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Indigenous agricultural knowledge and forest conservation in Ethiopia: the case of Ilu Abba Bor, since the 1920s

Wondachew Mitiku Jorbasa , Ketebo Abdiyo Ensene and Tsegaye Zeleke Tufa

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ABSTRACT

This study aims to examine indigenous knowledge in agriculture and forest conservation in Ethiopia's Ilu Abba Bor region since the 1920s. The study employed a qualitative research method. The study relies on oral and written sources. The oral information was collected from purposefully selected key informants. The data collected from the interview in different districts of the study area was substantiated with the data collected from written documents. The study reveals that agricultural knowledge and forest conservation are essential parts of the culture and history of society. The purpose of the conservation was for cultural and ecological values, livelihood, and construction. However, the forest, which had been conserved since the 17th century, had started to be adversely influenced by the Ethiopian state's interference with a strong interest in having control over resources since the 1920s. The interference negatively affected socio-culture, political empowerment, self-governance, and the knowledge system, which includes rituals and rules that restrict access and regulate the proper consumption of natural resources. The study concludes that indigenous knowledge has positively contributed to efficiency, effectiveness, sustainable agriculture, and forest conservation. The way forward suggested is integrating customary rules emanating from indigenous knowledge with modern rules and incorporating a development focused on sustainable agriculture and forest environments.

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1. Introduction

In African countries, such as Ethiopia, indigenous knowledge in agriculture and conservation of environment were embedded in people's cultures and preserved for centuries. The Oromo inhabitants' in Ilu Abba Bor, who had been pastoralists in time, had been transformed into mixed agriculture since the early 17th century as a means of securing their sustenance (Kenea, 2017,p.42). Furthermore, at the end of the 19th and early 20th centuries, the region was observed as a beautiful agricultural environment, and it had potential to cultivate many crops. According to the observer, 'the beginning of Ras Tasamma Nado's territory' though he did not clearly mention the territory, the region was Ilu Abba Bor. The observer added that the people of 'this district is particularly prosperous, well built, and cultivated' (Gwynn, 1911, p. 113; Landor, 1907).

The Oromo had been practicing the *gada* system for centuries. It is 'a key to the unique heritage of Oromo political, social, and cultural life', and it is a system referred to as a 'unique traditional African democracy' (Hassen, 1990, p. 12). In the sixteenth century, there was a single *gada* class that governed over the entire Oromo. Nonetheless, between the seventeenth and nineteenth centuries, the same institution began to evolve in different sects (Legesse, 1973, pp. 89–90). With the passage of time and the reproduction of its descendants, the family of Macha, one of the Oromo branches, organized itself into *afree* (four) and *sadacha* (three) confederacies. Thus, the descendants of Tume (one sect of the *sadacha*)

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were the early settlers' in the present day Ilu Abba Bor (Haile et al. 2006, pp. 162–164; Mohammed, 2009, p. 58¹

Like the Oromo in other parts of Ethiopia, the Oromo in Ilu Abba Bor had their own *gada* system, which included the indigenous knowledge system, socio-political aspects, and cultural aspects. Nonetheless, after bloody resistance, the people and the region were incorporated into the modern Ethiopian imperial state at the end of the 1880s. Then, after three decades of consolidation Ethiopian state interference began to affect the Oromo political and social order due to the introduction of land measurement (*qalad*) (Mohammed, 2009, p. 58). The proposed system began to adversely influence social institutions, indigenous land ownership rights, people's livelihoods, and the indigenous knowledge system in agriculture and forest conservation in the region. The imperial state authorities systematically and gradually eliminated the indigenous socio-economic organizations of the people of the study region so as to establish and sustain their political hegemony.

2. Literature review

Before going through the details of the study, understanding the concept of indigenous knowledge is very important. Hence, conceptually, human knowledge might have been divided into 'indigenous, or local/empirical, and exogenous, or scientific/western' (Fre, 2018, p. 1). Thus, the two forms of are based on 'observation, assumption and speech of complex realities' (Fre, 2018, p. 1). However, both forms seem similar in the sense that they are all local, driven in a particular time, culture, way of thinking, and belief structure (Fre, 2018, p. 1). According to some scholars, indigenous knowledge is unique to a given culture or society (Warren, 1991, p. 1). Furthermore, it is considered the basis for local level decision making in agriculture, healthcare, and natural resource management include other activities in rural communities (Twarog & Kapoor, 2004, p. 5; Warren, 1991, p. 1). Moreover, indigenous knowledge has significant values for the culture in which it evolves and for scientists and planners struggling to improve conditions in rural localities (Warren, 1991, p. 1).

A society might have possessed knowledge of the physical environment, such as soils, plants, climate, paste, and veterinary (Atteh, 1992, p. 6). Furthermore, it might have possessed technical knowledge like agriculture, medicine, and indigenous engineering (Atteh, 1992, p. 11). Indigenous agricultural systems are holistic and diverse, adaptable, nature friendly, and productive (Fernandez, 1994, p. 10). It is impossible to practice agriculture without soil, water, plant protection, conservation and sustainable use of these resources (FAO, 2017, p. 12). Hence, agriculture and natural resources, such as forest conservation, are inseparable.

The Oromo concept of knowledge is classified as *beekumsa aadaa* (cultural knowledge) and *beekumsa seeraa* (knowledge of laws) (Jalata, 2012, p. 140). Cultural knowledge is public and common knowledge that directs and controls the activities of members of society. Hence, the traits of this knowledge can be developed in to rules (Magarssa, 1993, pp. 20–21). According to the Oromo tradition, the knowledge of laws is also divided in to *seera-Waaqaa*/the laws of God/, and *seera namaa* (the laws of human beings). According to the Oromo tradition, the knowledge of laws is also divided into *seera-Waaqaa* (laws of God) and *seera namaa* (the laws of human beings) (Magarssa, 1993, pp. 22–23). The *seera-Waaqaa* was believed to be given by *Waaqa* (God). Hence, these rules had to be respected by every member of society (Magarssa, 1993; 1996, pp. 92–102). Generally speaking, it has been argued that the entire Oromo community was expected to understand and live according to the laws of *Waaqaa*, the laws of nature, and the laws of society (Jalata, 2012, p. 143). It is mainly because of this law that members of Oromo society are expected to learn and recognize the rules (Magarssa, 1993, p. 22, 23).

According to the Oromo tradition, the two great lawmakers were Dawwe Gobbo in Borana and Mako Bili in Macha. The Law of Mako Bili- the *Safuu* is well recognized in the entire Macha- branch, such as the Oromo of Wallagga and Jimma, including the Oromo of Ilu Abba Bor (Legesse, 2006, p. 209). Hence, according to the laws (the *Safuu*) the Oromo society is expected to keep both distance and respect between all things (Hassen 1990, p. 46). Accordingly, society respected the relationship between human beings and God and between human beings and natural resources. The Oromo indigenous knowledge is holistic in its approach and includes history and culture, which have been transmitted for generations through the approaches of *arga-dhageettii* (observation, participation, and oral dialog) (Hassen 1990, p. 130, interview with Lamu Lafto, Nov. 9, 2021).

3. Problem statement

Agriculture and conservation of the forest environment play a significant role in the socio-economic well-being of the Ethiopian people. The agricultural sector in Ethiopia is dominated by small-scale farmers who practice rain-fed mixed farming by employing indigenous knowledge and technology and adopting a low-input, low-output production system. The main problem with studies in Ethiopian agriculture and environment was that the scholars failed to focus on the holistic approach of studying the significance of indigenous knowledge in agriculture and forest conservation that is imbedded in the culture and history of the people. Furthermore, their studies focus on single-market-oriented commodities, disregarding the long-term environmental effects, neglecting the actual process of production, and giving less attention to indigenous agricultural systems (McCann, 1995, p. 6 and 9).

4. Objectives of the study

The main objective of this study is to examine the indigenous knowledge in agriculture and forest conservation among the Oromo in Ilu Abba Bor since the 1920s.

Specifically, the objectives of this study are:

- To find out the indigenous knowledge in agriculture and soil fertility management among the Oromo in Ilu Abba Bor
- To identify the role of customary rules, and practices in agriculture and forest conservation among the Oromo in Ilu Abba Bor
- To point out the ways in which the Ethiopian state intervention affected agriculture and forest conservation in Ilu Abba Bor

5. Materials and methods

5.1. Research design

The research design for this study is a qualitative approach. This design was applicable to collecting historical data and providing significant and proper answers for the research objectives. Moreover, descriptive data analysis was employed to conclude the study with an analytical interpretation.

5.2. Sampling methods and sampling procedure

The sources of data for this study were largely oral, and substituted with written documents. The tools of data collection were interviews and document analysis. Thus, knowledgeable key informants in different districts of Ilu Abba Bor were purposefully selected and interviewed. The key informant interview focuses on indigenous knowledge in agriculture and soil fertility management, as well as the roles of customary rules and practices in agriculture and forest conservation. Furthermore, to substantiate the data collected from oral sources, the analysis was supplemented by secondary written documents. The document analysis emphasizes how the Ethiopian state intervention influences agriculture and the conservation of forests.

In this study, purposive and snowball sampling techniques were used. As the main objective of this study is to examine the indigenous knowledge in agriculture and forest conservation that is directly attached to the culture and history of the people, the knowledgeable key informants from five districts, such as Bedelle, Dega, Darimu, Dorani and Mattu were purposefully selected and interviewed. An oral interview was considered as reliable for collecting historical data to reconstruct patterns and changes. To find out the knowledgeable elders (men and women farmers), the snowball technique was employed. This technique is employed to search for the right person until the informant has detailed knowledge about the themes of the study, like indigenous knowledge in agriculture and soil fertility management, the role of customary rules, and practices in agriculture, and forest conservation. On the other hand, the data related to the state intervention in agriculture and forest conservation was largely collected from secondary written sources and supplemented with oral information. The

oral information collected from oral sources through selected informants' interviews was cross-checked, evaluated, and analyzed with the information gathered from written documents to verify the information.

6. Results and discussions

6.1. Indigenous knowledge in agriculture and soil fertility management

The farmers of the study region have knowledge of agricultural practices and soil fertility management. Before practicing mixed-agriculture, the Oromo in the study region had experience with the cultivation of Roots and tuber crops in their food system. They have had the knowledge of identifying the season of maturity and harvest of the root crops based on their long years of experience. The roots and tuber crops cultivation have had a long history in securing the food shortage in the society of Ilu Abba Bor. However, their productions have been decreasing since the 1950s and 1960s due to the expansion of coffee plantations (Mekbib, & Deressa, 2016, p. 91).^{2,3} Hence, the farmers of this region started to prefer plantations of cash crops to cultivating roots and tuber crops for their economic significance (Mekbib, & Deressa, 2016, p. 91).⁴ This shows that the beginning of coffee plantations had started to adversely change the cultivation of roots and tuber crops, which sustained the food security of the people of the study region for centuries.

In the long process of their experiences, the people in Ilu Abba Bor had indigenous soil fertility management practices to increase crop productivity, and an achievement in addressing food insecurity (Warren, 1991, p. 1). Farmers could identify the features of the soil that lost fertility by observing the color and texture change, soil workability and occurrence of weeds, reduction of crops, high demand for input, and change in the quality and quantity of stream water (Erkosa, & Ayele, 2003, p. 9; Teshome et al. 2018, p. 5). In Ilu Abba Bor, the utilization of inorganic fertilizer has been a recent development; because; crop production was in a better position as the soil was naturally fertile.⁵

The farmers of Ilu Abba Bor have had the knowledge of identifying types of soil by observing the color, texture, and land position (Teshome et al. 2018, p. 4). The vast region of Ilu Abba Bor is covered by dense natural forest. Thus, the larger part of the region is covered by *biyyo-gurracha* (the black soil) or mollisols. This kind of soil is fertile and suitable for the cultivation of all crops, whereas *biyyoo diimaa* (red soil) or *nitosol* is less fertile due to erosion created by running water and intensive tillage.⁶ Nonetheless, since the middle of the 1980s, the *biyyo-gurracha* (black soil) coverage has been largely decreasing in the forest region of Ilu Abba Bor, whereas, the coverage of *biyyoo diimaa* (Nitosolis) has been increasing in this study region. This change is attributed to the development of soil degradation, mainly because of the clearance of vegetation and over plows.

The farmers of Ilu Abba Bor have developed different mechanisms of protecting soil fertility for centuries so as to improve and increase the productivity of small-holder agriculture (Erkosa and Ayele, 2003, p. 11).⁷ There are two kinds of soil fertility maintenance. These are organic fertilizers and inorganic fertilizers. Organic fertilizers are the natural materials acquired either from plants or animals including animal manure, residues, house wastes, and others, which are/were implemented using indigenous knowledge and practices. On the other hand, inorganic fertilizers are the practice of utilizing the synthetic fertilizers and inputs in order to increase crop productivity. The farmers in Ilu Abba Bor have had indigenous soil fertility management practices. Some of these practices are relocation of Kraal, *geebaa* (weed deposit), intercropping, crop rotation, and *bajjeessu* (fallowing).

Relocation of Kraal (*foonaa*) is an indigenous means of soil fertility maintenance in Ilu Abba Bor. The cattle usually spend the night in Kraal (*foonaa*), whereas other domestic animals such as sheep and goats spend the night in a separate room (*goorro*), and donkeys and horses spend the night in a separate room (*gaadaa*).

Farmers regularly relocate the Kraal (*foonaa*) so that the dung dropped by animals would distribute throughout their agricultural lands.⁸ It is through this process that the manure and urine of cattle are distributed to farms (*oyiruu*). The cattle dropped their manure in the Kraal, and this place is named *Lafa-dhayi* (the land of dung). *Foonaa* transfer to new plots of land every week during the wet season and every two weeks during the dry season, depending on the amount of dung dropped and the types

of crops to be cultivated (Ta'a, 2002, p. 108).⁹ For instance, the rainfall in the summer season is high, and if the numbers of cattle are large, the amount of dung dropped would also be large. In such a case, the transfer of Kraal would take only a week. On the other hand, if the types of crops to be cultivated may need a large amount of manure, Kraal transfer probably extends up to two weeks. For instance, farmers understand that the plots of land on which the Sorghum crop would be cultivated need a large amount of manure because they believe that the cultivation of Sorghum might have caused an extensive loss of soil fertility.¹⁰ In such conditions, the soil needs a large amount of animal manure. On the other hand, farmers are aware that the plots of land on which the bean crop would be cultivated might have needed less manure because it is believed that bean cultivation may increase the fertility of the soil.¹¹ This method would increase crop productivity for three consecutive seasons or years after bean crops would have been cultivated on the same plots of land and sustain the fertility of the soil.

The transfer of *foonaa* has had a significant role in soil fertility management and weed control through the incorporation of animal dung and crop residues (Erkosa, & Ayele, 2003, p. 12). The process of transferring *foonaa* would continue until the soils got fertilized. Hence, the practice integrates food production and animal husbandry (Ta'a, 2002, p. 108). The crop types grown using this practice were/are maize, bean, pepper, sorghum and others. The application of animal dung would largely improve the fertility of the soil. The restraint of using animal manure as soil fertility maintenance is the demand for large number of cattle in order to cover the wider farms.¹² The excretion dropped by sheep, goats, donkeys, and horses would be deposited until it was dry. Then, the dried manure and dried waste would be disseminated on the farm by the labor of women and children.¹³

Using animal manure as a means of maintaining soil fertility had many advantages as compared to commercial fertilizers in terms of cost-effectiveness, sustainability of soil fertility, and seed preservation. Whereas, labor-intensive, the necessity of a large number of cattle, and an increase of weeds were considered limitations of using animal manure.¹⁴

Geebaa (weed deposit) is an indigenous soil fertility maintenance practice in which farmers collect, deposit, and arrange weeds in strait lines or in circular forms.¹⁵ The deposited weeds are preserved until the next season of tillage. Then, the decomposed weeds might be burned or mixed and distributed to farms before the next season of cultivation.¹⁶ The deposited weeds prevent soil erosion, which is created by running water.¹⁷ Preserving *Geebaas* saves time and energy for farmers who invested on removal of weeds. Crop rotation is also an indigenous mechanism of soil fertility maintenance in Ilu Abba Bor. It is believed to have improved the soil structure and fertility.¹⁸ The farmers in the study region are aware that crop rotation could improve soil fertility and agricultural productivity from season to season. Thus, as some researchers indicated crop rotation has been regarded as 'a key principle of conservation agriculture' (Teshome et al. 2018, p. 1). It is mainly because of this that the farmers choose the types of crops to be grown in rotation based on types of soil, patterns of rainfall, and the availability of resources. For example, farmers in the region are cultivating legume crops following grain.¹⁹ It is believed that the cultivation of cereal crops after legumes or oil crops maintains soil fertility, weed control, and disease control (Erkosa, & Ayele, 2003, p. 12).²⁰ Because, the farmers are aware that, rotating crops such as linseed and beans were considered a better mechanism of improving soil fertility.²¹ For instance, farmers cultivate bean crops and maize crops one after the other on the same plot of land. Farmers learned from their long experience that cultivating bean crops could improve soil fertility and increase crops' productivity.²² Legumes crops like beans contain nutrients that could supplement inorganic fertilizers for cereal crops because of their ability to fix nitrogen in the cropping systems, whereas sorghum and millet extensively minimize fertility soil (Erkosa, & Ayele, 2003, p. 12; Teshome et al. 2018, p. 1).²³

Farmers' choice of crop rotation is mainly influenced by the desire to reduce the need for labor-intensive land preparation or weeding. According to informants, frequent cultivation of millet might have created a fine seed, increased weed, and loosened soil particles. On the contrary, the cultivation of bean crops in the preceding season might have strengthened soil particle by their long pods and added fertility to the soil. Despite the scarcity of farming land as a limitation of this method, the farmers of the study area believed that crop rotation is very important in managing soil fertility (Erkosa, & Ayele, 2003, p. 12; Teshome et al. 2018, p. 1).²⁴

Bajjeessu (fallowing) is an indigenous practice in which drained farms were left uncultivated for about three to five years in order to improve soil fertility (Erkosa, & Ayele, 2003, p. 12; Teshome et al. 2018, p.

1).²⁵ *Bajjii* (fallow) is a grazing land in which cattle, sheep, goats, and others drop their dung. Their excrement is believed to have improved or recovered the soil fertility that was damaged by tilling for long years. However, *bajjeessu* practice has been deteriorating due to the scarcity of agricultural land.²⁶ The scarcity of agricultural land was due to extensive forest coverage, expansion of commercial plants such as Coffee, Chat/khatt, and *bargamoo* (*Eucalyptus globules*), and population increase. Growing different crops on the same plot of land is aimed at a direct production increase as compared to monoculture or single cropping, spreading the risk of crop failure over more crops.

The farmers of Ilu Abba Bor had developed the practice of intercropping. Intercropping, is often undertaken by practicing high labor demands (low input) and low-yield farming, in which farmers grow different crops on the same plot to reduce labor expenditure (Atteh, 1992, p. 11; Teshome et al. 2018, p. 1).²⁷ Furthermore, intercropping is cultivating a second crop before the maturity of the first cultivated crop (Brooker et al. 2015, 115). This type of soil improvement mechanism reduces the risk of soil loss by raindrops and helps to maintain soil fertility and increase productivity.²⁸ There are two systems of intercropping in the study area. These are cultivating two or more crops on a farm, and cultivating other crops on the margins of farm. The farmer's cultivated various crops that might have different height, maturities and harvesting seasons. For example, farmers intercrop Maize and Bean, Millet and *Nuugii* (*Guizotia abyssinica*), Millet and bean, *Gijinbila* (*Zingiber-officinale*), *Ogiyo* (*Aframomum angustifolia*), and coffee. The intercropping system allows crop interaction and independent cultivation.

Crop rotation and a fallow method maintain soil fertility for about three years or so. However, such indigenous soil fertility improvement methods were not effectively utilized by farmers during *Darg* times (1974–1991) as land was nationalized and demanded for the implementation of a villagization and resettlement scheme, whereas the policy of the EPRDF (Ethiopian People's Revolutionary Democratic Front) encouraged the expansion of individual commercial plants since the beginning of the 1990s.²⁹

Farmers in the study region have the knowledge of cultivating crops within the suitable climatic conditions. For instance, they cultivate Millet and Sorghum in *gammoojjii* (hot climatic areas), whereas maize and coffee would grow in *badda-daree* (intermediate climatic) areas. On the other hand, crops such as *teff*, beans, and barley are cultivated in *baddaa* (cool climatic) areas.

Farmers' have implemented the system of 'improving the farming condition'³⁰. This condition means tilling the land twice before disseminating seeds. This is to expose the interior part of soils to sunlight, which would help reduce the amount of moisture in the soil.

The indigenous knowledge in agriculture and forest conservation started changing due to the introduction of 'modern' agricultural knowledge. The change started in 1963, when the branch office of the Imperial Ministry of Agriculture was opened in Ilu Abba Bor. Then, the agricultural expertise started to make peasants' aware of the 'modern' agricultural system, which totally overlooked indigenous knowledge and farming systems by undermining them.³¹ Initially, the opening of the office was expected to increase crop productivity that was deteriorating due to the loss of soil fertility. Nonetheless, agricultural expertise and extension workers continuously informed farmers, only focusing on the utilization of inorganic inputs such as fertilizers and selected seeds, and undermining the organic inputs as 'imperfect'. However, the agricultural expertise that imparted the significance of 'modern' knowledge did not well inform peasants' about the side effects of overutilization of inorganic fertilizers on the sustainability of soil fertility and natural resources.³²

It was in the middle of the 1970s that the modern farming system, such as using chemical fertilizers and selected seeds, was largely introduced to the farmers of the region.³³ In fact, the use of inorganic fertilizers would increase productivity only for one or two harvest seasons. Nonetheless, farmers were not happy with the utilization of chemical fertilizers and selected seeds for sustainability of productivity and soil fertility (Ta'a, 2002, pp. 97–113 & 106). On the other hand, the cost of agricultural inputs was not affordable, which had been increasing from time to time. Furthermore, the sustainability of soil fertility and agricultural productivity has been adversely affected by the excessive and inappropriate use of inorganic soil fertilizers (Ta'a, 2002, p. 107).³⁴

The farmers of the study region had been practicing crop cultivation on wetlands for so long. *Bonee* (dry season farming on wetland) is a traditional irrigation farming practiced during the Ethiopian winter season (December, January, February) using the soil moisture holding capacity of the land that would help to

cultivate crops on a small scale before the conventional farming seasons of *arfaasaa* (autumn season) (March, April, May) and *ganna* (summer season) (June, July, August) in Ethiopia based on rain fed. Though *bonee* (dry season farming) was not extensive, the cultivation of crops using this method was significant. Because crops harvested by this method secure food shortages and stabilize the local grain market, as *bonee* crops mature during a scarcity of food supply, which usually occurs in June and July.³⁵

Wetland farming has been practiced communally and privately on a small scale for many centuries.³⁶ However, larger change has been observed since the 1980s because; wetland farming has extended intensely to include larger areas of wetlands, which resulted in the deterioration of wetlands in the study region (Dixon, 2005). The intensity of wetland agriculture in Ilu Abba Bor, particularly, in the 1980s, was due to population increases as a result of the birth rate and the resettlement program implemented by the state which moved people from the northern part of Ethiopia (Wallo and Tigray) to Ilu Abba Bor. These two factors, had adversely affected the conservation of wetlands, grazing lands, and forests (Dixon, 2005, p. 310).³⁷

The knowledge gap of the settlers' about conservation of natural resource and the high demand of the settlers' in expanding agricultural lands deteriorated the wet lands. On the contrary, there were wetlands in different districts of Ilu Abba Bor in which the new settlement program was not implemented. In such areas, wet land has continuously existed for over 80 years with little occurrence of degradation (Dixon, 2005, p. 310).³⁸ The sustainability of wetlands in the area of indigenous local farmers was mainly due to the capacity and effectiveness of their ingenious knowledge, which enabled them to preserve the wetlands as well as other natural resources for centuries. Furthermore, the farmers in Ilu Abba Bor had the knowledge of planting trees in and surrounding their farms for so long as to sustain soil fertility.³⁹ On the other hand, the farmers had been conserving different tree species in their homestead and integrating them into the farm land for the sake of subsistence and economic purposes.⁴⁰

6.2. Customary rules, practices and forest conservation

The customary rules and ritual practices among the Oromo of Ilu Abba Bor were *Safuu*, *Kakaa*, *Abaarsa*, *Irreecha*, *Ateetee*, *Ulaa Bahuu*, and *Dhibaaayyu*. Such rules and practices were used to conserve natural resources like sacred landscapes, sacred forests, and water bodies (Berisso, 1995). Indigenous management rules such as *Safuu* (norm), *kaka* (swear), *abarsa* (curse), and belief in *Waaqa* (God) were used to restrict community access to natural resources, protect the environment, and encourage people to use only the necessary resources. *Safuu* is 'an ethical and moral code', which is a means of all human action and serves to distinguish bad from good and wrong from right. Furthermore, *Saffuu* relates the 'social and cosmic orders' that maintain duality through ethical behavior (Magarssa, 1996).⁴¹ Because of the respect and belief in *Waaqaa*, some places like *Qolloo* (a scared big tree where spirits are believed to be found), *Tulluu* (a mountain), *Huraa* (holy water), and forests might have been considered sacred.⁴² The aspirations, prayers, and blessings of the *abbaa-Qolloo* (father of *qolloo*) during ritual practices were related to good weather conditions, a good harvest, and surplus crops' production. This is the area of an interface between ritual practices and agriculture. The Oromo belief system and ritual practices started to be diminished due to the introduction of non-Oromo religious practices, non-Oromo state-dominated governance, and the deterioration of the indigenous knowledge system due to the expansion of 'modern' knowledge.⁴³

The Oromo farmers in Ilu Abba Bor have had the knowledge of protecting water bodies such as rivers, lakes, wetlands, and swampy areas, and they never till the water stream. Furthermore, they have knowledge of planting and preserving different tree species and forests for different purposes, such as the production of household and farm tools, construction materials, sources of fuel, and various ritual practices. As a result, farmers were not allowed to cut a single tree without purpose, and, largely, they preferred building their houses on low land and planting trees on mountains.⁴⁴

6.3. Agriculture and forest environment

Ilu Abba Bor is one of the southwest parts of Ethiopia where dense broadleaf *montane* forests have existed (McCann, 1995, p. 149). The peasant society of this region consumed forests as a source of survival for a long period of time. Forest food products are important components of many rural people's

diets, such as fruits, roots and tubers, honey, coffee, spices, wild animals, and others. Moreover, the peasant society of this region has had the tradition of protecting and conserving diverse tree species and forest environments for various purposes. These are for subsistence, coffee plantations, wild animals' protection, beekeeping, and honey production, among others. Though, the *Safuu* of the Oromo had strictly forbidden clearance of forests and vegetation, degradation of forests has increased in Ilu Abba Bor since the 1980s, mainly due to the policies implemented by the *Darg* government.

After the overthrow of the *Darg* government in the early 1990s, forest coffee plantations were expanded by individual farmers in different districts of the study region, particularly during the transitional government of Ethiopia (1992–1995). The local administrative bodies changed the communal forest, which was preserved for centuries, into individuals. Moreover, such state administrative actions intensified the competition between the farmers to control the remaining amount of natural forests for the sake of coffee plantations and the utilization of forest products such as dry wood, fuel, and charcoal for the livelihood of the peasantry. On the other hand, landless farmers and rural, jobless youth largely demanded the extraction of timber, which they supplied to the local market. Therefore, in the early 1990s, the need to satisfy human needs and economic significance has increased conflict of interest between local peasants (owners of coffee forests and non-owners) over forest use.⁴⁵

The forest in Ilu Abba Bor was/is a habitat for various wild animals, of which arboreal and species of birds are dominant. Of many wild animals; the civet cat is the most common. The market for civet products in Ethiopia has started to decrease since the middle of the 1990s.⁴⁶ This was because of the report given by a research team from the University of Pennsylvania, the Bronx Zoo, and Cornell University.⁴⁷

The traders had been supplying the product to the national market. The protection of civet has largely increased since the 1980s. This was mainly because; the demand for musk products was very high during this period, as it was largely exported to France. As a result, it was during this period that many farmers in different parts of the region engaged themselves in the protection of the civet.⁴⁸ The musk traders during the *Darg* regime included legal and illegal participants. Since the beginning of the 1990s, the productivity of musk has been increasing because traditional civet rearing and musk production have changed to modern methods. Nonetheless, there was the absence of fair market prices. On top of this, the government interfered in the process of deciding the market price and the amount of musk production supplied to the national market. Consequently, the absence of professional researchers to improve the productivity of the civet musk, as well as corruption and the absence of good governance in the process of supplying the product to the national market and receiving licenses, were the problems related to the state intervention. This was not only during the *Darg* government, but it was also continued up to the times of the EPRDF government.⁴⁹ As a result, many civet farmers in Ilu Abba Bor who were previously specialized in civet musk production have shifted their activities either to food crop production and coffee farming or totally stopped civet rearing in order to sustain their livelihood.⁵⁰ The peasant economy has been largely dependent on crop production and animal rearing. However, the support from the government to the farmers engaged themselves in civet rearing and musk production was very low, particularly in relation to veterinary medication.⁵¹

The Oromo of Ilu Abba Bor have had the tradition of beekeeping and honey production for so long. This is probably due to the existence of various flowering tree species, forests, water resources, and a favorable natural environment. The natural environment as well as the forests in Ilu Abba Bor were or are conducive to beekeeping and honey production. For instance, the Yayo natural forest encompasses more than one thousand types of tree species that flower every month of the year, which is favorable to the production of tasty honey.⁵²

6.4. Forest conservation and state intervention

Historically, forests have been very important for the entire lives of human beings. The history of forests has been dominated by the dynamic tension between conservation and exploitation, between life and death (Rahamato, 2001, p. 58; Zewude, 2008, p. 1). The descendants of Tume, the Oromo residents in present-day Ilu Abba Bor, were settled on forest land; where there was previously no population settlement in the early seventeenth century (Mohammed, 2009, p. 15).

Among the 58 national forest priority areas of Ethiopia, 43 (291,360 hectares) of them are located in Ormiya national regional state, and six of them (937,000 hectares) have been conserved in Ilu Abba Bor (Debele et al., 1998, p. 143). The undisturbed Yayo forest is registered by UNESCO as one of the 34th-most natural forest spots in the world. It covers 10,000 hectares, which was identified earlier as a potential coffee gene reserve and currently exists for the conservation of wild coffee *arabica* populations. It has a high plant species diversity and abundance of the coffee tree as compared to other forest areas in Ethiopia.⁵³ The Yayo forest is the largest natural forest coverage in Ilu Abba Bor, followed by the Nono-Salla'e forest, which had been preserved for more than three centuries by indigenous knowledge that encompasses customary rules access, rituals and practices, belief systems, and environmental ethics.

State forest policy, legislation, and administration in modern-day Ethiopia began as early as 1945 with the creation of the 'Department of Forestry, Game, and Fishery' within the Ministry of Agriculture. This department was dissolved and replaced by the 'Wildlife Conservation Department' with the responsibility to create and manage wildlife reserves in 1964. In 1971, the 'Wildlife Conservation Department' was renamed the 'Wildlife Conservation Organization', and forest management and conservation issues were given to the newly established 'State Forest Development Agency'. (Deresse, 2010, p. 56)

From the 1950s to the 1960s, individuals changed wooded and pastoral land into cultivable land to avoid state ownership claims (Rahamato, 2001, pp. 100–108). However, to legitimize this claim, Emperor Haile Selassie ratified the first legislation in 1965 (Rahamato, 2001, pp. 100–108). According to this legislation, the forms of forests were state forests, private forests and protected forests. The forest economic interest that initiated resettlement and expanded market-oriented smallholder agriculture has deteriorated the natural ecology of the region. The landless farmers in Ilu Abba Bor always asked the government; about the significance of the vast forest that covered the territory because; they did not benefit from the existing forests.⁵⁴ The people of the region contributed to the nation of the country in particular and to the world society in general by preserving dense forest environments and wild animals for centuries. Nonetheless, as farmers had not received rewards or incentives from the forests they conserved for many centuries, the positive attitude they had towards forests and natural resources had been deteriorating.⁵⁵

7. Conclusion

Indigenous knowledge in small-holder agriculture, which includes activities such as crop cultivation, animal rearing, and protection of resources like soil, water, and forest, as well as wetland and sacred land management. Technical knowledge such as soil classification, seed preservation and storage mechanisms, and planting and preserving tree species for different purposes is the product of indigenous knowledge that has been preserved for centuries and transferred from generation to generation through observation, participation, and oral dialog. Indigenous agricultural systems are holistic and diverse, adaptable, nature-friendly, and productive. The major strength of indigenous agriculture is the functional integration of different resources and farming practices.

The forest environment has been preserved for centuries through indigenous customary rules and ritual practices. These rules restrict community access to forests, and encourage people to use only the necessary resources. The Ethiopian state interference, which started in the early 1920s with the introduction of the *qalad* system (land distribution) aimed at natural resource exploitation, caused deterioration of the Oromo *gada* system. The deterioration of the Oromo *gada* system adversely influenced the socio-culture, people's self-governance; and also negatively influenced the Oromo knowledge system, which includes rituals and rules that restrict access to natural resources and regulate the proper consumption of forests.

The forest, which had been conserved since the beginning of the 17th century by indigenous knowledge for cultural values, livelihood, construction, and ecological values, had started to be conserved for economic significance since the beginning of the 1920s due to the emergence of coffee plantations by the local state governors.

The knowledge of inorganic agriculture that promoted extensive use of high input to improve agricultural productivity through its implementation had not certainly brought fundamental transformation

to the agricultural sector of the study region. Furthermore, it did not prevent the degradation of the forest environments. On the contrary, indigenous knowledge had positively contributed to efficient, effective, and sustainable agriculture and forest environment. Hence, empowering the local community and integrating selectively important indigenous agricultural knowledge with that of 'modern' agricultural knowledge is essential. Furthermore, if really sustainable agricultural economic development is needed, the incorporation of a sustainable forest environment and a development based mainly but not exclusively on locally available resources, such as forests and indigenous local knowledge, as well as indigenous customary rules and local human needs, should be considered and implemented.

Notes

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6. Informants: Gudina and Nega Alamu January 23, 2022.
7. Ibid.
8. Informant: Gudina and Nega.
9. Ibid.
10. Informants: Chokorso and Abara.
11. Ibid.
12. Informant: Mitiku
13. Informants: Alamu, Chokorso and Abara
14. Ibid.
15. Informants: Abara, Alamu and Tarekegn.
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28. Mekuria, "Sustaining the Agriculture", p. 135.
29. Informants: Abara and Tarekegn
30. Interview with: Daraje Kitila Oct. 18,2021
31. Informant: Daraje Kitila.
32. Ibid.
33. Ibid.
34. Informants: Abara and Tarekegn.
35. Informants: Dabala and Dheresa.
36. Informants: Alamu and Agamso.
37. Informants Dabala and Agamso.
38. Ibid.
39. Informant: Mitiku.
40. Informants: Dabala, Alamu, and Agamso.
41. Ibid.
42. Informants: Mitiku, Chokorso, Imamu, and Abara.
43. Ibid.
44. Interview with Abara Kuma and Tarekegn.

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Authors' contributions statement

The corresponding author developed the manuscript, the two co-authors reviewed it, edited it organized its format, and all of the authors read and approved the final manuscript.

Consent for publication

'Not applicable' in this section. Since the manuscript does not contain a person's data in any form like videos, pictures, etc.

Disclosure statement

No potential conflict of interest was reported by the authors.

Informed consent

Since an informant interview is necessary, all informant interviewees were informed about the objective of the interview. The researcher reminded the informants' that the data is necessary only for study and that the information they provided is not to be given to any third party, and confidentiality of the information is maintained.

Statements and declaration of authors

We, the authors, would declare that the article entitled 'Indigenous Agricultural Knowledge and Forest Conservation in Ethiopia: The Case of Ilu Abba Bor, Since the 1920s'. A study which focuses on agriculture and forest conservation is our original work, and all sources of information are fully acknowledged and not yet published, or not sent to any organization for publication.

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Ketebo Abdiyo (Dr., Associate Professor of History), and **Tsegaye Zeleke Tufa** (Dr., Assistant Professor of History) at the same institution are supervising the project, organized, reviewed and edited the article. The article submitted to Cogent Arts and Humanities entitled as 'Indigenous Agricultural Knowledge and Forest Conservation in Ethiopia: The Case of Ilu Abba Bor, Since the 1920s' is an article, which is a minor part taken from the major project.

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Availability of data and materials

The data used to support the study are available from the corresponding author and can be accessed at any time upon reasonable request.

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