

## The Role of Indigenous People Knowledge in the Biodiversity Conservation in Gursumwoerda, Easternhararghe Ethiopia

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### ABSTRACT

*The term biodiversity refers the number and variability of living organisms. It also incorporates human and cultural diversity. The Gursum indigenous people and their knowledge on the biodiversity conservation represent one of the oldest traditionally valuable systems in Ethiopia. Indigenous peoples and their socio cultural relationship with biological systems have largely been contributing to sustainable conservation of biodiversity. Lack of awareness and knowledge on the part of the people about biodiversity is one of the major factors that contribute for loss of biological resources. The main objective of this study was to analyze the role of indigenous peoples and their knowledge on biodiversity conservation. For this research key informant interview, Filed visit and informal discussion were carried out to generate primary data. The collected data was analyzed using descriptive statistics such as percentage. Mainly indigenous biodiversity conservation method dominantly owned by Gursum community was home garden/traditional agro forestry practice. And the methods are its own advantage to mitigate environmental problems such as loss of biodiversity and high concentration of atmospheric carbon dioxide. Lack of prioritization for indigenous people due to neglect, decay, as well as destruction of socio-cultural values and their knowledge on the biodiversity conservation were the reasons for the degradation of biodiversity. Therefore, we concluded that evidence of culture; spiritual, social and ethical norms possessed by indigenous peoples have often been determining factors for sustainable use and conservation of biodiversity.*

**Keywords:** *Gursum area, Indigenous knowledge, Indigenous people, Biodiversity;*

### INTRODUCTION

Ethiopia has reach in community indigenous knowledge in a wide range of fields like soil and water conservation, seed selection and preservation, advancement of traditional farm implements, development of appropriate farming systems, and adaptation of effective coping mechanisms withstanding food insecurities through time (Tizita E.E, 2016).It has well appreciated indigenous technologies that have been devised by the community, using their own indigenous knowledge to cope up harsh time and be able to sustain the livelihoods. For instance In Eastern Hararghe, remnants of the Harla civilization could be observed (near Dire Dawa) where improved soil and water conservation practices are still traceable (Norbert et al., 2002). Advanced soil and water conservation in Konso is a well-known living example of strategy to cope up with moisture-deficient soils and is still sustaining the livelihoods of the ever-increasing population (Besha, 2003).Farmers in KindoKoishaworeda (southern Ethiopia) mitigate the problem of declining soil fertility

through organic manuring, a succession of specific crops and short fallow at the lowland (Elias, 2002). Farmers in Tikurso catchments (northern Ethiopia) rank the qualities of their land by using slope, soil depth, soil fertility (quality), agro climatic zones and water logging as criteria (Bekele, 1997).The Borana pastoral community practiced regulated water use through local leaders to conserve water for livestock and human use during the dry period. In general different part of Ethiopian community has its own traditional knowledge system to conserve biodiversity and climate condition.

Most of the Gursum people are one of the Oromifa language speaking groups of Eastern haraghe Ethiopia. The Gursum indigenous peoples perform their cultural practice in their daily life a significant role in the conservation and maintenance of biodiversity. According to DesalegnDesissa, a plant ecologist (2007) who has studied the area, the Gursum's "traditional activities depend on a friendly relationship with the local environment, which frequently contributes to minimizing environmental

disruption and thereby maintaining an overall ecological equilibrium.” Since most of the Gursum communities are pastoral and agro-pastoral they have buffer areas that are off limits to grazing and cultivation. Besides this the community use organic and terraced cultivation and composting practice, which has greatly controlled soil erosion and water pollution and allowed them to cultivate most of their total land area. Careful use of manure as fertilizer is a key to soil fertility throughout the region. According to Desissa (2007), the communities are lead elders and they are apaternal symbol, a protector of communities against misfortunes.” And most study indicated that in range land area the abundance of biodiversity is high as compared to other cultivated areas. In each of the community the elders are responsible for leading community ceremonies and are also considered the “father” or traditional custodian for the rangeland. In this system, knowledge is transmitted to younger generations from stewards of the spiritual life, who hold the community responsible for the protection and well-being of the lands and waters. However, the issues of indigenous peoples, their socio-cultural values and knowledge on the biodiversity conservation are not give emphasis on the government and documented yet not only in the Gursum area but also most part of Ethiopia. Therefore, the main objective of this study was to assess the current situation and analyze the role of indigenous peoples and their knowledge in biodiversity conservation.

## **MATERIALS AND METHODS**

### **Study Area**

The study was conducted in Gursum woreda, eastern Hararghe Zone of Eastern Ethiopia (Figure 1). , Gursum is bordered on the south by Babelle, on the west by the Harari Region, on the north by Jarso, and on the east by the Somali Region. The woreda is located at about 562 km southeast of Addis Ababa. It is delimited a latitude and longitude of 9°21' N 42°24' E Coordinates with an elevation between 1980 - 2049 m.a.s.l.

The mean annual temperature is about 20.2°C, ranging from a mean minimum of 12.8°C to mean maximum of 29.4°C. There is only a slight difference in temperature throughout the year, with the hottest months during April to June (maximum 29.4°C) and the coldest during October to December (minimum 12.8°C). The mean annual rainfall is 740.6 mm year, with

high variation from year to year, ranging from 470.6 mm to 1270.4 mm year. Rainfall is bimodal, occurring from February to April (short rain season) and June to September (long rain season) (Source: National Metrological Service Agency of Ethiopia Data from 2000 to 2015). The livelihood of the local people in the district is based on mixed farming but pastoralism predominates over crop production. The vegetation of the woreda belongs to the Acacia- Commiphora woodland, semi-desert scrubland and evergreen scrub types. There are also riverine woody species in the area that include species of *Acacia robusta* Burch. *Tamarindusindica* L., *Oncobaspinosa*Forssk., *Acokantheraschimperi* (A. DC.) Schweinf. And *Capparistomentosa* Lam. (Anteneh and Demissew,2011).

A total population for this woreda of 171,931, of whom 91,819 were men and 80,112 were women; 12,048 or 7.93% of its population was urban dwellers. The majority of the inhabitants said they were Muslim, with 97.35% of the population reporting they observed this belief, while 2.34% of the population practised Ethiopian Orthodox Christianity (Source: Statistical Abstract of East Hararge Administrative Zone, East Hararge Planning and Economic Development Office. Harar: BirhanSelam Printing Press; 2012).

### **Gursum Indigenous Knowledge**

Gursum indigenous knowledge is knowledge of an indigenous community accumulated over generations of living in harmony with their environment. It is a broad concept that covers forms of knowledge, technologies, know-how, skills, practices and beliefs that enable the indigenous community of the area to achieve stable livelihoods in their environment. It is traditional cultural knowledge that includes intellectual, ecological, technological, and medical knowledge. The Gursum indigenous communities had a vast stock of knowledge on prediction and early warning of rainfall, weather forecasting, time-testing coping mechanisms, food production and storage techniques, and an impressive plant-based pharmacopoeia for both human, plant and animal health. For instance, in the field of prediction and early warning of rainfall, the Gursum indigenous community have a large number of climate monitoring indicators that enabled them to tell such things as the right time to start soil and water conservation practice, to start planting in

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anticipation of the rains or to preserve and store food in anticipation of a dry season as well as help to determine the rainy season (*kirment*) and dray season (*Bega*) in order to plan and design the cultivation and tillage type. These indicators included observation of the movement of sun, moon and star, behavior of animals, birds, reptiles, amphibians, insects, vegetation and trees, celestial bodies, wind sand level of temperatures.

Many of the area indigenous knowledge techniques to environmental conservation included such technologies and practices as shifting cultivation, mixed cropping or intercropping, minimum tillage and agro-forestry, home garden as well as transhumance. These technologies and practices were commonplace and were used with various other methods of land use and management to

promote higher yields and at the same time conserving the environment, this system in agreement with the study done in Gamo district by Tizita (2016).The Gursum indigenous people's mind also possesses detailed information about species of plants, animals, and some microorganisms; they also recognize types of minerals, soils, landforms, vegetation and landscapes. In case of soil, black soil (Tikurafer) which is suitable for growing crops such as sweet potatoes and potatoes. In case of microorganism: they also decide the type of microorganism those are living in soil to decompose organic matter of a soil through using smell of soil and observing the soil color. If the soil have deep dark color and pungent smell, they decide that the soil contain soil microorganism called as Bacteria (Nifusat).

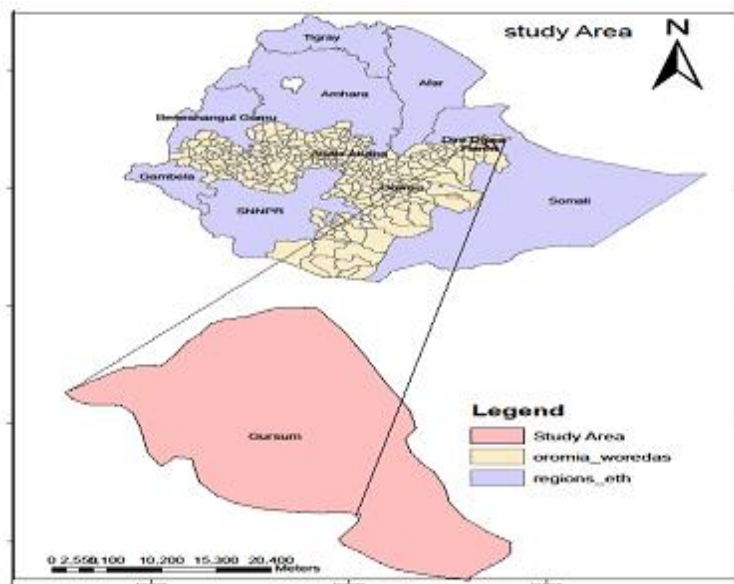


Figure1. Map of the study area

### Source of Data and Analysis

The study approach includes both secondary and primary data collection method to generate appropriate information for the study. The primary data were obtained through key informant interview. The interviews were focused to collect data on the relationship between indigenous peoples, their knowledge and culture on the biodiversity conservation to answer the research questions: Why the indigenous peoples and their knowledge are critical in biodiversity conservation? How are indigenous peoples, their knowledge, biodiversity and culture related between each other? And also focused to collect data on the their strategies for the conservation and improvement of the resources necessary for

survival and dominant biodiversity practice implemented on the community to mitigate climate change and adaptation to answer the research questions: Which biodiversity conservation method that is practiced by Gursum Indigenous peoples could contribute to climate change mitigating and adaptation in the area? And their coping approach adapted to overcome problems associated with the degradation of biodiversity could be associate with what are the main causes and consequences of biodiversity degradation in the area? Whereas, secondary data were collected through an examination of the peer reviewed literature, as published in journal and books for the data of dominant biodiversity practices in the area

### Sampling and Sampling Procedure

Based on the information of different stakeholders in the woerda from different perspectives 75 key informants were selected purposively from the area with the assistance of clan leaders, peasant association leaders and members of the local community.

### Key Informants Interview

Key informant interviews were carried out with elder people and community based organization

representatives, top governmental office of woreda agriculture and rural development bureaus, who know the history of the areas very well. The elders have been above 45 years old, acceptable by community for different social and cultural affairs. Based on the blew selection criteria the sample size were 60 from elders, ten (10) from community based organization and five (5) from top governmental office. Therefore, the total sample sizes were seventy five (75) (Fig.1).

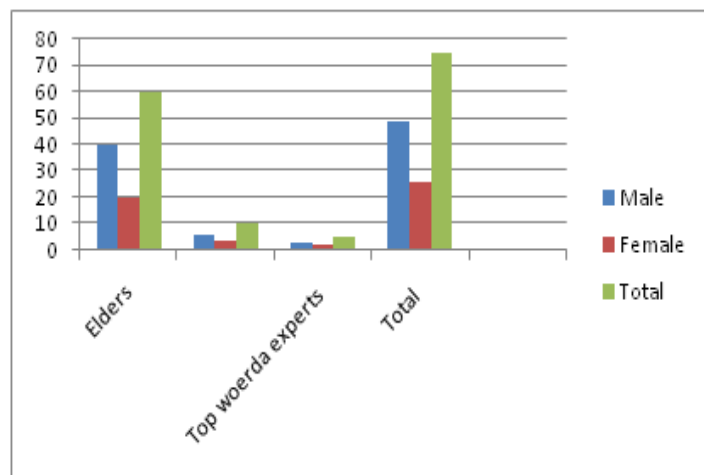


Figure1. Summary of key informants during interview

### Data Analysis

The quantitative data was analyzed using both descriptive and inferential statistical tools like percentages whereas qualitative data were analyzed by cross checking with different data sources in the study area.

## RESULTS AND DISCUSSION

### Values of Gursum Indigenous Knowledge in the Biodiversity Conservation

Gursum indigenous knowledge is essence of the social capital of Gursum peoples and plays a significant role in conservation of biodiversity. Local culture, spiritual, social and ethical norms possessed by these peoples has often been determining factors for sustainable use and conservation of biodiversity. According to the 35% of key informant interview responds, indigenous knowledge owned by the Gursum people to conserve biodiversity are shifting cultivation, sacred groves, local method of soil and water conservation practice (physical and biological structure) were as according to 65% of key informant interview responds, home garden/traditional agro forestry practice, locally

known as *Guaro* in the Gursum language are dominantly used to biodiversity conservations.

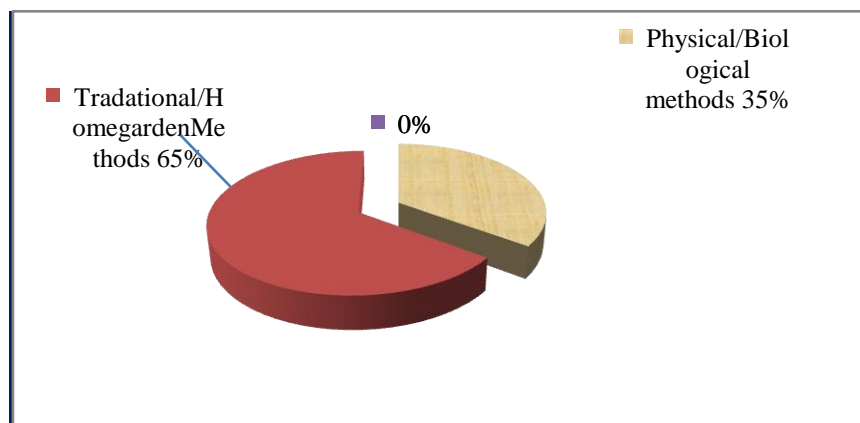
Some researchers are carried out on home-gardens in detail in certain localities of the Grsum area by Belachew *et al.* (2003), some land part of Gursum area are stated as traditional home-gardening is a sustainable agricultural practice; it is environmentally friend and also allows the harvesting of diverse products to the satisfaction of farming families as well as urban dwellers. This farming system that is composed of diverse and complex vegetation arrangements deserves unique nomenclature as it shares more with natural forests than it does with man-induced agro-ecosystems. According to the Gursum community based organization representative responds, the cultivated garden plants are composed of both food and non-food species. According to woreda agriculture and rural development bureau representative responds most of the area women encouraged the neighbors, husbands and youths to conserve home gardens by planting diverse plant species and by taking proper care of the gardens. As they said, women's play a silent but active role in home garden conservation and management of plant genetic resources and seed selection.



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During key informant interview with the elder women's, it was notice that women were interested because they thought that home gardens could help them to earn and save money.

However, many were also interested in preserving the environment and reducing biotic pressure on forests.



**Figure2.** Gursum indigenous knowledge in the biodiversity conservation

### Role of Home Garden in the Climate Change Mitigation and Adaptation

Based on the 69% of key informants interview responds, pollution (water, soil, air and noise), stream cuts, erosion, flood, rugged topography and quarry were identified as the potential hazards/constraints of biotic resources in the Gursum area but 31% of Key informants respondents, erosion, flood and rugged topography and quarry were identified as the potential hazards/constraints of biotic resources in the However, as they said that the contribution of home-gardens of the study area in sustaining the environment is promising. These Home gardens, developed and nurtured by the local farmers through generations of innovation and experiment, are often cited as the epitome of sustainability, yet have been long neglected by the developmental activities. Today, however, these age-old systems are receiving increasing attention owing to their perceived potential to mitigate environmental problems such as loss of biodiversity and high concentration of atmospheric carbon dioxide. According to Ajibade and Shokemi (2003) it is widely recognized that agro-forests play an important role in the global carbon cycle by sequestering and storing carbon(C).

During the interview, woreda agriculture and rural development bureaus pointed out that this home garden plants help remove pollutants from the air in three ways: absorption by the leaves or the soil surface; deposition of particulates and aerosols on leaf surfaces; and fallout of particulates on the leeward (downwind) side of

area. As they explained, water and soil pollutions emanated from improper disposal of urban and poorly regulated wastes from industries, unwise uses of chemical fertilizers and locally produced wastes. In Gursum society, almost all of the generated solid wastes are indiscriminately dumped into drainage channels, streams, open surfaces, culverts, and residential compounds and even on the road including highway passing through the town and this is highly cause for environmental pollution.

the vegetation because of the slowing of air movement. In line with this, home-gardens of the study area offer relevant service in mitigating the currently aggravating trend of climate change and in rehabilitating soil degradation. Soil erosion is minimized because of high vegetation cover that prevented the exposure of bare ground to heavy rainfall, improve the soil structure and increase the level of organic nutrient through the litter fall and releasing nutrient contain fluid through their roots. This help to increase the infiltration rate of the soil and also help to keep healthy soil. The healthy soils are a medium for sustainable growth of diversity plant and clean the environment through the process of organic matter decomposition. Since there is almost no use of pesticides in gardening, their produce is clean contributing to environmental protection as well as public health. Therefore, these home garden practices of the study area have dual service of reducing the emission of GHG (Green House Gas) from anthropogenic sources, and enhancing carbon sink. As they reported that

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“home garden also play a significant role in adaptation to the local climate change through practices of the planting early maturing crops,

adoption of hardy varieties of crops and selective keeping of livestock in home garden”.

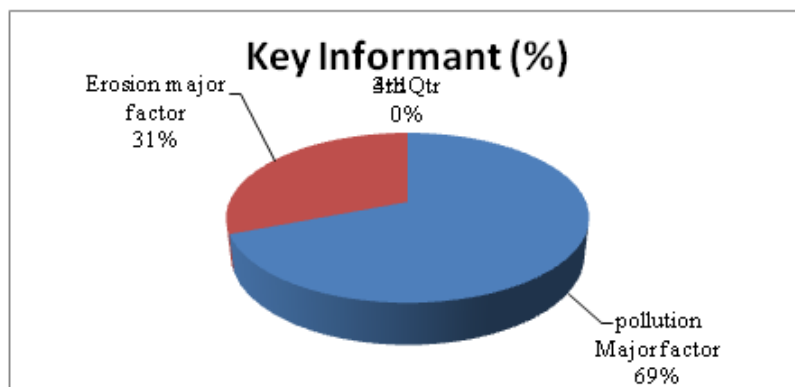


Figure3. The potential hazards/constraints of biotic resources in the Gursum area

### Causes and Consequences of Biodiversity Loss in the Gursum Area

According to (100%) of Gursum indigenous elders respondents (Fig. 4), the main causes for the loss of biodiversity are: neglecting of local-biodiversity relationship through belittling of local knowledge, beliefs and practices has led to a disconnection of local peoples from their local nature (biodiversity). As they explained that when the links of local people with nature have been severed, it becomes difficult for local people to wake up to the call to take up their responsibilities to care for and work with nature for their own good (let alone for the good of nature and others).

This eventually results in the loss of culture and biodiversity and lead the development programs implemented in such an area are hardly appropriate and will very likely be unsuccessful. Therefore, the local communities have often been led to believe that their own way of life, depending on local biodiversity must be shunned in favor of alternative lifestyles. These alternatives, however, usually alter traditional patterns of interaction with the environment beginning with mismanagement and eventual destruction of local biodiversity and cultural practices.

All most all of Gursum community based organization representatives respondents, (Fig.4) the main causes for the biodiversity loss are with regarding to policy failure: The policy and legislative frameworks do not articulate strategies specific to the conservation and sustainable use of biodiversity for indigenous people. As they said, migration from rural areas to town's and resettlement of people from

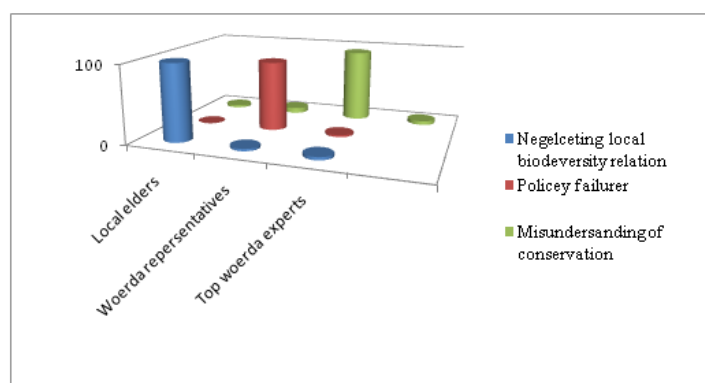
drought-stricken regions to fertile areas has also resulted in the deterioration of traditional practices. As they reported, lack of prioritization for indigenous people due to neglect, decay, as well as destruction of socio-cultural values and their knowledge on the biodiversity conservation were the other reasons for the loss of biodiversity. Furthermore, woreda's agriculture and rural development bureau respondent (Fig.4) pointed out that the misunderstanding of the principle of conservation by those conservationists and developers who have considered conservation strictly as the act of keeping biodiversity from change or loss, by protecting and preserving it or preventing, disallowing and denying the use of biodiversity by people in order to “save biodiversity”. If the principle of conservation has been understood, then actions on the ground have indicated that the principle has been misapplied. This misapplication whatever in the area on the ground results as regards development and biodiversity conservation programs have not been satisfactory.

Almost all interviewees quite agreed the impact of biodiversity loss lead to the indigenous peoples particularly youth to long-term-long distance internal migration on the women left behind in local areas. This indicates that the livelihood of women who are left behind as the male household head migrates out is highly affected by the labor gap and the social, cultural and institutional barriers, which constrain women's effort to improve and diversify their livelihood and come out of poverty and food insecurity. Women heads reported, labor gap at household level has forced most women to reduce the acreage of land they cultivate or

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leave some of their plots fallow. As a result women heads reported a decline in their agricultural production and high reliance on purchased food for survival. Were women effectively take over home garden conservation when household heads migrate out, in the study area the labor demanding tasks like land preparation and chat transplanting are practically impossible for women to stay in the home garden conservation. It is also learned that reliance on hired labor has a lot of negative effect on the conservation of home garden lead to decline in

the productivity of diversity. Especially at current time drought become a very seriously issue on the loss of biodiversity. Dry-season grazing and watering areas have dried up, the water table in the shallow wells has fallen, and there is little or no water for the livestock as well as humans" nascent efforts to practice small-scale irrigation. As a result, they said that they have to move their livestock further away to non-traditional grazing areas, that is, into the territory of their enemies, although they were fully aware that this could lead to more conflict.



**Figure4.** The main cause of biodiversity loss in the study area according to key informant's response

### CONCLUSIONS

Indigenous peoples and their socio-cultural relationship with biological systems have largely been contributing to sustainable conservation of biodiversity. Field-based studies or interview were identified that the indigenous knowledge dominantly practiced to conserve biodiversity were the practice of home-garden in small scope traditional agro ecosystem having diverse plant species was carried out in the area of Gursum. The indigenous farmers have well founded ingenious knowledge to conserve home garden and manage each components of the system. One major endeavor is the maintenance of diverse taxa of plant species in the home-gardens that are grown for food and others. This practice has a significant role on the biodiversity conservation and climate change mitigation and adaptation of the peoples. The major causes for biodiversity degradation are neglecting of local biodiversity relationship through belittling of local knowledge, beliefs and practices and policy failure. Based on this, it is possible to conclude that indigenous people and their knowledge are playing a significant role in the protection of environments well as biodiversity.

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