing. The authors also state the Dictionary definition of tacit knowledge as "knowledge for which individuals do not have the words".

Tacit knowledge embedded within the minds of the people in an organization. It involves perceptions, insights, experiences, and craftsmanship (Kidwell *et al.*, 2000). Indigenous knowledge is predominantly tacit (World Bank, 1998) and (Ngulube, 2002).

Tacit indigenous knowledge refers to the types of traditional knowledge that cannot be easily expressed or articulated to outsiders (Slade and Yoong, 2014). Tacit IK is largely based on an individual's emotions, experiences, insights, observations and perceptions. Examples of Samoan

tacit IK include the deep respect that Samoan people have for their elders or the process of reaching a unanimous consensus within a village Fono (meeting).

2.4 Indigenous knowledge of SWC

Indigenous practices have a considerable degree of sustainability in the 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 SWC practices have, relative to other forms of Indigenous knowledge (IK), gained considerable attention (Reij, 1996). This is in part due to the failure of many modern SWC facilities, either as a result of poor design, poor construction or poor operation and maintenance (or some combination of all three). The majority of IK in SWC practice work has been undertaken in Sub Saharan Africa such as:-

2.4.1 Contour plowing

Most farmers in Ethiopia apply different methods of soil conservation. Cultivating crops on the contour where the slope was steep is one of them. Most of the farmers, as observed, used contour plowing in order to minimize runoff and erosion (Mulatu, 2013).

2.4.2 Crop rotation

Crop rotation is another widespread phenomena in the area where maize, groundnut and sorghum grown rotational Mulatu, (2013). Crop rotation is used by the farmers important for different reasons, including soil fertility, thereby improved crop yield. The farmers of the area know that as of the scientific method improved Soil fertility can be achieved by alternating high residue producing crops with the growing low residue producing crops (Ibid).

2.4.3 Fallowing

Fallow land is commonly used as a grazing ground for five to seven years, depending on a land holding of the farmer and the nature of the land to recover. According Teklu and Gezahegn (2003) argue that fallowing is a carry out to discontinue seeding the land for upgrading when the nutrients are exhausted.

2.4.4 Fertilization

Fertilization is the other widely practiced activity of indigenous soil conservation mechanism in the Konso area (Mulatu, 2013). This is because the area is known in having continuous cropping activity. Thus, farmers used it to retain the fertility of the soil. This importance is reflected in the very high frequency with which both inorganic and organic fertilizer used to apply in this area.

2.4.5 Field boundaries

According Mulatu stated that field boundaries are common ridge covered with grasses between plots of farmland. The dividing line, boundary, and the land before and after the ridge are the property of two different individuals. This structure is important for soil conservation, which can reduce the intensity of erosion in the farm fields. But the uses of this structure are not noticed by most farmers also soil (stone) bund is an embankment, or ridge built across a slope along the contour. Soil bunds are made of soil or mud. On a moderately sloping area the farmers construct the soil bunds for erosion control. On steep eroded bare lands, stone terraces are most used structures in the study area (Mulatu, 2013).

2.4.6 Kosii

Kosii were practiced of distributing domestic wastes to the field for soil fertility preservation (Teklu and Gezahegn, 2003). Kosii, which literally means waste, consist all kinds of human and livestock residues/leftovers in and around the residence. Consequently, the practice is criticized for inducing weed infestation to the field.

2.4.7 Mixed croping

Farmers used to inter planting two or more crops together with some root edible plants. Mixed cropping in the area helped the potential to reduce erosion by having a crop on the land for a longer period of the year. Also, it served for them to cultivate different crops at one time on a single farm land. However, the crops in the area he studied, i.e. Konso are widely similar growing seasons and thus the potential for this benefit is not as such. Nevertheless, the inclusion of leguminous plant may improve its nitrogen fixation process for cereal crops (Mulatu, 2013).

2.4.8 Surface mulching

Surface mulching is using surface mulches on their fields, thus providing a protective cover at a time when crop cover is not present. Some farmers left crop residue while others used by branches. The benefit of protective covering was widely appreciated, as was the improved infiltration rate afforded by the techniques and reduced evaporation rate (Mulatu, 2013). Further he stated objective is the addition of nutrients to the soil through the decomposition of the organic matter. However, the density of mulch viewed in many fields was below the level required to be most effective as a protective cover since the use of residues as animal food was witnessed in many households of the area i.e. Konso.

2.4.9 Water harvesting

Ferroukhi and Chokkakula, (1997) cited by Addis (2014) explored IK of water harvesting and artificial recharge in northern India. The techniques they have developed, which harvest the sporadic floodwater, ensure that their drinking needs are fulfilled even during water scarce years when no rain at all falls. Their extensive knowledge of water harvesting as well as of the local ecosystem and of the complex water harvesting system they subsequently developed, are based on hundreds of years of experience and are deeply embedded in their culture. The water lasts several months before drying up. The local nomads discovered that after infiltrating the fresh water is trapped in the ground and store at shallow depths in a layer floating' above denser salty ground water. Each virda is used until the water begins to get salty at which point the virda is filled with grasses and silt from the next virda and left to replenish. Other methods include the development of a series of tanks sunk parallel with the slope. These progressively fill during the rainy season with each feeding to one larger deeper tank.

2.4.10 Water retention

The making of thin slurry from cow dung that is then sprinkled over drought affected paddy so as to increase the water retention properties of the soil is also common practice. In the field of local rice, at an early stage, the use of a hand hoe followed by laddering is undertaken. This process thins out unwanted seedlings and weeds, and aids mulching (Ferroukhi and Chokkakula, 1997).

2.5 Perception of indigenous knowledge in SWC

The overall the way we view towards indigenous knowledge used to be that it was primitive, unproductive and irrelevant. It was viewed as part of a mysterious past and a major obstacle in the development of third-world countries, instead of a critical, evolving component of a cultural alternative to modernization (Bray and Els, 2007). As Lwoga, *et al.,* (2008) poor feelings, culture and individual characteristics (age, gender, status, wealth, political influence and so on) also affect perceptions, actions and access to knowledge in the local communities". Studies by Abera and Belachew, (2011) local Perceptions of Soil Fertility Management in South Eastern Ethiopia indicates IK existence, though it focused on farmer's perception in a similar way Ramata *et.al*., (2017) stated that Local knowledge was regarded as primitive are now being perceived as sophisticated" Practically an IK activity depends on perception. Indigenous people respond to the situation in terms of their perception.

Indigenous communities have long been aware of the problems of soil degradation and have traditionally been conserved minded at the level of the farm since the mankind. For instance in Ethiopia has given less attention to IKSWC by research and development agent (Reij, 1996). Whereas inversely true for an extensive work on indigenous knowledge in land management by Kruger *et al.,* (1996) shows there is poor record and lack of appreciation of indigenous practices by soil conservation experts and policy makers.

2.6 Policy on indigenous knowledge

The World Bank, a lot of Universities, and the United Nations, among other organizations use the term indigenous knowledge and have created indigenous knowledge programs or initiatives in their institutions. Policy plays a major role in providing outlines of objectives and goals. It is seen as a compass that gives direction when lost. A policy is defined as whatever government decides to do or not to do regarding specific matters (Monngakgotla, 2009). In the preparation and formulation of indigenous knowledge policies, it is essential for governments to engage actively with indigenous communities. Policy papers recognize the value of indigenous knowledge (World Bank, 2005).

A lot of government policies are not clear from a local community perspective. The key ingredient of any successful policy formulation and implementation involves the participation of a range of stakeholders (Monngakgotla, 2009). Stakeholders play an important role in motivating the policy, while motivation influences the capacity reasoning of policy.

Monngakgotla, (2009) points out that when a policy framework ensures and recognizes indigenous knowledge as valuable knowledge, it enables communities to realize that they hold valuable knowledge. In this regard, countries should bring about public policy for the governance of indigenous knowledge. Indigenous knowledge in Ethiopia has not given attention specifically, but in the FDRE constitution, (1995) address in diversified ways article 5 (1) recognition of language, article 39 (2) right of the people to preserve, develop culture, language and to preserve its history, article 39 (5) people is a large measure of culture, intelligibility of language and contiguous territory and article 41 (6) economic social and cultural right state shall pursue policies. Accordingly the constitution is a fertile ground to draw policy, therefore the government has a mandate to protect and preserve indigenous knowledge. Msuya, (2007) states the appropriate policies each country needs for indigenous knowledge:

- Governmental appreciation of indigenous knowledge
- A Political commitment to indigenous knowledge
- Preservation of indigenous knowledge
- Statement on protection of indigenous knowledge
- Copyright and patent issues
- Cross-border indigenous knowledge and how to share it
- Use of indigenous knowledge
- Distribution of benefits accrued from indigenous knowledge

For instance South Africans IK policy there are 4 key policy drivers which are Affirmation of African cultural values in the face of globalization, Development of the services provided by Indigenous Knowledge Holders and Practitioners, Contribution of indigenous knowledge to the economy and Interfacing with other knowledge systems. South Africa has already made progress in developing IK related legislation. The Policy will help to coordinate the focus of initiatives, create the appropriate linkages, lead to improved impact as well it is an important indicator for other countries.

2.7 Barriers of IK

There are basic barriers for IK which is in Acquisition of IK, Sharing of IK and Storage of IK as a result it were classified at the following categories: personal which are poor recognition of IK; poor knowledge sharing culture; lack of trust; and personal characteristics (that is, age, gender, status), Social barriers were related to the poor recognition of IK; a poor knowledge sharing culture; disappearance of traditional seeds and plant species; the difficulty of knowing the IK custodians; disappearance of IK holders; the dominant use of contemporary technologies; traditional structures, customs and taboos that inhibited sharing of IK; high illiteracy level of the early IK custodians; and disappearance of oral culture such as folklore and Further, the problems at the external environment level were related to the inadequate efforts by the government to recognize IK in its policies and plans; lack of appropriate intellectual property right; exclusion of IK in the formal education system; and lack of professionals, such as extension agents to recognize and manage IK (Lwoga, *et al*., 2011).

2.8 Indigenous knowledge management

Management of knowledge is a fundamental issue in an era of knowledge. To have knowledge only is not sufficient, but connecting knowledge with its application conceptually to desirable social ends is essential. IK systems generally provide a way of connecting a way of knowing, a way of feeling and also a way of doing. Like the scientific knowledge, indigenous knowledge also needs to be managed on technical base.

The essential steps as mentioned by (World Bank, 1998) are the ways of its transformation, i.e.

a. Recognition and identification,

The process typically begins with recognition and identification of knowledge as expressed in a technology or a problem solving strategy. However, identification of IK can at times prove difficult.

b. Validation,

Lessons from earlier transfers of modern as well as appropriate technologies indicate that the cultural, political, and economic environment and the level of technical competence of recipients are critical for sustainable adoption and adaptation of foreign technologies

c. Recording and documentation,

The recording may require audio-visual technology, taped narration, drawings, or other forms of codified information. In case the tacit nature of a practice does not lend itself to such recording, information about locations, individuals or organizations that can demonstrate or teach a practice could be used as a pointer to the source of IK.

d. Storage in retrievable repositories,

It should also include other retrievable types of repositories of information such as tapes, films, databases and IK practitioners. Meta-information needs to be produced to make retrieval more user-friendly. This could include electronically stored and indexed abstracts, directories of experts or applications.

e. Transfer

It is beyond conveying it to the potential recipients. Individuals, a community group, a civil society organization, or researchers could be used to help test, reject or adopt and adapt the new knowledge. The transfer may involve intensive practical training, apprenticeships or demonstrations. Some local practices can only be transferred directly, from practitioner to practitioner. The risk of failure is reduced if the new technology builds upon existing local knowledge.

f. Dissemination

To a wider community adds the developmental dimension to the exchange of knowledge and could bring about a wider and deeper impact of the knowledge transfer. Depending on content and context, dissemination activities could include public awareness campaigns, public broadcasting, advertisements, seminars, workshops, distribution of information resources,

publications and the incorporation of IK in extension programs or curricula. Governments could encourage the process by creating a favorable political, economical and legal framework

g. Exchange

The ideal outcome of a successful IK exchange is transferred. This is essentially a learning process whereby the community where an IK practice originates, the agent that transmits the practice, and the community that adopts and adapts the practice all learn during the process.

2.9 Indigenous knowledge sharing practices mechanism

IK is predominantly tacit, embedded in the practices and experiences of its holders commonly shared and expressed locally by orally or tradition by using different folklore activities such as song, proverbs, poems, drama, stories, symbols, dances, rituals, architecture, arts, and crafts through personal communication and demonstrations from the teacher to the apprentice, from parents to children, from neighbor to neighbor these folklores are performed in socio-cultural events for empowering the peoples with the relevant knowledge for condition at hand (Franklin, 2008).

IK is usually shared and exchanged within social networks, with individuals making use of their primary networks (family, friends, neighbors, members of the community) and secondary networks (other contacts and relations outside their primary networks or closer circles such as organizations, work or business contacts and other intermediated contacts), not only to obtain their information and gain access to new knowledge, but also to share it (Das, 2011). In these primary networks, the oral tradition and empirical learning are the principal ways of transmitting knowledge. The codification of the tacit and explicit knowledge which exists in the local communities is complemented by the secondary network (Das, 2011). Thus, IK is commonly created and shared in the primary social networks, while explicit sources of knowledge, such as print format play a supplemental role.

According Warren, (1995) Indigenous channels carry a wide range of messages: entertainment, news, and other social exchanges. Indigenous communication can take many different forms such as:

a. Folk media are the indigenous equivalents of exogenous mass media. They include festivals, plays, puppet shows, dance, song, storytelling and poetry (Valbuena, 1986). He suggests that from the various indigenous channels, the folk media have been mostly used to support development activities.
b. Indigenous organizations include religious groups, village meetings, irrigation associations, mothers' clubs and loan associations (Lwoga, 2011). These organizations orchestrate much communication: through formal meetings of members, by messages sent about activities and obligations, and through work activities.
c. Economic relationships and service suppliers such as traders, farm input suppliers, and indigenous specialists such as healers and midwives are important sources of information for local people. Market traders provide information on prices, varieties and fertilizer use. Healers explain diseases and treatments.
d. Deliberate instruction. When we are kids, our parents, families and peers teach us how to eat, how to behave, how to cook, plow and plant. Warren, (1992) calls this process "deliberate instruction."
e. Unstructured channels. Indigenous communication occurs in many other settings: talk at home and at the wheel, in the fields and on the road, in the teahouse and the chief's house, and wherever else people meet and talk. A major part is communication among kin and peer groups.

However, IK is not equally shared and distributed in the communities; social dimensions (age, gender, status, wealth, political influence) affect perceptions, actions and access to knowledge resources in the communities (Fairhead and Leach, 1994). Resistance to change and social relevance as a control mechanism to transmit what is perceived as significant and omit the rest over a period of time have largely limited the sharing of IK (Meyer, 2003; Meyer, 2009). IK sharing is also inhibited by attitudes, perceptions, norms, values, belief systems and security mechanism of the local people to protect their own intellectual property inherent to indigenous people (Meyer, 2009).

2.10 Model of Indigenous Knowledge Management

Several studies conducted for understanding and conceptualize IK frameworks in a lot of disciplines. According the study were conducted in Tanzania by Lwoga, (2011) proposes an

understanding conceptual KM model for rural communities in developing countries; based on findings, The study demonstrated that western-based KM models should be applied carefully and would be applicable in a developing world context with considering policies, frameworks, ICTs and culture determined access to knowledge in the communities and proposes a KM model for rural communities, which indicates that the potential of knowledge for agricultural development should be conceptualized within the framework of the targeted community consequently these study was appropriate for these work based on the status of the countries and relevance of the topic which is general agriculture development.

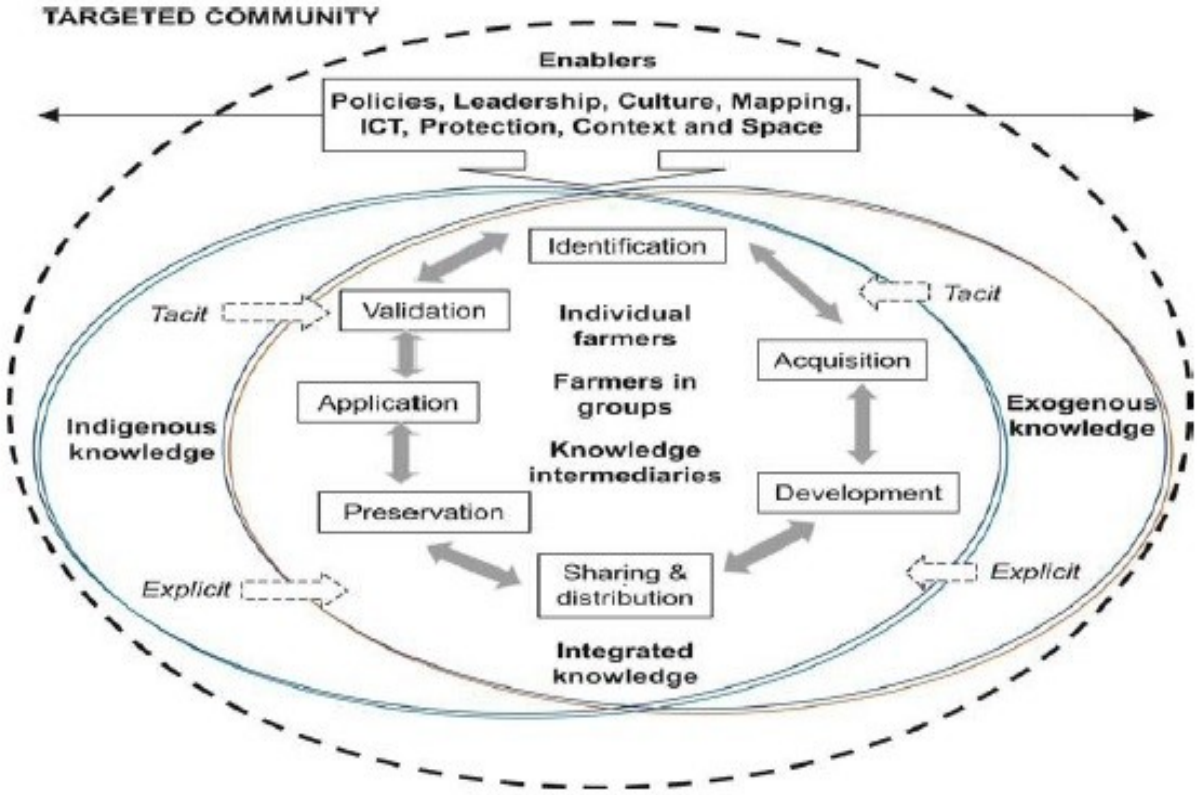


Figure 2.2 Indigenous Knowledge Management Framework (Lwoga, 2011)

2.11 Related works

In Ethiopia studies on indigenous SWC practices was carried out in 1983 and detailed study continued by Alemayehu in 1992, Kruger *et al.,* in 1996 and Gebere Michael in 1996 as cited in Mulatu, (2013). Gebere Michael, (1998) as cited in Addis, (2014) has examined the indigenous

SWC in Northern Showa and Southern Wello in Ethiopia. A Study by Alemayehu, (1992) focuses on the role of traditional ditches in controlling soil erosion on increasing production in Northern Ethiopia. The author has described the use of traditional terracing, traditional ditches and mulching.

According Herweg, (2002) described the role of IK in soil management to overcome labor shortage and optimize farm operations. The practices described include working arrangements (Share cropping and Animal fatting) and gradual terrace building for degraded farm plots. Use of manure, compost and crop residue, soil burning, temporary structure (trash line) and indigenous grass and vegetation strip. Review by Herweg shows the role of IK practices in improving physical soil properties, nutrient recycling and fertility improvement. There are also reviews on traditional conservation measures by Reij, (1996) bench terracing for chat (*Catha edulis*), Herweg, *et al.,* (2000) on traditional technique "*daget*" in Tigray.

Assefa, (2007) reviewed terracing practice in Ethiopia taking into account the geographic variation in Tigray, Shewa, Harerghe and Gamo Gofa region. The study shows the significance of the indigenous terracing as key to survival in vulnerable areas of Konso area in Southern Gamo Gofa.

Addis, (2014) studied on the role of indigenous knowledge and practice on water and soil conservation management and were assessed various aspects of indigenous knowledge and practice in water and soil conservation measures introduced in Albuko Wereda, South Wello, as a result Farmers faced several constraints in adopting soil and water conservation measures whereas, farmers were knowledgeable about various indigenous SWC measures but a few of them implemented.

Previous studies reflect the significance of indigenous knowledge on SWC stressed in agricultural science and technology where as these studies had given emphasis on capturing, documenting in the way of acquiring, sharing, storing and using of IK and in its approach which was knowledge management approach.

CHAPTER THREE
METHODOLOGY

3.1 Description of study area

Oromia is one of the regional states in Ethiopia. Geographically, Oromia Regional 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's, Gambela, Benshangul Gumuz, Harare and Somali region and international boundary with Kenya and South Sudan to South and South West respectively. It covers about 32% of the country's total area. In addition the region varies climatic condition from cold mountains (0.2%), mountains/temperate (14.5%), temperate plateaus (42.3%), warm plains/tropical (42.7%) and semi-desert (0.3%) (CSA, 2007).

The Oromoo people are one of the ancient races of Eastern Africa with indigenous people with possibly had been embedded with other people who are found in East Africa and is distinguished as an ancient people, great African nation (Bates, 1979). They speak Afaan Oromoo one of the five most widely spoken languages from among the approximately thousand languages of Africa. The Cushitic language family to which Afaan Oromoo belongs is indeed the largest language family in its number of speakers in the Afro-Asiatic super language family spoken in Africa in general and Ethiopia in specific (Kanno, 2005).

Oromia is divided into 18 zones, including one special zone, 309 Aannaa /districts, 6500 Ganda and 39 urban centers, the national capital Addis Ababa, known as Finfinnee in Afaan Oromoo, is also the capital city of the region. As per the decentralization system authority and responsibility have been devolved to lower (district) level since 2002 to accelerate the socioeconomic and political development of the region (OBFED, 2010). Gadaa system is an indigenous democratic socio- political system of the Oromo. It registered to the Representative List of the intangible cultural heritage of humanity in 2016. The Gadaa system refers to typical socio-political, economic, religious and cultural system or heritage of the Oromoo people and it is as an Oromoo traditional institution always it reveals five social sets and grades with eight years (Legesse, 2000). Gadaa constitutes a dynamic living culture that regulates contemporary Oromoo political, social, economic and religious life. As a social institution, it functions as a mechanism of

socialization, conflict resolution, judicial administration, natural resource conservation (soil, water and forest) religious expression and social harmony etc.

Finfinnee Special Zone of Surrounding Finfinne/ Addis Ababa is found in the central part of the Oromia Regional State, surroundings of and nearby areas in North, East, West and South-West Shewa. Finfinnee/ Addis Ababa is the capital town of Oromia regional state and Federal government of Ethiopia. The special zone has an estimated total area of 4,800 km^2 The IK management still remains an agenda and a problem, particularly in sustaining and resolving their SWC.

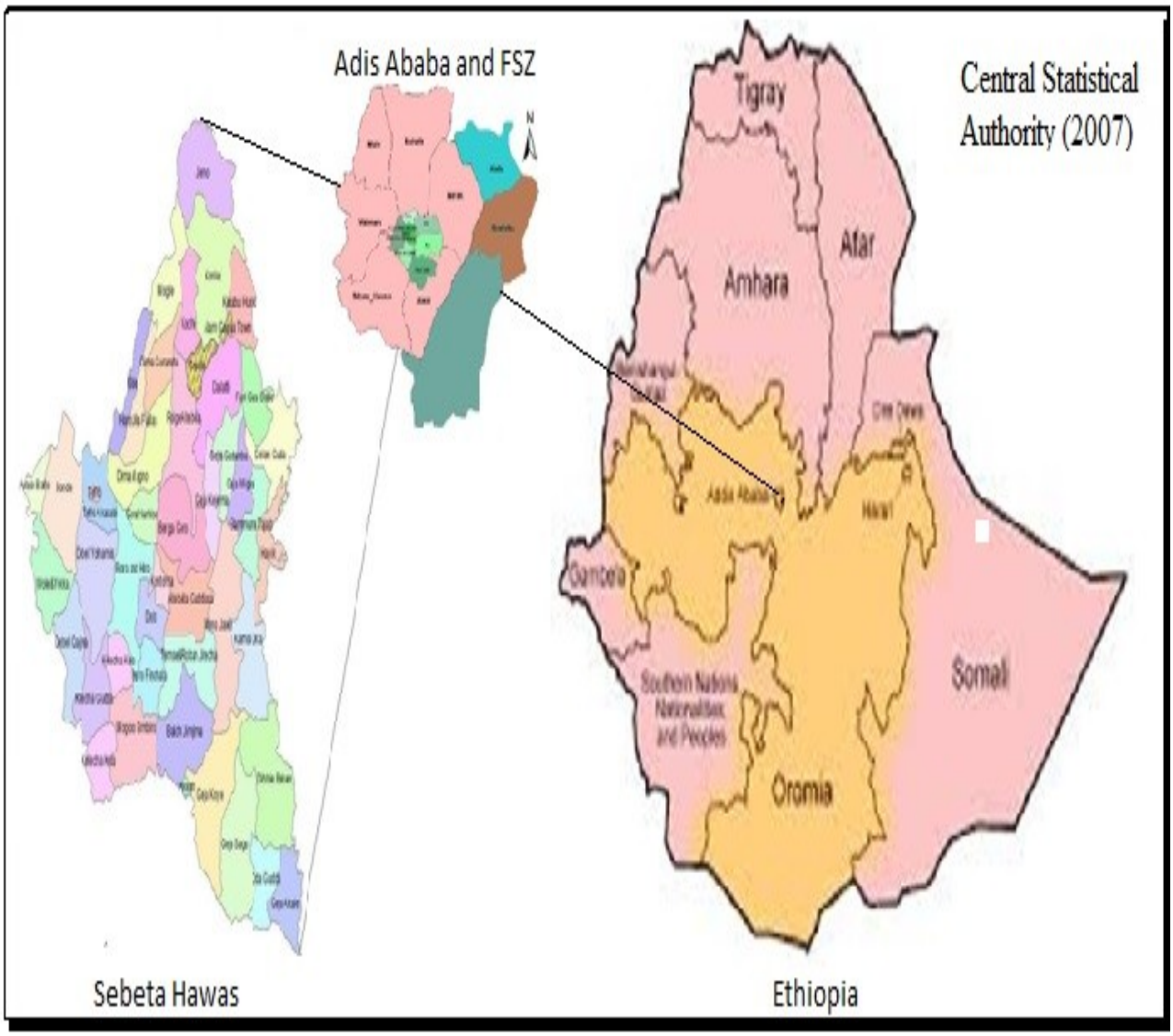


Figure 3.3 Study Area

Source: Central statistics authority, 2007

3.2 Study design

For the present study a cross-sectional was used because the cross-sectional research design allows data to be collected at one position in time. Accordingly, in this study qualitative research was employed (Creswell, 2013). Qualitative approaches to research are concerned with the subjective assessment of attitudes, opinion and behavior (Kothari, 2004).

3.3 Study population

The study area was Sebeta-Hawas the total population census of 2007 was 132,294 (CSA, 2007). With regards to the ratio of the rural urban population of the district, the rural population accounts for 124,935 (i.e. 9094 elders whose age greater than 55 were, 4190, Males and 4904 Females) while the urban population was 7,359. As a result 85 respondents were participated.

3.4 Data type and sources

In view of the fact that a way to collect a reliable and relevant data both primary and secondary sources of data were collected. Accordingly, primary data were collected from inactive elders (i.e. From *Yuubaa* up to *Jarsaa*). As Mascarenhas, (2013) stated that old peoples are holders of IK, but dead without preserving their knowledge for the next generation.

The rationale to select these primary sources of data was evidently shown the level and influences of IK in SWC practices. Moreover, secondary sources of data were obtained in order to correlate the study with the previously existing works. Accordingly, different published and unpublished materials, articles, journals, researches, governmental reports were referred and used.

3.4 Sampling

3.4.1 Techniques of Selection

In Finfinnee special zone there are six Aanaas (Akaki, Berek, Mulo, Sebeta-Hawas, Sululta, and Welmera). Out of these Aanaas the researcher selects one Aanaa namely; (Sebeta-Hawas) purposefully.

According SHFEDO (2015) report land demanded for Aanaa Sebeta-Hawas five times greater than Aanaa Sululta and more of other Aanaas (for Investment, Addis Ababa city administration, Federal government offices and Sebeta Municipality for community Housing and services) and The Aannaa consists of 41 rural Ganda and 2 urban centers (Tefki and Awash-Melkakunture) whereas since 2008 Jamoo and Hanna Mariam annexed to Addis Ababa city administration and in 2015 five rural Gandas incorporated into Sebeta town. There were also available indigenous practices of Gadaa and Waaqeffanna. Legesse (2000), also states that *Gadaa* institution is one of the famous indigenous African institutions that deals with almost all aspects of human society. From Aanaa Sebeta-Hawass Seven Gandas i.e Atabala, Dima Guranda, Gora Harkiso. Dima Magoo, Qochie, Mogleem, Fulasoo There are a lot of mountains adjacent to the selected Gandas (Furii, Buba, Dieraa, Qochie Moglee, and Wechecha etc.) and the Sebeta rivers and its tributary rivers consequently vulnerable to soil erosion which were selected purposefully according to the recommendation of Sebeta-Hawas agricultural and natural resource office. Here below some of the mountains and rivers shown Fig.3.4, 3.5, 3.6, 3.7 and 3.8.

Figure 3.4 River Wajtu and Bali

Field survey, April 2017

Figure 3.5 Mountain Furii

Field survey, April 2017

Figure 3.6 Mountain Buba

Field survey, April 2017

Figure 3.7 Mountain Qocii

Field survey, April 2017

Figure 3.8 Mountain Moglee

Field survey, April 2017

In addition, a snowball sampling techniques were used to locate other members who possessed on IK of SWC practice. Through these two methods, the researcher identified informants to provide the needed information on IK on SWC practices. In this regard, the number of people contacted and determined by the information saturation. According to this, the non-probability sampling refers to objects that selected based on the judgment of the researcher without using statistical techniques (Zikmund, 2003).

3.4.2 Sample size determination

The study used a qualitative type. For the qualitative, the sample size eighty five (seven Focus group discussions with at least seven members of elder people, seven interviewed from each Ganda developmental agent/ experts, Indigenous institution and those elder people through snowball technique for key informant interview were determined and suggested by focus group discussants whom age, experience, social status were taken into account, two from Association for promoting Indigenous Knowledge (APIK), One Head of Sebeta-Hawas Agriculture and Natural Resource). In selecting individuals for key informant interview and focus group discussion as Flick *et al.*, (2000) stated that gaining adequate qualitative data requires pre-selected individuals that should be selected based on their level of knowledge and experience.

3.5 Data collection instruments

There are several ways of collecting suitable data which differ significantly in the context of money costs, time and other resources at the disposal of the researcher Kothari (2004).

Accordingly, the study was employed by undertaken:

Focus group discussions are two ways of communication was conducted between farmers and interviewers in order to make the process of data collection more effectively and selected in consultation of developmental agent. In this way, the Ganda elder dwellers that were involved in SWC practices should ask questions on the objective of IK SWC Practices.

Key informant interviews are largely used instrument for data collection was interviewed with carefully constructed Snow-ball sampling method used for accessing informants through the contact information that was provided by focus group discussants to select elders who have lived

in the area for a long time, active and knowledgeable of their localities were selected. Accordingly, fourteen key informants were selected from seven Gandas. And

Observation: Direct field observation was employed by the researcher to collect first-hand information. Field observation was aimed at understanding indigenous practices; an indigenous way of resource/ tools utilized and natural topography. For this study, the term "non-participant" observation was used in the sense of observing the ongoing activity of farming, writing notes about it and interviewing the participant in audio, video and pictures of the activity at a convenient time. General observation was started while writing the proposal and continued onto the whole process of data collection to make sure the validity of acquired information.

In doing this, the English version of the interviews and focus group discussions were translated into the study area community language, which is Afaan Oromoo with moderators in order to be in touch easily and gain full information from the respondents.

3.6 Methods of data processing and analysis

In analyzing the data, the researcher employed both qualitative data analysis techniques. The data collected making sense of the text; audio, video and visual data were analyzed systematically using triangulation to increase the reliability, credibility and validity of the research findings. As a result, the qualitative data collected was 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 socio-demographic characteristics of the rural farmers' and the respondents in general were analyzed by using descriptive statistical tools such as (percentages, table and bar graph).

3.7 Data quality control

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. This was done to ensure the questions are clear and flow in a logical manner. Also reliability of the interview and focus group discussion was censured by asking the same

questions to different people to ensure the answers are the most similar. Check out questions and put a further way similar questions were used to cross check the validity of responses.

3.8 Ethical consideration

Ethical issues should be an important consideration in the design and conduct of research. This research was not enforced and deceived the participants. It does not involve people without their knowledge or consent. It keeps the privacy of each participant. The information gathered is used only for the purpose of conducting this research and the researcher did not use bias over the data when extracting it from their sources that increased one's confidence in providing conclusions and recommendations. Among the most serious ethical concerns that have received attention recently is the assurance that participants are voluntarily involved in the research and are informed of all potential risks (Creswell, 2013). Accordingly, an implied (verbal) consent Creswell, (2013) was used in this study to collect data from the participants through a tape recorder and field notes. In this study, a formal written letter from the Department of Information Science, Jimma University has been used to communicate with FSZ Agriculture and natural resource office, Sebeta-Hawas Agriculture and natural resource office and Nongovernmental organization working on IK. A support letter was written by the Bureaus to their respective offices at zone level; and a similar letter was written by the Aanaa to the Gandas. More importantly, officials of (Aanaa, Ganda and Gooxii) who were facilitated conditions for data collection. They were identified the appropriate places to go and persons to contact. With the help of those moderators, identified the informants before collecting data, always conducted discussions with the informants for the purposes of research and how confidentiality would be maintained even though many of the participants were eager to share their experiences.

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Socio-demographic Characteristics of the Respondent

The respondents of the researchers were farmers who practices indigenous methods of soil and water conservation and stakeholders in SWC like Indigenous institutions, Developmental Agents from Governmental organization and Association for Promoting IK from non-governmental organization. Based on the methodology section focus group discussions were created by selecting farmers from each "Ganda" The researcher conducted the group discussions with these farmers. Then the data were analyzed based on the objectives of the study by including the socio-demographic characteristics of the respondents. The following table 4.1 shows the Socio-demographic of the respondents.

The total sample sizes of the respondents were **85**, sixty eight farmers (Group discussions and key informant interview), Seven from Developmental Agents / Expertise, Seven from Indigenous Institution and religion, two from association for promoting IK, and one Head of Sebeta-Hawas agriculture and natural resource office.

Table 4.1 Socio-demographic of the respondents

Socio-demographic characteristics of respondents			
		No	%
Age range Based On the Gadaa system	≤ 48	5	5.88
	49-56 Yuubaa I	3	3.53
	57-64 Yuubaa II	42	49.41
	65-72 Yuubaa III	14	16.47
	73-80 Gadamoojjii	6	7.06
	≥ 81 Jaarsa	15	17.65
Sex	Male	80	94.12
	Female	5	5.88

Experience in years	≤ 20	10	11.76
	>20 ≤ 40	44	51.76
	> 41	31	36.47
Education	Illiterate	47	55.29
	Basic Education	16	18.82
	Elementary	10	11.76
	High school	2	2.35
	Diploma & above	10	11.76
Marital status	Married	77	90.59
	Widow	3	3.53
	Divorced	1	1.18
	Single	4	4.70
Family size	≤5	11	12.94
	>5 & ≤10	51	69.12
	>10	23	27.94
Farm size	≤ 2.5Hectares	56	65.88
	>2.5 & ≤ 5 Hectares	15	17.65
	> 5 Hectares	14	16.47
Religion	Waaqqeeffata	11	12.94
	Muslim	-	-
	Orthodox	64	75.29
	Catholic	-	-
	Protestant	10	11.77

As it was stated in table 4.1 above the family size of respondents ≤ 5were 11 (12.94 %), the number of family size of respondents > 5 & ≤10 were 51 (69.12%) and the number of family size of respondents ≥ 10 were 23 (27.94%). The farming and working experience of the respondents was less than 20, 40 years and greater than 41 years were 10 (11.76%) and 44 (51.76%) and 31 (36.47%) respectively. The respondents' family size, farm size and farming/working experience were measured in terms of their involvement in agriculture development. It was high practice and wide participation paves a way for plenty try and error in

the daily activities of their livelihood. As a result, it was facilitated the IK acquisition, sharing, storing and using practice in soil and water conservation practices. As Warren, (1991) land is the backbone of IK and Herweg, (2002) IK in soil management have a significant role to overcome labor shortage and optimize farm operations.

Regarding to their educational status, 47 (55.29%) of them were illiterate, 16 (18.82%).of respondents were basic level of education, 10 (11.76%) of them were elementary level of education 2 (2.35%) of them were High school level of education and 10 (11.76%) of them were diploma and above level of education therefore most of the respondents educational status were illiterate and the study shown that IK in soil and water conservation practiced by illiterates whom they were shares orally and preserve in their mind and practice where as not codified generally IK of soil and water conservation practiced is tacit knowledge of plenty researches confirmed that IK is a tacit knowledge.

Related to the religions, 64 (75.29%) of the respondents were orthodox, 11 (12.94%) of the respondent were Waaqqeeffata and 10 (11.76%) of the respondent were protestants. According the respondent there were the indigenous religion Waaqqeeffata and its practice as a result the existence of Indigenous knowledge is directly related to the indigenous religion of the people on specific territory (World Bank, 1998)

As presented in the above table and bar chart below, 80 (94.12%) of the respondents were male, whereas 5 (5.88 %) female. Also $\leq$ 48, 3,(3.53%) which were Active, 49-56 Yuuba I; 42, (49.41%); 57-64 Yuuba II; 14, (16.47%) 65-72 Yuuba III; 3, (7.06%) 73-80 Gadamoojjii and 15, (17.65%) 81-88 Jaarsa. As a result, the majority of the study participants were male and elders.

As a result, these studies have shown that the sex and age of the IK holders of SWC practice were elder males and they do have influence on their rural communities' agricultural development in general and on daily activities of IK in SWC practices in particular. As revealed by body of literature, elder males and Males in general have high involvement and participation over IK in SWC practice and are high for decision making than their counterparts. Several sources also showed that the age is considered as one factor the IK holding ability of people.

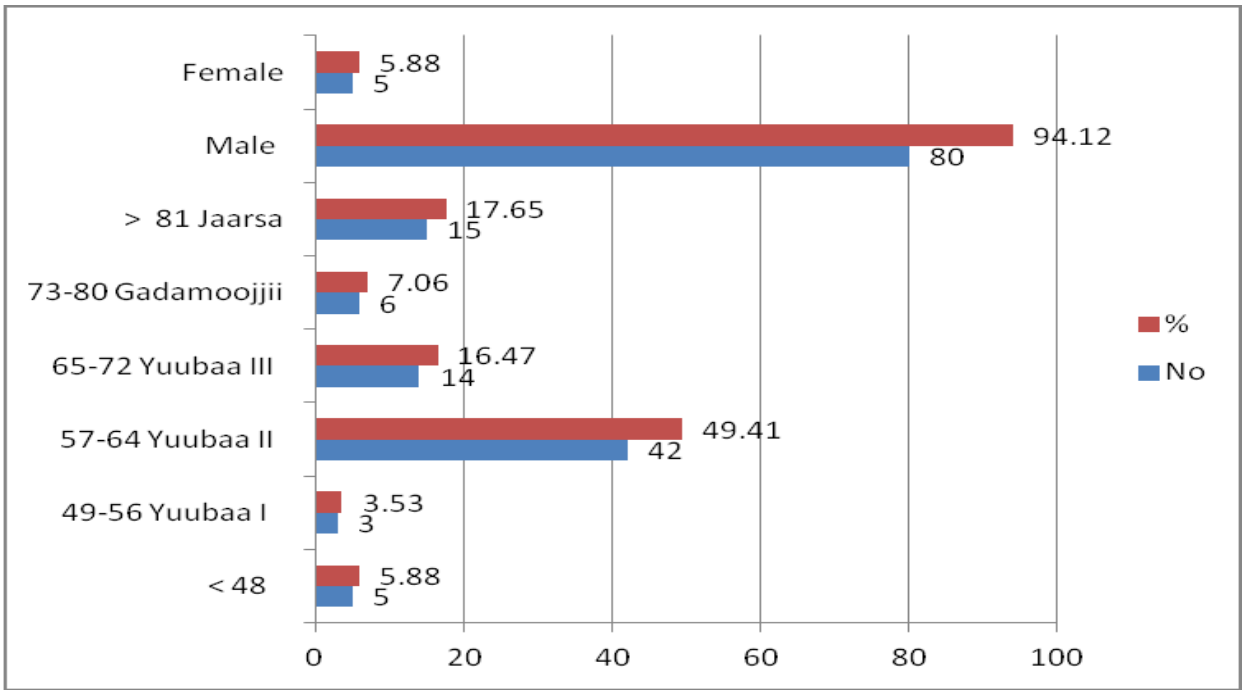


Figure 4.9 Sex and Age range of the respondents

Field survey, April 2017

For instance, Mundy and Compton, (1995) and Haverkort, (1995) states that the level of indigenous knowledge ones possesses varies greatly and is a function of age, gender, experience, profession and personality. Korea, (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). Moreover Battiste, (2002) stated that indigenous knowledge is both empirical (based on experience) and normative (based on social values and norms).

4.2 Perception of IK of SWC

According to data collected from the study area, the perception of soil erosion as a hazard to agricultural development tremendously underlined and awarded on all focus group discussions. They have gained enough awareness about the benefits obtained and the disadvantage from IK of SWC practices. On the other hand, when farmers do not acknowledge and practiced IK of SWC, erosion as a problem, they will not expect sustainable life (both spiritually and economically in agricultural production) from it inversely true if they do. Practically the way of addressing it was

differentiated in one or other way sloppy land (*lafatabba)*, swampy land *(lafa bishaanii*) high rainfall etc..

According to the participant of FGD discussants, as a farmer and community member of Ganda Gora Harkisoo he said that "I have positive perception towards indigenous SWC since my childhood my father persuades soil and water by song known as Geerarsa said

"*Bishaan koo; Bishaan keenya;*
Biyyeen koo; Biyyee keenya;
Jiraachun kee; Jiraachuu kooti"

The *Geerarsa* seems like to be "My dear water; Water of us
My dear soil; Soil of us
Your continuation to exist is; our existence"

As a result, he had seen and memorized always the change against soil and water in his life. He perceives that if he does not engage in such things in SWC practice. He will be the loser and sin in front of GOD *(Waaqaa*). In the same way other participants strengthen the idea in proverb (*mammaaksa*) he said that:

"*Bishaan Burqaa faalessee Bishaan Lagaa Dhuga*"

To say that almost like "polluted the spring water, he/she will drink the river water" It showed that *waaqaa* to be punished immediately in response of the sin if they polluted the water.

The perception of the farmers for water more concreted by *mammaaksa* as

"*Haadhaa fi bishaan badduu hin qabdu"*

The meaning it seems like a mother and water is never bad which is integrated with individuals whom never and ever should not bad as a result, everyone in the rural community interrelated the water directly with his/her mother.

In the same way one of the discussants mentioned that "he was doing heartfelt in the IK SWC practice because he was touched, he was seen what it was coming in their day to day agricultural works. Therefore, he assured highly agricultural productivity has got IK in SWC practice but that

it is better if the practice is supported by government especially to minimize the struggle to nature because it consumes much time and in other way IK SWC treats what a modern/ Science mechanism fails to treat" i.e. organic agricultural production another discussant strengthens this idea saying that IK SWC should be encouraged because it is the base of our philosophy of living with Waaqaa to us as the society of Oromo which it was integrated with our culture, religion, and belief with specific law of natural resources *(sirna qabeenya uumamaa*) it includeded water, soil i.e. it came from the Gadaa system as a whole.

In Another FGD discussant also raised that "one of the most basic requirements for us is the nature i.e. the water, the soil , the forest etc. including we human beings which we describe as ring finger which we depend on that our hand have five fingers (*tokko shanee*) those fingers described as first finger fine things hope and peace second finger nature which Waaqaa provide us third finger the taller finger indicated challenge and obstacle bigger than whatever we have forth finger the pinpoint for action to address the problems which identified and the fifth finger it is the big finger seems Sirna Gadaa that is a way to control all the fingers. Also female participations which were indirectly partaking in IK SWC practice because they were perceived to make them tired and infertile. For this reason, Females abstain from the practice, but, incorporating themselves, made a thin local beer *farsoo* from millet or sorghum, a thick local beer *boordee* from millet or sorghum, mead *daadhii* and thin local bread *buddeena* and also thick sourdough bread known as *cumboo* which were indigenous foods and drink of the society in the study area to accelerate the work and to keep the moral of Ingenious SWC practices. Generally the majority of respondents talked indigenously about the perception of soil and water sensitively in diverse ways of expression even though it fits each other

As Abay, (1999) states that, when the farmers' awareness and perception of soil erosion is high, it must be that soil degradation has reached critical level. This is because soil erosion is a gradual process which cannot be easily noticed. Farmers in the study rural area seem to have realized that their agricultural lands are being degraded by soil erosion. This indicates the IK in SWC practice appear in acquiring, sharing, storage and using becomes a practice in agricultural development.

4.3 Types of IK SWC practices

4.3.1 Water sources of the Study Area

According the farmers of the study area, the Indigenous sources of water in the study area classified into four and its usage illustrated in the table 4.2 below

Table 4.2 Indigenous source of Water

No	Sources of water	Usage	Indigenous method of conservation	Examples
1.	*Bishaan Rooba* (Rain water)	For seasonal plantations	*Daagga ijaaru, boo'ii Baasuu, fi Biqiltuu Dhaabu* (Terrace, Canal and Planting).	*Bokkaa Gannaa* (Winter Rain)
2.	*Bishaan Burqaa* (Spring water)	For Drinking, Household and Irrigation	*Boo'ii, Baasuu, fi Biqiltuu Dhaabu* (Canal and Planting)	*Burqa Gamie, Burqa Balie.*
3.	*Bishaan Eela* (Ground water)	For Drinking, Household and home gardening	*boo'ii, Baasuu* (Canal)	Available Per-household
4.	*Bishaan lagaa* (River)	For Household and Irrigation plantation	*Daagga ijaaru fi boo'ii Baasuu* (Terrace and Canal)	*Saabata,Wajtu Bali, Qocii* etc.

4.3.2 Indigenous classification of soil

The rural community of the study area categorizes the soil into three types based on the color and its name has called "*Bayeen"* at the beginning. These classifications are *Biyyeen Kooticha/Gurachaa* (Black soil)*, Bayern Gumburee* (Red soil) and *Biyyeen Daalacha/Kakisaa/ Challo* (Mixed soil). It was discussed separately below:

4.3.2.1 *Biyyeen Kooticha /Gurachaa* / Black soil

Biyyeen Kootcha/ Black soil is a dominant one in both of the study areas also water logging is higher than the other types of the soils. From the first week of July till end of August plowing and planting *xaafi* (Eragrostis tef) and sometimes *Baaqila* (Faba beans), and up to September 12/19 *Misir* (Lentiles), *shumburaa* (Chickpeas), *qamadii* (wheat), being sown in line to protect the soil and water which appropriate use of water and minimize the washing away of the soil. This type of soil is as depicted in figure 4.10 below.

Figure 4.10 *Biyyeen kooticha/ Gurachaa/* Black soil

Field survey, April 2017

4.3.2.2 *Biyyeen Gumburi* /Red soil

Biyyeen Gumburi/ Red soil 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 and also to easily remix with manure (cattle dungs). From May 19 up to the first week of July plowing and planting crops such as *qamadii*, *Baaqila, Misir and Garbuu* the most appropriate crop was *qamadii* 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. *Biyyeen Gumburi* looks like as depicted in figure 4.11 below.

Figure 4.11 *Biyyeen Gumburi/* Red soil

Field survey, April 2017

4.3.2.3 *Biyyeen Dalaacha/Kakisaa/Challo*/ Mixed soil

According to the farmers, *Biyyeen Dalaacha /Red* soil covered a small part of the study area; water logging is low also most of it swampy land (*lafa bishaanii*) it is used for irrigation practice. From May 19 up to July 5 ploughing and planting of crops such as *qamadii*, *Baaqila, Misir, Boqqoolloo* and *Shumburaa, Gayoo* and *Nugee* through considering the to protect the soil and in the first rainy days similar to the case of the Mixed soil/*Biyyeen Dalaacha* type they build (*bo'ii)* canals to control soil erosion. This soil type is as shown in the figure 4.12 below.

Figure 4.12 ***Biyyeen Dalaacha/Kakisaa/Challo/*** **Mixed soil**

Field survey, April 2017

Biyyeen Gumburi (Red soil) and *Biyyeen Dalaacha* (Mixed soil) have similar behavior in plowed and planted where as *Biyyeen kooticha* (Black soil) radically differ from other type of soil .Therefore Indigenous type of soil classification has an impact on SWC practice.

For instance soil color and texture were commonly used by farmers to describe soil quality (Abera and Belachew, 2011) understanding indigenous knowledge of soils has come to be seen as essential in understanding the local realities of farmer and may be critical for the success or failure of agricultural development.

4.3.3 Indigenous naming of the seasons

According the farmers of the study area, the years classified into four seasons which are *Birraa* (spring), *Bona* (summer), *Arfaasaa* (autumn) and *Gannaa* (winter). It was discussed below as follows.

4.3.3.1 *Birraa* (Spring)

The season is included the months of *Fulbaana, Onkololeessa* and *Sadaasa* (September, October and November*)*. It is the harvesting season, *onkololeessa qoticha* (first plowing) which is break the soil to preserve the rain water and moisture in line with majority observations were taken for IK SWC practices to be working in the coming season.

The ceremony of *Irrechaa* is celebrated in *Birraa* annually as thanks giving to *Waqa* for helping the people through the rainy and muddy season of *Gannaa* to a bright season. During the ceremony of *Irrechaa,* a song that is sung to thank *Waqa* is known as *Marewoo*

"Hooyaa mare woo, mare woo, mare woo,
Alaa manaaf nuutolii yaaaayyolee woo"

Consequently, in this, the coming of the New Year and the wish for the New Year is expressed. The other significance of *Irrechaa* is the creation of an opportunity for the Oromo people to meet at this place and manifest their culture, greet one another and share IK as the sense of belonging at large.

4.3.3.2 *Bona* (Summer)

The season is included the months of *Muddee, Ammajjii* and *Guraandhala* (December, January, and February). It is the dry season and some easy works of IK SWC practices were worked during these Bona seasons. The forest grass was burned naturally as well as by the farmers, meanwhile highly conserved soil during *Arfaasaa* in line with given good agricultural production and cattle feeding grass.

4.3.3.3 *Arfaasaa* (Autumn)

The season is included the months of *Bitootessa, Ebla* and *Caamsaa* (March, April and May). It is the rainy season and *Ebla qoticha* (first plowing) which is break the soil to preserve the rain water and moisture and to *Gannaa* works of IK SWC practices were worked during these *Arfaasaa* seasons for the appropriate and practical actions taken by the farmer.

4.3.3.4 *Gannaa* (Winter)

The season is included the months of *Waxabajjii, Adoolessa and Hagayya* (June, July and August). It is the rainy season and majority works of IK SWC practices were worked during these *Gannaa* seasons for the appropriate and practical actions taken by the farmer.

According to the data obtained from *Aanaa* Sebeta-Hawas Agricultural and natural resources office, the time of performing agricultural activities depends on the season of cultivation, agro-climatic zones, and the type of crops produced in the district. In the study area, the SWC period varies from 90 days in a *Birraa* season to 120 days in *Arfaasaa* season in line with the agricultural calendar and considering the condition of rainfall.

The Aanaa has its own agricultural calendar accordingly the farmers IK of SWC has been practiced (Table 4.3).

Table 4.3 Agricultural calendar of Anna Sebeta-Hawas, Finfinnee Special Zone

No	Type of Activities	*Arfaasaa* (Spring) season	Farmers, Indigenous SWC practices	*Birraa* (Autumn) season
1.	*Lafa qopheessuu fi qotisaa* (Land preparation)	March-June	*Wal barsiisuu* (Showing to peer/ community the problems the mechanisms to resolve and sharing the indigenous knowledge*)*	February-April
2.	*Facaasa* (Sowing)	June-August	Frequently engaged and using the indigenous knowledge in the daily activity of the farms	March-April
3.	*Aramaa* (Weeding)	July-September	Rarely engaged and using the indigenous knowledge	April-May
4.	*Haamaa fi Homishu* (Harvesting)	September-January	Identifying the problem and Acquiring/collecting The indigenous knowledge to discuss the problems among themselves	July-August

Source**:** Anna Sebeta-Hawas Agricultural and natural resources office (2017)

4.3.4 Tools used for SWC

During SWC the communities use different tools. Indigenous tools were used by the farmers of the study area before the Italian occupation of 1930s and those post Italian tools known since the Italian occupation. Some of the tools are listed and explained in the below table 4.4 and table 4.5.

Table 4.4 Indigenous tools

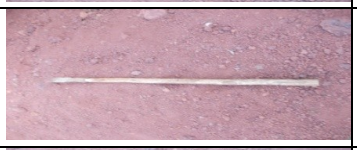
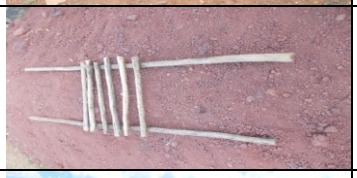
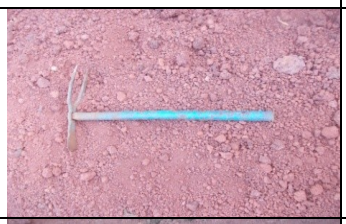
No	Name	Figure	Used
1.	*Dhagaraa*		To cut a tree which it uses for SWC
2.	*Qooto /Kotkottuu*		To cultivate (manage) the plants/tree which used for SWC
3.	*Gasoo*		To dig the land for SWC practices
4.	*Hordaa*		To make the land strong which it digs to place woods, stones for SWC practice
5.	*Gajaraa*		To cut the plants /trees /grass to reshape the canals, traces and also to remove weeds which it uses for SWC
6.	*Aka bataa / Dhagaa baataa*		To transporting heavy stones to build the traces in SWC
7.	*Aadaa qotisaa* (*kuni hundi mala qonnaati*)		To plowing the land repeatedly based on the conditions of rainfall and also remixing the manure to preserve soil and water i.e. *Erfiii, ginda,Ragati,wagala,Marasha, Batatie, Tikirtee, Sangot, Harkota, Manakia, Marara, Mukofgna, Sanga Alanga*

Table 4.5 Post Italian tools

No	Name	Figure	Used
1.	*Doomaa abbaa gurra sadii /afurii* axe (Pick)		To break up /dig the land and to collect soil from canals for SWC practices
2.	*Doomaa* (Mattock*)*		To dig and level the land in order to build *Daagga ijaaru, boo'ii Baasuu* /canals and traces/ for SWC practices
3.	*Marajaa* (Sledge hammer)		To break down a stone to build traces for SWC practices
4.	*Kotkotto* (Dibber)		To make level the land into building trace for SWC practices
5.	*Akaafaa* (Spade)		To disseminate/applying natural fertilizer/ manure/ in the given land, to full soil in building traces, To lift soil and keep going the water in the canal
6.	*Jaambaa* (Hand Hoe)		To direct water through the canals, to extract soils which were available inland waterways and for cultivating land or weeding crops

4.3.5 Types of grasses for SWC

Table 4.6 Available grass naturally

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

According the study participants they used different type grass for IK SWC practices based on the condition of the rainfall and thus *Qaca/Citaa/ and Saardoo* in table 4.5 if the rain is less to preserve the moisture and protect the soil and *Coqorsa, Chaffee, Ashufee and Urorii/Kuni* are used in high rainfall to preserve the soil and water. Generally, they are called as *Joroo*. For instance Farmers in Kerala and Kamataka states of India have used *vetiver* grass for more than a century for protecting Ponds from erosion (Warren, 1991).

4.3.6 Indigenous Fertilizations for SWC

According to data collected from the respondent's, there were two types of organic fertilizers, which are *Kumburs* and *Ciicata* prepared in dry and wet seasons. When farmers were collected the solid and liquid waste of livestock (cow, donkey, goat, sheep), dry leaves on the surface of the land and digging a sort of land to preserve, they called it *Kumburs* also parking and feeding on the farmland their own, relatives and voluntary member of the community which they called it *Ciicata*. Most of the time, the farmers prefer cow dung because it has given an immediate response in their agricultural productivity.

Table 4.7 Indigenous Fertilizers for SWC

No	Name	Figure	Used
1.	*Kumbursi /Kosii / (kurkuri, Fando, Okie,Finchani,* and baala, marga)		To rehabilitate the affected soil, it is homemade natural fertilizer, but it needs transport
2.	*Ciicata*		To rehabilitate the soil, it is a way of parking and feeding the domestic animals in farmland in order to drop its waste, no need to transport

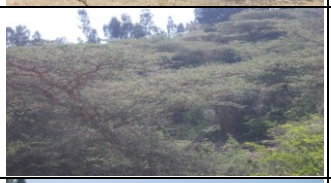
According the farmers Kumburus and Ciicata as Organic manure in the form of compost is being used in the study areas in order to improve and maintain the fertility and productivity of soil. Application of organic manure is considered as a long term work of the farmers. According the farmers, it was found that more manure is applied in (*Jiddu galee'ssa gara dirrira fi tabba)* moderate to flat and gentle slope where the erosion rate is low or there is no erosion. Also, manure is applied more in the soil with medium fertility as they found no response by applying manure in low fertile soil. Also, manure is applied more in the soil with medium fertility as they found no response by applying manure in low fertile soil. The Farmers mentioned that it was difficult to apply manure too far away plots due to the lack of transportation. In such cases, they used to hire animals from a neighbor and used to transport manure. From the survey also, it was

found that distance matters for the manure application as most of the manure applied is near to the homestead (up to 10-15 min walking distance from home).

According Mahapatra, (1983) *Rah* is a traditional system of seed bed cultivation practiced in the past in Thana district of Maharashtra state with the use of wood, twigs, leaves, grass, and cow dung with earth on top. This system was appropriate in the past, given the existing ecology and the level of development of technology. Even now a well-regulated utilization of forest resources for *Rab* may be sound from the viewpoint of preservation of soil fertility and a pollution-free environment.

4.3.7 Planting different types of plants for SWC

Table 4.8 Planting different types of plants

No	Name	Figure	Used
1.	Planting trees surrounding the board of farmland		To protect the farmland from erosion
2.	Forests of *Korie/Grarr*		- Increase the fertility of soil, protect from erosion - Help in the conservation and -Preserve water.
3.	*Hargissa*		To protect the farmland from erosion
4.	*Sokorruu*		To protect the farmland from erosion
5.	*Goraa*		To protect the farmland from erosion at the farming season used for soil fertility

Farmers in the study area plant different types of trees which were indigenous (*Dhumugaa, Ebichaa/Rajii, Oddessa, Laftoo*) and exogenous tress (*Bahirzafii* the most one) since the soil erosion was a problem to conserve the soil and water in the same way those planted trees were high water consuming plants like an exogenous tree and to preserve the soil In general these plants are drought tolerant, not edible and therefore not destroyed by animals in the area. Another advantage is that farmers use these to mark the border between adjacent fields.In similar way Trees planted above and below crop fields 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) respectively according our farmers' experience of IK in SWC practices.

4.3.9 Using different Indigenous methods for SWC

Table 4.9 Indigenous methods

No	Name	Figure	Used to
1.	*Lafa badaa*		The farmland was left empty for 3-5 years; it used to be the most common method of improving the soil fertility, but now rarely applied because the farmers have limited farmland.
2.	*Daagaas* (Terraces)		It was built with stone and soil from top to bottom to retain the soil on each stage minimize the speed of the water preserve it accordingly

3.	*Mukkaan Halaya Hidu (Mukka bargamoo, Qoree , Hargissa, Quncee, Wadaroo ,Hida, chichita buttutuu*)		It was built with any type of wood which was easily available to recover largely/ widely affected farm land in order to preserve the soil
4.	*Dalga qotuu/qotamaa* (Horizontal farming*)*		It was farming practices to protect the soil and retain water for its appropriate use
5.	*Bo'ii Baasuu*		To suitable preservation of the soil and appropriate use of water.
6.	*Bulloo*		To harvest and minimize the speed of water and to preserve the soil
7.	*Laga hidhuu*		To preserve the water , used the water for irrigation and avoid soil erosion
8.	*Hora*		To preserve the water for planted on irrigation, The animal watering and to calm down the soil from erosion.

9. *Sanyii jijjiiranii facaasuu* / Crop rotation are a common and simple practice in both of the study areas. All the farmers in both areas are practicing crop rotation as a traditional way of Indigenous SWC practices and 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*, *Baqellaa – Atar – Baaqelaa*. They have been doing this since a long time for better production of their agriculture works.

10. *Waliin malkaa facaasuu/* Mixed farming is a rarely and simple practice of growing two or more crops on the same piece of land either at the same time or within some intervals. In both of the study areas. All the farmers in both areas are practicing to help crop rotation as a traditional way of Indigenous SWC practices and 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' mixed farming practiced most of the time for crop which include *baaqella –goyaa* and *Qamadii – Xaafii*. Waliin malkaa facaasuu looks like as depicted in figure 4.13 below.

Figure 4.13 *Waliin malkaa facaasuu* /Mixed farming

Field survey, April 2017

4.3.10 Indigenous Irrigation Practices for SWC

According the farmers of the study area, Irrigation is one of the ways of indigenous SWC practice. There are two sources for practice on irrigated farmlands from Spring water *Burqa Gamie* and *Burqa Balie* and the other one rivers which are tributaries of Awash, Sabata that are join up of *Wajtu*, *Biliqai*, *Moglai, Sanbo* and Qocii the name has given Sebeta which mean that ribbon by such rivers.

Figure 4.14 Burqa Gamee

Field survey, April 2017

The farm land at the tail of the spring water and the rivers were adjacent to *Burqa* and *Bishan laga* for irrigation the places are named Ataballa , Dima Magono and Dimma Guranda has been more of flat ever some parts of the farm lands adjacent to the rivers affected by the industries (Meta Brewery, flower farms . Factories plastic, Liqueur, leather et.c.).

Figure 4.15 Sebeta river

Field survey, April 2017

According the farmers in irrigated farm land in earlier times *Abba guya* aperson who was assigned for water use and maintenance on a given day and *Abba herrega* who was assigned for over all water management the spring water and the rivers and also *Jaarsuma* whom was cooperation group for daily watering now a days there is *tokko shanee* (one to five) over all activities management of spring water and the rivers all the members including the leader scheduled the irrigation activities also if there was a problem they go and discuss on gandas based on the Gadaa system in former times their grandfathers were gone to *Odaa* resolved their problems and conflict through *Seera bishanii* (water rule) based on the Gadaa system.

There are two most types of Indigenous SWC practices in irrigation were available in the study area as follows:

4.3.10.1 *Adaa Daaga Qotuu* /Indigenous waterways

Adaa Daagaa qotuu/ Indigenous waterways are a common practice in the study area also to protect the farmland from being damaged by overflow of water that comes from assured direction. From the discussion and key informant interview, it has been generalized that the farmers have long years of experience in preparing the waterways due to their nature of

topography, but farmers could not practice this method on a flat area (when the slope of their land is at the same level).

The *Daagaa qotuu* are build mainly by *Weedduu hojii* 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 that the knowledgeable person leads specially the Jaarsa leads the group work he share the knowledge, if it was some difficulty acquire from the group some people of the group preserve in mind through theory and practice, some suggest by default the knowledge was created from try and error there were accelerators they were used such as sirba (songs) *geerarsa* etc. The *Daagaa qotuu* had two stages in the study area *biyyee* (soil) and *marga* (grass) waterways. The second stage grass, paved waterways were too little/no soil erosion where as the first stage some soil was eroded up plant grass strengthen. The grass waterway protected, damaging effect of water overflow as a result, it takes full advantage of the agricultural development of the community of the study.

Figure 4.16 Daagaa qotuu

Field survey, April 2017

4.3.10.2 *Adaa Boraatii qotuu* /Indigenous Cutoff Drains

Adaa Boraatii qotuu /Indigenous waterways are an indigenous cutoff drain is the most important and widely practiced indigenous soil conservation in the irrigation 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 were built across the indigenous waterways, which were 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 farm plot. Farmers to conserve the soil from the power of the water killed and to allow excess water to infiltrate easily and drain out of the farmland.

Figure 4.17 Adaa Boraatii qotuu

Source: Field survey, April 2017

Most of the soil in the irrigated area of the study was *Biyyeen Chelo* (mixed soil) which comes through soil degradation from the mountainous area, also the farmers planting different vegetation, crops sometimes planting grasses if excess of water emerged because of deflecting the new train infrastructure which accelerates the power of the water grass planting to preserve the soil.

Figure 4.18 Grass plants

Field survey, April 2017

Figure 4.19 Irrigation practice

Field survey, April 2017

4.4 Factors affecting IK Practices on SWC

4.4.1 The Expansion of Town and Urbanization

There are private and governmental housing in the study area, which is in large scale for different services. At present large scale condominium housing is the typical characteristic of the previous farmlands of the area as shown in figure 4.20 and figure 4.21. Condominium blocks buildings clustered in groups in a compound where communal facilities (open spaces, parking area and communal buildings) are provided as a result the IK of SWC practice departed with the rural community. As mentioned by SHFEDO, (2015) more than 55% of the farmer households have owned less than 1.5 hectares of landholding per a household size in the study area because of urbanization.

Figure 4.20 Expansion of Finfinnee

Field survey, April 2017

Figure 4.21 Urbanization

Field survey, April 2017

There were a series of conflicts being observed between the Addis Ababa city and the surrounding farm communities, specifically the source of the conflict being on land use issues. Consequently, according the Ethiopia Broadcasting Corporation, (2016) referencing the Directorate of Government policy and research center one of the researchers said based on their research in titled "Good governance and fair distribution of wealth in Ethiopia" that quoted in their finding were

"የምን ማስትሬት የምን ዶክትሬት

ትንሽ ይበቃሃል የሰበታ መሬት"

It means that "a piece of land more

enough than M.Sc. and PhD."

Based on finding above Aanaa Sebeta-Hawas have shared border with Addis Ababa, which affected the living conditions of the rural communities of the study area in IK SWC practice through Land conversion and land loss, forest, spring water and rivers under threat, including the rura1 ecosystem beyond these the settlers they had not adjusted themselves in the IK SWC practice of the rural communities.

4.4.2 The Globalization and Nationalization

Globalization is over all the global impact of the western society in every way of the livelihood of the society in schooling, in culture, in industry, etc. Greatly affected the IK SWC practice and Nationalization-is the modern establishment of Ethiopia by itself its own deteriorations on IK SWC practice. Government bureaucracy represents its own custom and practice in recent times, nowadays even imposed in different mechanisms from those Federal government institutions set up in the study area, National/Federal government highways, train and in land, construction of commercial buildings, residential houses, real estate development and industrial zones not considered or consult the public at large.

As Labonte, (2011) definition, "globalization, defined at its simplest, describes the constellation of processes by which nations, business and people are becoming more connected and interdependent across the globe through increased economic integration and communication exchange, cultural diffusions (especially of Western culture) and travel." Mazrui, (2001) stating that although the term "globalization" is new, the actual process started centuries ago, fuelled by four major engines: empire building, economy, religion and technology and the one tremendously affect the developing world the Cultural globalization 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, unscientific knowledge. To sum up Das, (2011) states 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 hand, 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.

The industrialization as well as constructions deep in the farmland in the study area was shown in figure 4.22. Contrary to the SWC of IK, such industries are releasing their waste products into the environment and pollute the area (figure 4.23). In general, the expansion of the Capital city as well as the industrialization is threatening IK of SWC in the study area.

Figure 4.22 Industrialization

Field survey, April 2017

As the figure (4.23) below showed that Sebeta River polluted because of the industries available in the Sebeta-Hawas which are Meta brewery, leather factory, liquor factory, flower farms, etc. and sewerage of Sebeta Municipality immediately, it responded in the irrigation practice of the adjacent rural communities of the river in their agricultural production of vegetation, crops etc. and affected the livelihood of the farmers as a result the it extinct the practice of ingenious knowledge of their irrigated lands for SWC practice.

Figure 4.23 Polluted Sebeta River and its impact

Field survey, April 2017

Figure 4.24 Highways

Field survey, April 2017

Figure 4.25 Railway

Field survey, April 2017

4.4.3 The Weakening of indigenous institution/Gadaa System

The farmers of the study area confirmed traditionally, the Oromo is known for their age-grade organization known as the Gadaa system, and by their religious institution known as Waaqeffanna. These two institutions control the everyday life of the society, including SWC and agriculture as a whole. For example, SWC practice is deeply rooted in the Gadaa system and Waaqeffanna i.e. it is unthinkable among the community to cut down trees, to polluted water, to see degraded soil in specific.

In recent days the Gadaa System plays a major role in IK SWC practice 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 differences in between the formal and the indigenous institution in IK SW conservation practice. However, with the expansion of Christianity, Islam, Civil war and the

consequent repressive ruling for long time imposed on the society caused the IK SWC practices were greatly deteriorated.

Figure 4.26 Indigenous institution

Field survey, April 2017

The Oromoo political culture is based on a system known as the Gadaa (Legesse 2000). The Gadaa is a system of classes (Luba) in which male individuals succeed each other every eight years. The Gadaa has 11 age-grades: Dabballee (ages 0-8), Folle (8-16 years of age), Qondaala (16-24 years of age), Kuusa (24-32 years of age), Raaba Doorii (32-40 years of age), Gadaa (40-48 years of age), Yuuba I (48-56 years of age), Yuuba II (56-64 years of age), Yuuba III (64-72 years of age), Gadamoojjii (72-80 years of age) and Jaarsa (80 and above years of age) (Legesse 2000).

The Oromoo believes in one Supreme Being known as Waaqa, which literally means God. The people believe that Waaqa is *Uumaa* (a creator) of all things; the created things are referred to as *Uumamaa* (creatures). The Oromoo believes that Waaqa put everything in order and if anybody breaks his order, it results in sin, which in turn leads to punishment. They also believe that

Waaqa can punish anyone who commits sin because Waaqa 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 (Legesse, 2000).

Figure 4.27 Conserved areas around indigenous institution
Field survey, April 2017

As Warren stated that strengthening the capacity of indigenous institutions can greatly facilitate sustainable approaches to development (Warren, 1992)

4.4.4 The Population growth

Farmers of the study are area too much aware about the population growth which they stated at first point their own family size and their responsibility to share the farm land with their children if it were not possible the children have the right to received a land from the Ganda communal land which should be Forest/grazing e.tc secondly their own land shrinking because

different governmental projects especially for housing and merging to nearby urban settlements thirdly they addressed there were new settlers through investment and government willingness to share the communal land therefore it should have a consequences of deforestation overgrazing as result there were soil erosion in line with these there were impossible to practice the IK SWC for agriculture development.

4.4.5 Mass media

In the study area based on FGD identified that there were no Radio transmission and publications in Afaan Oromo there were even a few farmers have television, but there were no television transmission service, except one Oromia Television in Afaan Oromo as a result it limits IK specifically to acquire, to share, to store and to use in SWC practices.

Figure 4.28 Notice for the rural community

Field survey, April 2017

As we are shown in Figure 4.28 above, the researcher observed as simple as but it was critical about the notice it were questioning again who are the user of these notices board? He replied again, a few one used it easily, even those learnt.

For instance, scholars such as Boykoff and Rajan (2007) assert that the mass media is still the main source of information and opinion for millions of readers and viewers through newspapers, magazines, television, radio and the Internet. This view was also confirmed by the results of the focus group discussions and interviews with stakeholders who revealed that the mass media is a leading source for acquiring, sharing, storing, and using IK.

4.5 Contemporary IK practice mechanisms for SWC

According the key informant and the focus group participants of the rural community of the FSZ the IK practice in SWC performed through different mechanisms they used for IK Acquisition, IK Sharing, IK preserving and IK using practices always performed activities of their livelihood in SWC practices. According to one of the key informants "IK creation through tremendously try and error, we created the IK for day to day activities in agriculture, which were specifically for soil and water conservation practice the same is true, but sometimes we get the IK by default the defaults were from practice" Whereas for transferring IK one study participant said

"*Oggaanani Jedhu waanaan jedhu*
ijooleen ana jalaa qabachaa deemti
biyyaa aadaatii"
To mean that "I told to my Children then
gain and understand the IK, It is culture"

Another study participant has an argument on the issue of children's learning from elders through using proverb (*mammaaksaa)*

"*Warqeen harkaa qaban sibiila jedha Oromoon*"
"Gold with a hand seems like a piece of iron to its owner says Oromoo"

In order to indicate how his children and young generation, they did not give emphasis on receiving indigenous knowledge from his fathers and elders from whom able to provide them easily. According to the farmers, their fathers and the grandfathers' thought them the IK in theory and practice the same is true the elders thought the children. The faith of all the respondent farmers the children's in the community is the children of the society whatever they do and they say if it were positive they said (*jadhee)* keep up and support them if it were

negative (*lakkii*) No and consult them based on the tradition of (*Jaarssa biyyaa)* elders of the society. The indigenous knowledge, practice mechanisms of the study area are presented in table 4.10 below.

Table 4.10 Indigenous knowledge, practice mechanisms

No	Type of IK practice mechanisms	Acquisition	Sharing	Preserving	Use
1.	*Weedduu sabaa* (Public song)				Significant
2.	*Durdur /seenaa* (History)	Significant			
3.	*Faaruu* (Spiritual song)				Significant
4.	*walaloo* (Poems)		Significant		
5.	*Suunsuma* (Humorous poem)			Significant	
6.	*Hibbo-Hibbaka* (Conundrum)			Significant	
7.	*Geerarsa* (Heroic tale)				Significant
8.	Oduu durii odeessii (Traditional stories)	Significant			
9.	Weedduu hojii /Jigii (work songs)		Significant		
10.	*Ciigoo* (sabooka-soorgo- Soorko)			Significant	
11.	*Mammaaksa* (Proverb)		Significant		
12.	*Sirba* (song)				Significant

Based on the above table 4.10 there were ways for IK practices in SWC in FSZ When IK acquiring for SWC practice the rural community of the FSZ significantly using the *Durdur/seenaa* (History) and *Oduu durii odeessu* (traditional story). In acquiring IK there were top down approach they pursue according the seniority in age, knowledgeable and the traditional system of the FSZ society.

For IK Sharing for SWC practices were *Wal barsiisuu* thought each other among in similar Gadaa age and knowledgeable of the rural community of the FSZ significantly uses *walaloo* (poems), *Weedduu hojii /Jigii* (work songs) and *Mammaaksa* (Proverb)

For IK Preserving for SWC practice the community of the FSZ significantly uses *Suunsuma* (humorous poem), *Hibbo-hibbaka* and *ciigoo (sabooka-soorgo- Soorko*) (hand in glove)in order to measure the IK it stored in his/her mind and *sammuukoo hin raftuu* (not forgotten).

For IK using for SWC practice the community of the FSZ significantly uses *Weedduu sabaa* (folk song), *Faaruu* (Spiritual song), *Sirbaa (*song) and *Geerarsa* (heroic tale). The IK practiced used through incorporating themselves, for instance clap their hands, Jumping, acting with hand stick, words *shshshsh*: *ashkikiee* etc. as a result it accelerated their work and motives.

According to Grenier, (1998) indigenous knowledge is stored in people's memories and activities and is expressed in stories, songs, folklore, proverbs, dances, myths, cultural values, beliefs, rituals, community laws, local language and taxonomy, agricultural practices, equipment, materials, plant species, and animal breeds. Indigenous knowledge is, hence, shared and be in touch orally. Communication of indigenous information takes place through folk media, folk drama, storytelling, and interpersonal communication. The primary purpose of these media and channels, however, may not have been communicated, but they interacted to form a network which constitutes the information environment (Mundy and Compton, 1995). IK is shared and communicated and understood orally using specific examples and through cultural practice (Grenier, 1998). Indigenous knowledge is embedded in culture in various forms such as cultural practices, customs, traditions, religions and spiritual beliefs, ceremonies, folk stories, folk songs, legends and proverbs (Battiste, 2002). It is basically transmitted through oral tradition, not in written form (Lwoga, and Ngulube, 2008).

4.1 A framework for Incorporating IK into SWC practices

According the study, the farmers possess a lot of Indigenous Knowledge with respect to SWC practice. The study also showed that indigenous knowledge's are found to contribute significantly to productivity and sustainability for the agricultural development. It is also essential that this knowledge incorporated into culture, belief and language of the society, the Gadaa system and as well as the governmental (Sebeta-Hawas agricultural and natural resources offices) and Nongovernmental organization like APIK (Association for promoting Indigenous Knowledge).

The farmers in the study area categorized themselves *Tulama Oromoo*, as one of the clan of the Oromoo it has sub clans which were *Dachii* it includes *Galan ,Aboo, Sodo* ; *Bachoo* it includes *Eiluu, Mataa, Wajituu, Garasuu, Kiaaku & Ouruu* and *Jili* it includes *Gonna ,Gossa, Loyaa, Warie,Sibaa and Ginddo* as well as classified further up to house level (*Mana)*. The farmers

made their representative up to the *mana* level for their Oromumma known, practiced for their age-grade/Luba/ organization known as the Gadaa system, and by their religious institution known as Waaqeefanna and had *Abba Gadaa and Abba Muuda/Kaluu* leaders respectively. These two institutions control everyday life of the society through the *Jaarmiyaa* (congress) about the economy, social, political, religious and other. Hence, the indigenous Knowledge of SWC practice has its own indigenous rule which was cascading from the Gadaa and Waaqeefanna. SWC touches all the *Jaarmiyaa* specific *Seera lafa (*law of land*)*, *Seera bosonaa* (law of Forest) and *sirna qabeenya uumamaa* (law of natural resources). SWC practice is deeply rooted in the Gadaa system and *Waqefanna*. Farmers in the study area, as mainly rural societies, are religious and spiritual people have unique knowledge and Socio-cultural interpretations concerning their Indigenous Knowledge of their soil and water, they integrated into the Agricultural development and implemented and practiced to respond their community problems.

Regarding to the Governmental organization, the Agricultural developmental agent and Experts there were top down approach they follow in SWC practices, whereas they respect the farmers IK in SWC practice but they were not supported as much as possible.

As for the Nongovernmental organization, APIK leaders they were underlined the assumptions in to three which were some people want only IK practice, Some people want only Science and Technology/ Western knowledge/ but APIK set the two perspectives were considered as a result APIK was founded in December 1998 by committed Ethiopians. Its members have wide experience in research and project management and are composed of different academic disciplines. The Association was registered with the Ministry of Justice as a local NGO in May 1999. APIK one of its consideration is agriculture, specifically SWC since the establishment two international conferences were conducted and plenty publications were in different IK practices. Its motto is “Little knowledge transferred to many people is as great as the number of recipients” (APIK, 1999).

According the APIK leadership the association addressed its objective through the mechanism of scientific investigation and close examination and appreciation of the environment in order to make both adults and youth are proud of their country, people and their indigenous knowledge.

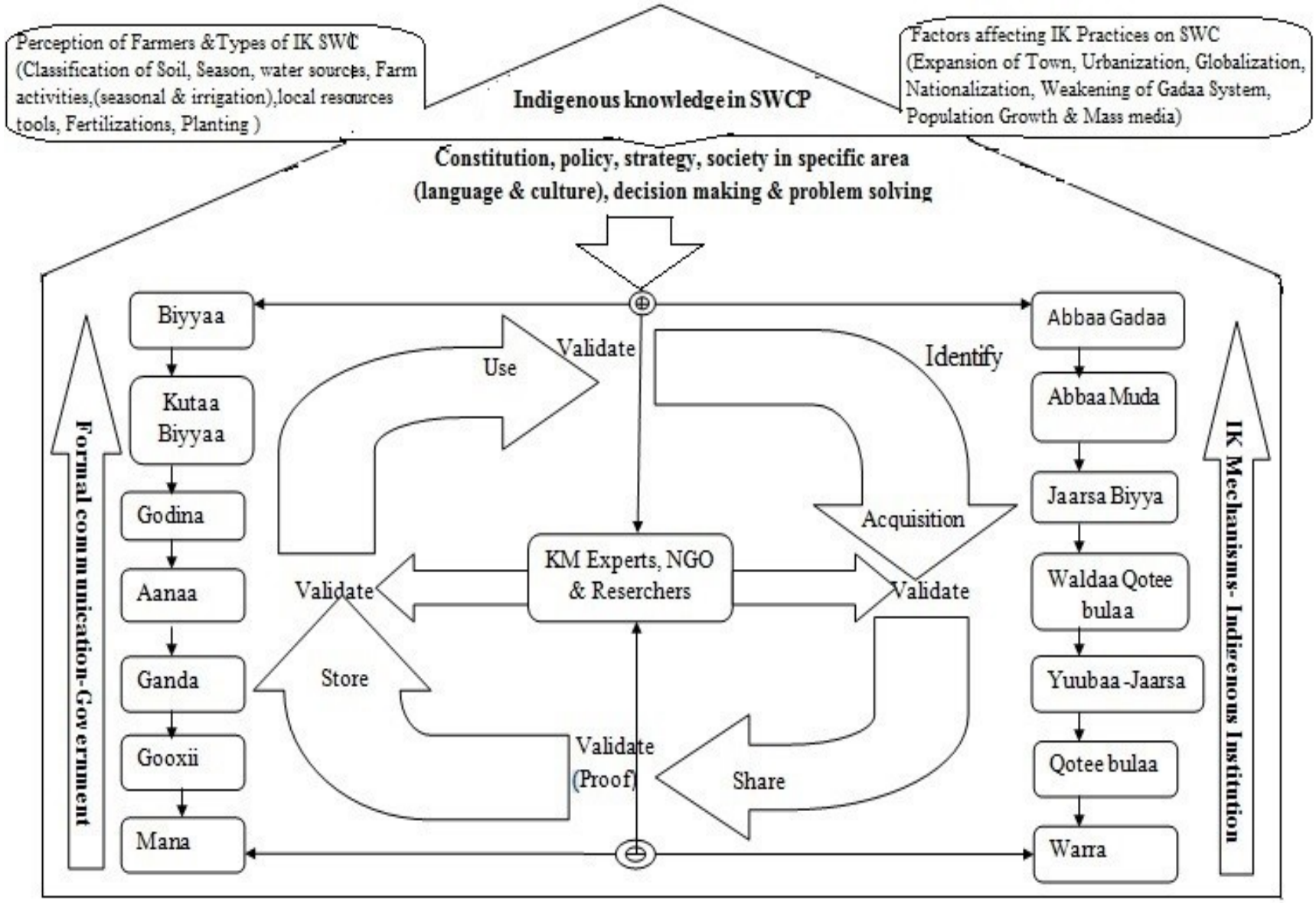


Figure 4.29 A proposed Framework of IK in SWC practice for Agricultural development

According the Figure 4.29 a Framework of IK in SWC practice for Agricultural development stated there are levels in left formal government organization and right sides Indigenous Institution which are as follow:

The levels are categorized into seven in both sides

- From *Manna – Gooxii – Ganda – Aanaa – Godina – Kutaa Biyya – Biyaa* (House level Block – Sub district – district – Zone – Region – Nation)
- From *Warra – Qotee bula – Yuubaa _ Jaarsa – Waldaa Qotee bula – Jaarsa Biyya Abbaa Muda* – Abbaa Gadaa (Family – Farmers – elders – Farmers Association – Elders association – Indigenous religion leader – Indigenous Institution leader).

Both levels were integrated within and each other the communication mechanisms hierarchical However, they follow formal based from the big constitution and based on it documents in written where as informal IK Mechanisms- Indigenous Institution based from the Gadaa system as a whole the ways are (*Weedduu sabaa , seenaa , Faaruu, walaloo ,Suunsuma , Hibbo-Hibbaka, Geerarsa , Oduu durii odeessii ,Jigii , ciigoo (sabooka-soorgo- Soorko), Mammaaksa, Sirba*) and specifically *Seera lafa* (law of land), *Seera bosonaa* (law of Forest) and *sirna qabeenya uumamaa* (law of natural resources) respectively.

The indigenous knowledge management process rotates forward by acquiring, sharing, storing and using process with identify, validate and proof of IK, KM experts play the role in facilitating the activities KM process, recommended possible technology and infrastructure, NGO have the role financing the research, promoting and disseminating the outcomes and researchers based on the identified, validated and proofed of the IK practices in capturing, recording and analyzing the trends of IK to set a theory and a concept. All the activities done based on constitution, policies, society (Language and Culture) of Specific area, and deal with the factors affecting the IK SWC practices.

Finally the Evaluation of the framework was made through face to face and telephone with Developmental agents / experts, APIK and professionals. However, participants were available only on the result and discuss in person for the applicability Framework as an ultimate point they proved the framework is possible. Generally, this framework is strongly informed by a transformed common sense that farmers' engagement of indigenous knowledge into SWC practice is essential for achieving the agricultural development.

CHAPTER FIVE
CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Based on the major findings of the study, a number of implications could be derived from the IK SWC practices. Fundamentally, the conclusion has also given direction for the general practice of IK for SWC practice including the present times.

Oromia is the biggest Regional State in Ethiopia and has diverse types IK. IK for SWC practice has enormous economic benefits. However, despite the existing enormous potentials of production and subsequent benefits of these indigenous practices, no due attention has been given to improve their conservation, preservation, rehabilitations so far.

The types of IK in SWC practice were mainly based on the color and natural phenomena respectively. In other word, the classification of soil was easily defined in a clearer way, such as *Biyyeen Kooticha*, *Biyyeen Gumburiee* and *Biyyeen Dalaacha* where as the classification of water were *Bishaan rooba, Bishaan burqaa*, *Bishaan lagaa*, *Bishaan eela*. As a result of the practice of IK in SWC practice was persuaded and influenced by the perception of both socio-cultural and religious. This has further implications that studying the typologies of the IK in SWC practice seeks to start from the purpose for which the IK in SWC practice used by the farmers. On the other hand, it has the implication that assumes the researchers in this field or issues face difficulty to put clear conclusions except providing trends of practices. Thus, studying such issue requires seeing and perceiving in multi-dimensions and including the religious issue is mandatory, especially to study the history IK practice of the Oromoo people.

The farmers were using different mechanisms to acquire, share, store and use IK in SWC practice which were *Weedduu sabaa* (public song), *Durdur/seenaa* (History), *Faaruu* (Spiritual song), *walaloo* (poems), *Suunsuma* (humorous poem), *Hibbo-Hibbaka*, *Geerarsa* (heroic tale), *Oduu durii odeessii* (traditional story), *Weedduu hojii /Jigii* (work songs), *ciigoo* : *sabooka – soorgo - Soorko* (hand in glove), *Mammaaksa* (Proverb) and *Sirba* (Music). Farmers were using through employment of different means that enables to transform it easier to use and treat soil and water.

The possession of the IK in SWC practice was mostly limited to Farmers and natural resource experts who knew the process of conserving by acquiring the skills from older people. The skill of IK in SWC practice was shared through involvement, and practice in conserving the soil, preserving the IK in SWC practice in their minds at the individual level. The process of using the IK knowledge was so systematic for the community to benefit the society it was open practice to every farmer.

Farmers, natural resource and knowledge managers of IK in SWC practice encountered a number of constraints such as, lack of Mass Media in Afaan Oromoo, population growth, weakening of Indigenous Institution (the Gadaa System and *waqefennan)*, the Globalization/Nationalization, the 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 IK in SWC practice were using their experience that might have been ineffective in acquiring, sharing, preserving and using IK in SWC practice. In other word, the above statement has the message for current generations to take a policy action that is proactive and comprehensive in its nature.

Despite the potential benefits derived from the practice IK in SWC practice, a sizable number of the rural community and the importance of the practice seem to have been ignored. There was a limitation of coverage on the part of the Government on the extent of potential socioeconomic benefits IK in SWC practice, which was evidenced by the lack of interventions targeted to improve the use IK in SWC practice, and to address the problems encountered by the community, and most importantly, failure to provide information to the rural communities on the media outlets in their language, namely Afaan Oromoo for IK in SWC practices in the study area.

A comprehensive, sound and context specific framework was not in place as implied from different studies. This study has the direct implication that assumes a comprehensive, sound and context specific implementation framework could be developed to allow the IK in SWC practice and other interested bodies to use in a relatively in a similar manner that simplifies how, when, where and for what purpose to use the IK in SWC practice. This is to mean in a sense that improves indigenous knowledge in soil and water conservation practice in acquiring, sharing, storing and usage.

5.2 Recommendations

The finding of the study explicitly implied that there were problems in IK in SWC practice, capturing, recording and documenting of IK of SWC practices. This resulted in various problems related to provision indigenous institution/Gadaa system at large, religion, culture, language and custom of the society clearly not developed historically. Currently, the modern information and knowledge society, IK have been given emphasis since a decade except reaching the conclusion that holds there are some problems in capturing that is mostly explained through broad terms. This calls in turn and requires all the concerning bodies to contribute their respective efforts and the recommendation given are better to put in IK in SWC practice.

Recommendations for Farmers, Natural Resource and Knowledge Management Experts

Different entities or organizations, whether Governmental or Non-Governmental, should contribute in its respective sphere of objectives and goals. Thus, it is strongly recommended that these sectors/entities advisable to:

- Create conducive environment for IK in SWC practices and professionals so that they will work together hand in hand complementing each other.
- Establishing commission of IK and strengthening from federal up to Ganda with responsible staff of IK in SWC practices to extend the works of IK.
- Encouraging assessments and researches in the area of IK in SWC practices;
- Institutionalizing the practice of IK in SWC practice that may reflect for farmers bottom to top IK process;
- Included in future studies the comparison of the expenses and return of IK in SWC practices;
- Continuous follow up enables to capture IK in SWC practices that help keep the IK on the track.
- Acquire special attention and support from the financial and economic development sector in ensuring how budgets are accelerated the sector.
- Obtain professional and material support from the culture and information communication sector to enhance researches in this area.

- Plan for support of the sector from voluntary and NGOs that have been serving in different area of social issues and service are as land degradation is one of the communities' vital issues, in their scope.
- Stimulate the government in encouraging the practices of acquiring, sharing, preserving and using IK among the existing farmers, natural resource and knowledge management experts, researchers and all other stakeholders.

Recommendations for future studies

Like any other studies, this study has inevitably its own limitations that should seek attention by future studies, and researchers who are interested to conduct research in this area. Furthermore, the information generated will also inform future validation studies, so as to increase the acceptability of IK in SWC practices both nationally and internationally.

- This study did not consider the modern SWC practices, but only collected/ capture some tools. Therefore, future studies should better include and analyze this concept for better understanding of trends that exist in the practices of IK.
- The acquisition, sharing, storage and usage, the status of IK in SWC practice requires the contribution and participation of different professionals or generalists from different field of studies and experiences. This researcher would like to recommend future researchers to do with a team of multi-disciplinary professionals, by integrating their respective skills, which may help to implement the framework for decision making.
- The future study should also consider incorporating various technologies like Knowledge based system, case based system, hybrid system for effectiveness and efficiency of IK in SWC practices.
- It is also better to recommend the upcoming researchers should focus their work on policy and strategy for better utilization of IK in SWC practices.
- This study did not focus, in detail, the impact of modernization on IK in SWC practice usage and the future study should incorporate if he/she needs better analysis and widen the scope of the study.

References

Abay, F., Haile, M. and A. Waters-Bayer (1999). Dynamics in IK: innovation in land husbandry in Ethiopia, *Indigenous Knowledge and Development Monitor*, 7(2), 14–15.

Abera Y. and Belachew, T. (2011). Local Perceptions of Soil Fertility Management in Southeastern Ethiopia. *International Research Journal of Agricultural,* 1(2), 064-069.

Addis T. (2014). The role of indigenous knowledge and practice on water and soil conservation management Albuko Wereda, south wollo, M.A thesis, School of Graduate Studies, Addis Ababa University

Alemayehu, M, (1992). The Effect of Traditional Ditches on Soil Erosion and Production. *Soil Conservation Research Report* 22(33), University of Bern, Switzerland and Ministry of Agriculture, Bern and Addis Ababa.

Allameh, M., Zamani, M., & Davoodi, S. M. R. (2011). The relationship between organizational culture and knowledge management. Procedia Computer Science, 3, 1224–1236.

APIK, (1999). Association for the promotion of indigenous knowledge founding manual, Addis Ababa, Ethiopia

Assefa, A. (2007). Impact of Terrace Development and Management on Soil Properties in Anjeni Area, West Gojam, M.A thesis, School of Graduate Studies, Addis Ababa University

Barquin, C. (2001). What is Knowledge Management? Knowledge and Innovation: *Journal of the KMCL,* 1(2), 127-143.

Battiste, M. (2002). Indigenous knowledge and pedagogy in first nation's education Unpacking 'ethno-finance': an introduction to indigenous 'financial' knowledge systems, *Canadian Journal of native education,* 22(1), 16–27.

Belay T. (1998). Potential and limitation of indigenous structural soil conservation technology of Welo, Ethiopia: Eastern Africa.

Boykoff, M.T. and Rajan S.R. (2007). Signals and noise: mass-media coverage of climate change in the USA and the UK. *EMBO Rep*, 8(3), 207–211.

Bray R.J.C. and Els, G. (2007). Unpacking 'ethno-finance': an introduction to indigenous 'financial' knowledge systems, *South Africa Journal of information management* , 9(1), 1–10.

Central statistics agency of Ethiopia, (2007). Population and Housing Census of Ethiopia, Addis Ababa: Ethiopia

Choo, C.W. (1996). The knowing organization: how organizations use information to construct meaning, 5, 329-340.

Creswell, J. W. (2013). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Thousand Oaks: SAGE Publications, Inc.

Das, G. A. (2011). Does Indigenous Knowledge have anything to deal with Sustainable Development? *Antrocom Journal of Anthropology*, 7(1).

Day, R.C. (2005). Clearing up implicit knowledge: Implications for knowledge management, information science, psychology, and social epistemology: *Journal of the American Society for Information Science and Technology,* 56(6), 630–635.

Dei, G.J.S., Hall, B.L., and Rosenberg, D. G. (2000). Indigenous knowledge in global contexts' multiple readings of our world, Rosenberg, University of Toronto Press, Toronto Canada

Directorate of Government policy and research center [Ethiopian Broadcasting Corporation Television Broadcas]. (2016). Challenges of good Governance in Ethiopia, Addis Ababa: Ethiopia.

Emeagwali, G. (2014). Intersections between Africa's indigenous knowledge systems and history: African indigenous knowledge and the disciplines.1-17, Rotterdam, Netherlands: Sense Publishers.

Fairhead, J. and M. Leach, (1994). Reversing Landscape History: power, policy and socialized ecology in West Africa's forest -savanna mosaic, (93)1, 481-512.

Fanthun, T. (2016). Indigenous Knowledge in Ethiopia: The Untapped Resource; PROLINNOVA-Ethiopia, Agri-Service Ethiopia, Addis Ababa.

FDRE, (1995). The Constitution of the Federal Democratic Republic of Ethiopia: Addis Ababa: Ethiopia.

Feleke, T. (2003). Urban Development and the displacement of rural communities around Addis Ababa, Paper presented at the workshop on Settlement and Resettlement in Ethiopia, Addis Ababa: Ethiopia.

Feyera, A., (2005). Urban Expansion and the Livelihood of the Peri-urban Agriculture. Addis Ababa: Ethiopia.

Firestone, J.M and Mark, W. M. (2005). Doing Knowledge Management, *Journal of Learning Organization,* 12(2), 1-29.

Flick, U., Ernst von, K. and Ines, S. (2000). An introduction to qualitative research. London: Sage.

Fujisaka, S. (1986). Participation by Farmers, Researchers, and Extension Workers in Soil Conservation. IIED Gatekeeper Series No. 16. International Institute of Environment and Development: London.

Grenier, Louise. (1998). Working with Indigenous Knowledge: A Guide for Researchers. Ottawa: IDRC.

Hart, T., & Mouton, J. (2007). Indigenous knowledge and its relevance for agriculture: a case study in Uganda. Indilinga: *African Journal of Indigenous Knowledge Systems*, 4(1).

Haverkort, 8. (1995). Agricultural development with a focus on local resources: ILEIA's view on indigenous knowledge. The cultural dimension of development, 454 - 457. London: Immediate Technology Publications.

Herweg, K (2002). Indigenous soil management, In Encyclopedia of Soil Science (pp. 679-682). Marcel Dekker, New York.

Hofstede, G., Namenwirth, Z. and Weber, R. (2007). Society and culture: (219-223). Westport: McGraw-Hill/Irwin.

Johnson, M. (1992). Capturing traditional environmental knowledge. Ottawa, Canada: IDRC.

Kanno, A. (2005). An ancient people, great African nation: The Oromo. As recounted by Martial De Salviac, Finfinnee: Reprinted with permission by Oromia Culture and Tourism Bureau.

Kapoor, I., (2005). Participatory development complicity and desire. Third World Quarterly, 26 (8), 1203-1220.

Kidwell, J.J., K.M.V. Linde and S.L. Johnson. (2000). Applying corporate knowledge management practices in higher education, Educause Quarterly, 4, 28-33.

Kora, E. (2005). Protecting indigenous knowledge systems: Earth year: *Journal for Sustainable Development,* 2, 44-46.

Kothari, C. R. (2004). Research Methodology: Methods and Techniques. New Age International New Delhi: India.

Kruger, H.J, Berhanu F, Gebere Michael Y., Kejela, K (1996). Inventory of indigenous soil and water conservation measures on selected sites in Ethiopian Highlands. Soil Conservation Research Report 34. Centre for Development and Environment, University of Bern , Switzerland.

Labonte, R. (2011). Globalization, Health and Development: The Right Prescription? Retrieved March 8, 2017, from: http://www.idrc.ca/en/ev-67832-201-1-DO_TOPIC.html,

Langil, S. (1999). Introduction to Indigenous Knowledge, Jadpur: Student edition.

Legesse, A. (2000). Oromo democracy: an indigenous African political system. Lawrenceville, NJ: Red Sea Press.

Lwoga, E. T. (2011). Knowledge management approaches in managing agricultural indigenous and exogenous knowledge in Tanzania. National Agricultural Library, Sokoine University of Agriculture, 67(3), 407–430. Morogoro: Tanzania.

Lwoga, E. T., and Ngulube, P. (2008). Managing Indigenous and Exogenous Knowledge through Information and Communication Technologies for Agricultural Development and Achievement of the UN Millennium Development Goals, 73–88. Berlin: Walter de Gruyter.

Lwoga, E.T, Ngulube, P. and Stilwell, C. (2011). Challenges of Managing Indigenous Knowledge with other Knowledge Systems for Agricultural Growth in sub-Saharan Africa, 61(1), 226–238. Berlin: Walter de Gruyter.

Macionis, John J. (2007). Society: The Basics. Philadelphia: Pearson.

Mahapatra, L.K. (1983). Swidden Cultivation in Asia. Bangkok: UNESCO, Regional Office for Education in Asia and the Pacific.

Mascarenhas, A. (2013). Indigenous knowledge, livelihood and development: is a high rate of sustainable growth achievable? Paper read at the Inaugural Tanzanian Biennial Development Forum, Dar es Salaam Tanzania, 24-25.

Mazrui, A. (2001). Pan-Africanism the origins of globalization. Retrieved 3 may 20017, from http://igcs.binghamton.edu/igcs_site/ dirton12.htm.

Merriam-Webster Online, (2016). Retrieved 16 December 2017, from WWW: http://www.webster.com.

Meyer, H., (2003). Communication mechanisms of indigenous knowledge systems: gateway to untapped resources: Mousaion.

Meyer, H., (2009). The influence of information behavior on information sharing across cultural boundaries in development contexts: Information research.

Minang, P. A. and McCall, M. K. (2006). Participatory GIS and local knowledge enhancement for community carbon forestry planning: an example from Cameroon; Participatory Learning and Action 54, 85-91.

Monngakgotla, (2009). Policy makers' knowledge and practices of intellectualpr operty rights on Indigenous Knowledge Systems in Botswana, *South Africa Journal of information management* 11(3), 21–43.

Mulatu, Y. (2013). Indigenous Knowledge Practices in Soil Conservation at Konso People, *Journal of Agriculture and Environmental Sciences*, 2(2).

Mundy, P.A. and Compton, J.L. (1995). Indigenous communication and indigenous knowledge: The cultural dimension of development. London: Intermediate Technology Publications Ltd.

Nakata, M. (2002). Indigenous knowledge and the cultural interface: Underlying issues at the intersection of knowledge and information systems. *IFLA Journal*, 28 (5/6), 281-291.

Ngulube, P. (2002). Managing and Preserving Indigenous Knowledge in the Knowledge Management Era: challenges and opportunities for information professionals Information Development 18 (2), 95-102.

Nonaka, I & Toyama, R. (2005). The Theory of the Knowledge Creation Firm: Subjectivity, Objectivity and Synthesis. Industrial and corporate change, 14(3), 419-436.

Nonaka, I (1996). The Knowledge Creating Company: How Japanese Companies Create the Dynamics of Innovation; New York: Oxford University Press.

Oromia Bureau of Finance and Economic Development (OBFED), (2010). Demographic and Socio-Economic Profile of Oromia, Finfinnee, Ethiopia.

Ramata, M., Worku J. and Rahel, B. (2017). Knowledge Management Strategy for Indigenous Knowledge on Land Use and Agricultural Development in Western Ethiopia, Universal Journal of Agricultural Research, 5(1), 18-26.

Reij, C. (1996). Indigenous SWC in Africa, Gatekeeper Series , 27, 35-36, IIED: London.

Rowland, J. (2004). Is higher education ready for knowledge management? *The International Journal of Educational Management*, 14(7), 325-33.

Sanchez, R. (2000). Tacit knowledge versus explicit knowledge approaches to knowledge management practice, Copenhagen Business School Lund University.

Sebeta-Hawas Finance and Economic Development Office (SHFEDO) (2015). Annual Socio Economic profile and Statistical Abstract Report.

Slade, J. and Yoong, P. (2014). The types of indigenous knowledge to be retained for young New Zealand based Samoans: Samoan grandparents' perspective PACIS proceedings Paper 161.

Smith, E.A. (2001). The role of tacit and explicit knowledge in the workplace *Journal of Knowledge Management,* 5(4), 311-321.

Stewart, Thomas A. (1997). Intellectual Capital: The New Wealth of Organizations. London: Nicholas Brealy.

Syed Ikhsan , S.O.S & Rowland, F. (2004). Benchmarking knowledge management in a public organization in Malaysia," *Benchmarking: an International Journal*, (11), 238-266.

Tandi Lwoga, E. (2011). Knowledge management approaches in managing agricultural indigenous and exogenous knowledge in Tanzania. *Journal of Documentation*, 67(3), 407–430.

Teklu Erkossa and Gezahegn Ayele (2003). Indigenous Knowledge and Practices for Soil and Water Management in East Wollega, Ethiopia; Conference on International Agricultural Research for Development.

Warren, D., Slikkerveer, L. and Brokensha, D. (1995). Introduction to the cultural dimension of development: indigenous knowledge systems. London: Intermediate Technology Publications.

Warren, D.M. (1991). Using Indigenous in Agricultural Development. World Bank Discussion Paper. Number 127. Washington, D.C.USA.

Warren,D. M. and Rajasekaran, B. (1993). Putting local knowledge to good use; International Agricultural Development, 13(4), 8-10.

World Bank (1998). Indigenous Knowledge for Development: A Framework for Action, Washington, D.C.USA.

World Bank (2005). Promoting Local Innovation: Enhancing IK Dynamics and Links with Scientific Knowledge; IK Notes. Washington, D.C.USA.

Zikmund, W.G., (2003). Sample designs and sampling procedures, Business research methods, 3(2): 95-108.

APPENDIX A: - FOCUS GROUP DISCUSSION

Part I: General Information

1) Name……...……District….....…

2) Age range…….....Sex.....Experience.....

3) Education.....Marital status.....Religion….....

4) Family size.....Farm size…….....

Part II: Perception of IK practices of SWC

1) How do you see IK practices of SWC in your community?

_____

_____

2) What is the attitude of your community on IK practices of SWC?

_____

_____

3) What are the motives for IK practices of SWC?

_____

_____

4) Are you interested to engage with IK practices of SWC?

_____

_____

5) What are your experiences on IK practices of SWC?

_____

_____

6) What are the practices that were done before and not done any more for the conservation of soil and water? If any, what is (are) the reason(s)?

_____

_____

7) What are your expectations from IK practices of soil and water conservation?

_____

_____

8) How do you achieve your specific target of IK practices of SWC?

_____

_____

9) What are the attributes like action, size and other shapes the way you see it?

_____

_____

10) How are IK practices of SWC perceived in your community? By older people and by younger ones… Is there a difference in perceiving IK?

_____

_____

Part III: Types of IK of SWC practices in the local community

1) Please list the types of IK of SWC practices in the local community of Finfinnee special zone?

_____

_____

2) Do you have the indigenous/traditional way of classification of soil and water of the local area? Why? How?

_____

_____

3) What is the source of water in your local area? How do you use/conserve it?

_____

_____

4) When do you engage in soil and water conservation, every time? Seasonally?

_____

_____

Part IV: Factors affecting IK Practices on SWC

1) What are the causes/reasons to engage in IK of SWC practices?

_____

_____

2) What are the barriers in the process of IK practices for SWC practices?

_____

_____

3) What is the effect of the expansion of the Capital city on IK practices of SWC? And what do you think are the impacts on soil, water, and agricultural development, such as crop and livestock production?

_____

_____

4) Is there change of the species and diversity of crop or livestock? How about the issue of water pollution and Soil degradation?

_____

_____

5) Is there IK practices to treat the water before using? If so, how? If not and if used as it is, what problem do you face in your community?

_____

_____

6) Who is more exposed to the impact of IK SWC practices? (Rich or Poor) (Children, aged groups/elderly, women, Men) and Why?

_____

_____

7) What challenges (constraints) do you face in using and also not using the various IK Soil and water conservation practices?

_____

_____

8) Please would you like to explain the extent of IK effects on soil , water, agriculture (crop and livestock) of your community?

_____

_____

9) What are the main success factors/reasons for the effectiveness of IK in SWC practice in the community?

_____

_____

Part V: IK contemporary practice mechanisms in the rural communities

1) From where/whom do you acquire IK practices of SWC?

_____

_____

2) When, how and for whom is IK sharing practices of SWC done?

_____

_____

3) When do you use IK practices of SWC? Why?

_____

_____

4) What are the social grounds (the mechanism of sharing of IK) that exist in your community to store Indigenous knowledge practices for SWC?

_____

_____

5) What are the sustainable ways of storages of IK practices of SWC against all odds (challenges)?

_____

_____

6) How did you acquire IK practices from the past generation and how do you transfer it? What are the differences and similarities?

_____

_____

7) How is your readiness to share IK? How about the readiness of the young generation to acquire it?

_____

_____

8) What is the current status of acquiring, sharing, preserving and using IK in your community?

_____

_____

Part VI: Frameworks that exist in rural communities to help Indigenous knowledge, practice of SWC

1) What are your contributions to IK practices for SWC?

_____

_____

2) How does your community interact day by day with natural/social/cultural phenomena with respect to IK practices for SWC?

_____

_____

3) What is the traditional procedure/mechanism of SWC practices in your community?

_____

_____

4) Explain the role of institutions (traditional/cultural) in assisting IK practices for SWC?

_____

_____

5) How does the social/traditional and religious institutions involving in supporting IK practices for SWC?

_____

_____

6) What kinds of involvement exist by those institutions?

_____

_____

7) List the best/top IK practices of SWC that can be learned from your district in SWC?

_____

_____

8) What are the roles of the stakeholders such as local leadership, government, the community, etc. in IK in SWC practices in your district?

_____

_____

9) Are there formal policy/ guidelines of IK in SWC practices?

_____

_____

10) In general what is the contribution of IK practices of SWC for agricultural development in your community?

_____

_____

11) If you have additional information on IK practices of SWC in your community, please state it.

_____

_____

APPENDIX B: - OBSERVATION

1) Natural resources/ Renewable and nonrenewable resources/ & Topography of the area
2) Indigenous knowledge, practices, tools and methods
3) IK soil and water conservation practice availability
4) IK soil and water conservation practice indicators
5) Cultural implication for IK soil and water conservation practices
6) Forms of Indigenous knowledge
7) Constraints to IK soil and water conservation practices
8) Practices of IK for crop and livestock production in the area

APPENDIX C- INTERVIEW

1) Know-how of Indigenous Knowledge?

_____

_____

2) What is SWC Indigenous Knowledge?

_____

_____

3) What is the relationship between IK of Agriculture (crop and livestock production) and SWC practices?

_____

_____

4) What are IK needs and local experiences in SWC practices?

_____

_____

5) What type of IK do farmers require for daily agricultural practices?

_____

_____

6) Common tools/methods of IK in SWC practices?

_____

_____

7) How is agriculture (crop and livestock production) being treated using IK methods in SWC practices?

_____

_____

8) Which methods/ approaches of IK in SWC practices have worked better and why?

_____

_____

9) What are the existing mechanisms of capturing, acquiring, preserving and disseminating IK in SWC practices?

_____

_____

10) What are the problems/challenges and opportunities faced by IK in SWC practices? What efforts have been done to address them?

_____

_____

11) What are the differences and similarities of IK practices of SWC in the past and of the present?

_____

_____

12) According to your view, what is the future of IK practices of SWC in your community for agricultural development (crop and livestock production)?

_____

_____

13) Additional information, if any?

_____

_____

AFANN OROMOO

GUCA MARII GAREE

Qajeelfama 1 ffaa: Odeeffannoo Waliigala

1. Maqaa …… Aanaa…….Ganda…….……..…….....
2. Umurii…….....Saala.....Muuxxannoo.....
3. Sadarkaa barnoota.....Gaa'ila.....Amantaa.….....
4. Baay'ina maatii.....Hanga lafa qonnaa……..….

Qajeelfama 2 ffaa: Ilaalcha beekumsa aadaa bishaanii fi Biyyee kunuunsu

1) Malli beekumsa aadaatin Bishaanii fi Biyyee kunuunsu hawwaasa kee keessati akkamiti ilaalama?

   _____

   _____

2) Bartee mala beekumsa aadaatin biyyee fi bishaanii kunuunsa irratti ilaalchi hawwaasni kee qabu maalfakkata?

   _____

   _____

3) Akka mala beekumsa aadaatin biyyee fi bishaan kunuunsitan maaltu issin kakaasee?

   _____

   _____

4) Mala beekumsa aadaatin biyyee fi bishaanii kunuunsu irrati hirmaachuuf fedha qabda?

   - Eyyeen
   - Lakki

5) Gaffii lakk 4 ffaa Eyyeen yoo jette maaliif?

   _____

   _____

6) Gaffii lakk 4 ffaa lakki yoo jette maaliif?

_____

_____

7) Mala beekumsa aadaatin muuxxannoo ati Bishaan fi Biyyee kununsuun qabdu maal fa'i?

_____

_____

8) Bifa beekumsa aadatin wanti biyyee fi bishaaniitiif kunuunsuf godhamaa ture fi hin godhamne maalfa'i? Kamtu godhamaa hin turres, yoo jiraate sababiin isaa maali?

_____

_____

9) Mala aadaatin biyyee fi Bishaan kunuunsu irraa maal egda?

_____

_____

10) Karoora bifa beekumsa aadaatin Biyyee fi Bishaan kunuunsu kee akkamit galmaan geessaa?

_____

_____

11) Caasaa akkamii fakkeeneegaaf gochaan, hojjan fi boccaa akkami fayyadamtu?

_____

_____

12) Barteewwan mala beekumsa aadaatin biyyee fi bishaanii kunuunsu hawwaasa ke keessatti akkamittin fudhama? Jaarsota, gargageessa gidduti garagarumma qaba?

_____

_____

Qajeelfama 3 ffaa: Gosawwaan mala beekumsa aadaatin Biyyee fi Bishaan hawwaasa keessati kunuunsu

1) Gosawwaan mala beekumsa aadaatin Biyyee fi Bishaan hawwaasa keessati kunuunsu fayyadamta tarreessi?

_____

_____

2) Naannoo keetti gosawwan biyyee fi bishaanii akkka mala aadaatin hiraman qabdu? Maalif? Akkamitti?

_____

_____

3) Maaddi bishaanii naannoo keetii maalidha? Akkamitti gargaaramtu/kunuunsitu?

_____

_____

4) Kunuunsa biyyee fi bishaanii yoom hojjettu? Wakti akkamii?

_____

_____

Qajeelfama 4 ffaa: Gufuuwwaan mala beekumsa aadaatin Biyyee fi bishaan kunuunsu

1) Bifa mala beekumsa aadaatin Bishaani fi Biyyee kunuunsuf sababni keessaan maalidha?

_____

_____

2) Akka ati mala beekumsa aadaatin Bishaani fi Biyyee kunuunsine waanti si dangessan maalfa'i?

_____

_____

3) Baballini magaalaa guddaa bartee odeeffannoo fi beekumsaa kununsa biyyee fi bishaanii irratti jijjiiramni inni fidu maalidha? Biyyee, bishaanii fi guddina qonnaa kan akka oomisha midhaan nyaataa fi horsiisa beeladaa irratti dhiibbaa inni qabu maaliidha jettee yaadda?

_____

_____

4) Mala beekumsa aadaa kana biyyee fi Bishaan kunuunsun jijjiiramni garagarumma midhaan nyaataa fi beeyiladaa dhufu jira? Dhimma faalama bishaanii fi dhiqama biyyee akkamitti ilaalta?

_____

_____

5) Malli beekumsa aadaatin utuu hin fayyadamin bishaan jiraa? Yoo jiraate akkami? Yoo hin turre immoo rakkoowwan akkamii qaba?

_____

_____

6) Mala mala beekumsa aadaattin Biyyee fi Bishaan miidhaa qaba?

- Eyyeen
- Lakki

7) Gaffii lakk. 6 ffaa Eyyeen yoo jette namoota akkamiitu saaxilama? (sooressa ykn hiyyeessa)(Ijoollee, ga'eessota, maanguddoo, dubartii, dhiira)? maalif?

_____

_____

8) Gaffii lakk. 6 ffaa Lakki yoo jette akkamiti?

_____

_____

9) Mala beekumsa aadaattin Biyyee fi Bishaan kunuunsu keessatti rakkowwan akkammiitu si quuaanamee beeka?

_____

_____

10) Hawwaasa kee keessatti jijjiirama mala beekumsa aadaattin Biyyee fi Bishaan kunuunsuun biyyee, bishaanii fi oomisha qonnaa (midhaan nyaataa fi beelada) irratti qabu ibsuu dandeessaa?

_____

_____

11) Mala beekumsa aadaattin Biyyee fi Bishaan kunuunsuuf wantootni galma'ina gargaarsa isiniif ta'an maliidha?

_____

_____

12) Yeroo ammaa kana sadarkaan hawwaasni mala beekumsa aadaattin Biyyee fi Bishaan kunuunsuuf argachuu, daddabarsuu, gargaaramuu fi gargaaramuu maalirra jira?

_____

_____

Qajeelfama 5 ffaa: Mala beekumsa aadaattin Biyyee fi Bishaan kunuunsu haala ittin daddabarsan

1) Mala beekumsa aadaattin Biyyee fi Bishaan kunuunsu eessaa ykn eenyurraa argaattu?

_____

_____

2) Mala beekumsa aadaattin Biyyee fi Bishaan kunuunsu daddabarsu yoom, akkamii fi eenyuudhaaf godhama?

_____

_____

3) Mala beekumsa aadaattin Biyyee fi Bishaan kunuunsu yoom gargaaramtu? Maalif?

_____

_____

4) Haalaa hawaasni mala beekumsa aadaattin Biyyee fi Bishaan kunuunsu ittin waliif daddabarsan maalfa'i?

_____

_____

5) Karaa Mala beekumsa aadaattin Biyyee fi Bishaan kunuunsan kan faallessani rakkoo ta'an maalfa'i?

_____

_____

6) Dhaloota darbanirraa akkamittiin bartee mala beekumsa aadaattin Biyyee fi Bishaan kunuunsu argachuu dandeessa? Akkamittis dhaloota dhufuuf dabarsita? Gara garummaa fi walfakkeenya isaa akkamitti ibsita?

_____

_____

7) Mala beekumsa aadaattin Biyyee fi Bishaan kunuunsu hiruuf qophii hammamii qabda? Qophiin dhaloota ammaa isa kana argachuudhaaf hagam ta'a?

_____

_____

Qajeelfama 6 [ffaa]: Utubaa ykn adeemsa hawaasni mala beekumsa aadaa Biyyee fi Bishaan kunuunsu ittin hojji irra oolu.

1) Gumaacha sochi kunuunsa biyyee fi bishaaniif keessatti issin gootan maalfa'i?

_____

_____

2) Ta'eewwan yeroo yerooti beekumsa aadaa biyyee fi bishaan kunuunsu illaalchisee hawaasni uumaman, hawaassummaan fi barteewwanin godhu maalfadha?

_____

_____

3) Malli/adeemsi barsiifata hawaasa biyyee fi bishaan kunuunsuf fayyadamaan maali?

_____

_____

4) Gahee dhaabbanni kan ammayyaa ykn Aadaa barsifattee kunuunsa biyyee fi bishaanii irratti qaban ibsi?

_____

_____

5) Deeggarsi dhaabbilee hawaasaa fi amantaa kunuunsa biyyee fi bishaanii irratti godhaa jiran maalfa'i?

_____

_____

6) Hirmaannaa akkamiitu yeroo ammaa kana dhaabbilee kanaan godhama?

_____

_____

7) Maloota beekumsa aadaa kunuunsa biyyee fi bishaanii naannoo keessan irraa baratamuu danda'an tarreessi?

_____

_____

8) Ga'eewwan itti gaafatamtootni sadarkaa sadarkaa irra jiran, mootummaan fi ummatni kunuunsa Biyyee fi Bishaaniif godhan jiran maalii?

_____

_____

9) Hawaasa keessan keessatti Qajeelfamni dhaabbataan wa'ee beekumsa aadaa kunuunsa Biyyee fi Bishaani maaltu jiraa?

_____

_____

10) Akka walii galaatti gumaachi beekumsi aadaa kunuunsa biyyee fi bishaanii guddina misooma qonnaa keessatti qabu maali?

_____

_____

11) Odeeffannoo dabalataa beekumsi aadaa kunuunsa biyyee fi bishaanii nannoo kee keessa qabda yoo jiraate ibsi?

_____

_____

GAAFFII FI DEEBII

1. Beekumsa aadaa akkamitti beekta?

   _____

   _____

2. Beekumsi aadaa kunuunsa biyyee fi bishaanii maalidha?

   _____

   _____

3. Walitti dhufeenyi beekumsi aadaa misooma qonnaa (midhaan nyaataa, horsiisa beeyiladaa) fi bartee kunuunsa biyyee fi bishaanii maalidha?

   _____

   _____

4. Muuxxannoon kunnunsa biyyee fi bishaanii naannoo keessa jiruu fi barbaachisummaan beekumsi aadaa maalidha?

   _____

   _____

5. Qonnaan bulaan bartee misooma qonnaatiif beekumsi aadaa inni barbaadu kami?

   _____

   _____

6. Malli ykn meeshawwan dhaabataan beekumsi aadaa bartee kunuunsa biyyee fi bishaanii maalifaadha?

   _____

   _____

7. Tooftaawwan beekumsi aadaa misooma qonnaa (midhaan nyaataa fi horsiisa beeyiladaa) kunuunsan akkamiin kunuunsa biyyee fi bishaniitiif barbaashisu?

   _____

   _____

8. Tooftaawwan ykn maleen beekumsi aadaa fi bartee kunuunsa biyyee fi bishaanii akka gaariitti tajaajilan isaan kami?

   _____

   _____

9. Tooftaawwan yeroo ammaa beekumsi aadaa kunuunsa biyyee fi bishaaniitiif barbaaduu, fudhachuu, eeggachuu fi itti fayyadamuudhaaf barbaachisan maalfaadha?

_____

_____

10. Rakkoowwan ykn mudannoo gama beekumsi aadaa bartee kunuunsa biyyee fi bishaanii keessatti nama quunnaman maalfaadha? Issna kana fufuudhaaf deemsa akkamiitu deemame?

_____

_____

11. Garagarummaa fi walitti dhufeenyi bartee beekumsi aadaa kunuunsa biyyee fi bishaanii duraa fi ammaa maaliidha?

_____

_____

12. Akka ilaalcha keetti gara fula duraatti bartee beekumsi aadaa kunuunsa biyyee fi bishaanii guddina misooma qonnaa (midhaan nyaataa fi horsiisa beeyiladaa) keessatti maal ta'a jettee yaadda?

_____

_____

13. Odeeffannoo dabalataa yoo jraate?

_____

_____

Glossary

Aadaa Beekumsaa: Indigenous Knowledge

Aanaa: District the lower administrative unit next to zone in Ethiopia.

Abbaa Muda: Indigenous religion leader

Abbaa Gadaa: Indigenous institution leader

Biyaa: Country

Ganda: Sub District a fifth administrative unit down from the federal level in Ethiopia.

Godina: Zone

Gooxii: Block

Jaarsa: Elder

Jarsaa Biyya: Elders Association

Kutaa Biyya: Region

Mana: House

Qotee bulaa: Farmer

Waldaa Qotee bulaa: Farmers Association

Warra: Family

Yuuba I – Jaarsa: Elders > 48 years