

CONSERVATION PRACTICES AND CHALLENGES OF THE BAYSO COMMUNITY IN GIDICHO ISLAND, SOUTHERN ETHIOPIA

¹*Eshetu Fekadu

¹ Arba Minch University, Department of Sociology and Social Anthropology, Arba Minch, Ethiopia.

Email: eshetufekadu@gmail.com

*Corresponding Author: Eshetu Fekadu (eshetufekadu@gmail.com)

Received: 26 June 2026 **Revised:** 29 July 2026, **Accepted:** 25 August 2026, **Published:** 01 Sept 2026

Vol:6, Issue 3 (2026)

Doi: 10.5281/zenodo.21782779

Abstract

The Bayso are inhabitants of Gidicho Island and the surrounding areas of Abaya Lake and have developed a remarkable traditional ecological knowledge over time. For them, it is more than just knowledge; rather, it is spiritual and cultural, firmly intertwined with the lives of the community, their livestock, and their environment. It helped the Bayso maintain the abundance (*mogossa*) of their natural environment (*ul*) through religious rituals and practices that have been vibrant for generations. Lately, however, this knowledge faces a threat of extinction. Despite its ecological and cultural importance, the conservation practices on Gidicho Island and areas on the western coast of the Lake are not well documented in the literature. This study examines Bayso's environmental conservation knowledge, strategies, and practices, highlighting what places them in a vulnerable situation. Informants were selected via snowball sampling, and the study sites were selected purposively to get an appropriate representation of Bayso villages. Findings reveal that Bayso's religious rituals of environmental conservation involve prayers, *hulluuqaa*, and *oborro*, while the cultural practices include climate monitoring, taboo, terrace construction (*dem*), use of floodwater, controlled fire (*golla*), and crop rotation. These are not only conservation practices but also adaptive patterns of livelihood. Therefore, this paper argues that studying the local conservation practices and challenges of a specific community, such as the Bayso, helps to preserve valuable knowledge that might otherwise be lost. It also offers practical lessons from successes and failures that can guide cultural communities with comparable environments, cultures, and constraints. Sharing these insights strengthens collaboration, enabling cultural communities worldwide to adopt effective strategies without having to start from scratch.

Keyword:

Bayso,
Challenges,
Gidicho Island,
South Ethiopia



This is an open-access article under the CC BY-SA license.

Doi: 10.5281/zenodo.21782779

1. Introduction

Ethiopia is endowed with diverse natural resources, including fertile soil, rich biodiversity, abundant water, and an array of minerals (Ethiopian Biodiversity Institute 2022). These resources are predominantly sustained by cultural communities, who possess indigenous conservation knowledge that is deeply rooted in cultural values and local institutions (Wassie 2020). However, these essential approaches to traditional ecological knowledge (TEK) and conservation face an emerging threat (Berkes 2012). This is attributed to accelerated modernization, government development projects, environmental conditions, the breakdown of traditional systems, and the displacement of the cultural values of indigenous communities (Berkes 2012). The loss of these local practices represents a dual crisis of biocultural diversity loss and the erosion of a vital, often context-specific, resource base for conservation efforts (Wassie 2020). Regionally, southern Ethiopia is also recognized as a melting pot of ethnic groups, with distinct socioecological structures well suited to the area's micro-conditions (Maru and Haile 2020). Despite the region's political and economic transformation, its resource management systems have frequently been threatened, creating an unstable balance between development needs and resource management (Engdawork and Hans-Rudolf 2017). Land used for cultivation and pasture, as well as bodies of water such as the Rift Valley Lakes, are critical habitats facing high levels of anthropogenic pressures from land-use change and climate shifts (Alem, Tsendbazar, and Speelman 2025). Locally, Gidicho Island, which is situated in Lake Abaya, Ethiopia, was inhabited by the Bayso people long ago. The culture and lifestyle of this small ethnic group are intricately linked with that of the environment (Fekadu, Hebo, and Emirie 2024). The Bayso have developed distinct conservation practices, including religious rituals, customary laws, taboos, and communal management strategies governing the use of grazing lands, forests, and medicinal plants, among others. These practices have ensured the sustainability and abundance (*mogossa*) of the local environment (*ul*) through generations. However, Bayso's local conservation practices are currently fading out, causing heavy damage to the area's natural resources. This crisis has had a significant impact on the community's social, cultural, and economic well-being. Despite its ecological and cultural importance, the conservation practices on Gidicho Island are not well documented in the literature. This study, therefore, examines Bayso's local conservation practices, as well as the challenges they face in their conservation efforts. By focusing on Bayso's conservation practices, the study provides in-depth qualitative insights into the mechanisms, effectiveness, and threats to TEK-based conservation. The findings will contribute to the broader academic understanding of biocultural conservation and offer practical, context-based recommendations for policymakers and development agencies. Eventually, the study advocates the recognition and integration of Bayso's TEK into the conservation and development planning of Gidicho Island and its coastal areas, and other vulnerable ecosystems throughout the region.

2. Theoretical deliberation

2.1 Traditional ecological knowledge

TEK is a holistic, intergenerational body of adaptive knowledge, land stewardship practices, and spiritual beliefs that frames humans as inherently interconnected with their biophysical environment (Berkes, 1993, 2012; Nepal, 2024). Rather than an anthropocentric model, this body of knowledge encompasses a relational view that embraces complex ecosystems, species, and environmental interactions, offering a holistic picture that reflects a community's entire worldview (Berkes, 2012; Kimmerer, 2021). By promoting a deep understanding of human-environment interdependencies through indigenous methods, TEK has a long record of success in supporting human livelihoods while preserving biodiversity (Kimmerer, 2021; Khosravi & Escobedo, 2025). Ultimately, TEK offers a valuable framework for community conservation that challenges Eurocentric models by recognizing indigenous practices as dynamic, historically rooted, and scientifically valid systems of ecosystem management (Fletcher et al., 2021).

By utilizing a TEK lens, the academic perspective shifts from viewing local communities as conservation threats to acknowledging them as active agents with deep, multigenerational ecological understanding intertwined with their cultural identity and livelihood security (Mistry & Berardi, 2016). This framework reveals that contemporary conservation issues often stem from structural pressures, such as land encroachment, political marginalization, and climate disruptions that damage traditional resource management, rather than localized ecological failures (Gavin et al., 2015). However, TEK faces severe institutional limitations when conventional academic frameworks fragment it from its holistic cultural, moral, and spiritual contexts, reducing rich traditions to mere 'data points' to fit Western empirical metrics (Ludwig & Poliseli, 2018). This creates sharp power imbalances and analytical biases, as TEK is frequently marginalized or validated only when it aligns with Western scientific standards, disregarding the autonomy of knowledge holders (Ludwig & Macnaghten, 2019). To overcome these limitations, contemporary research must shift from selective integration to cross-cultural, community-led knowledge co-production. While the need for co-production is widely recognized, existing literature rarely addresses how these collaborative frameworks apply to highly specific, isolated, and climate-vulnerable ecosystems. A typical example in this regard is Gidicho Island in the Lake Abaya basin, an enclosed environment subject to concurrent pressures from various factors, including severe soil degradation, geographical containment, and fluctuating water levels.

This theoretical framework was designed to examine the unique socio-ecological landscape of the study area and to understand how the indigenous Bayso people navigate and cope with existential constraints. The study advances the fields of environmental anthropology by focusing on three key areas. Firstly, it attempts to conceptualize the dynamics of confined spaces and demonstrate the historical effectiveness of periodic movement (*gondossa*) within isolated island and coastal ecosystems, in addition to their religious rituals. Secondly, it examines how dual pressures from climate change and overgrazing force the study community to violate traditional ecological taboos (e.g., cutting down trees to produce charcoal), thereby highlighting the direct link between cultural erosion and ecological degradation. Thirdly, it demonstrates the importance of combining modern, top-down conservation mechanisms such as afforestation and terrace construction with TEK frameworks, such as indigenous soil bunds (*dem*) and controlled fire management (*golla*), in the future governance of the natural resources of the Gidicho Island and the surrounding coastal areas.

3. Methodology

3.1. The study area context

Gidicho is the largest Island on Lake Abaya, which was inhabited by the Bayso and Haro communities until their recent migration to the west coast areas of the Lake due to heavy resource degradation that is caused by the recurrent drought and overgrazing (Fekadu, Hebo, and Emirie 2024). As a minority in the region, they have rich cultural traditions and practices and unique rituals that have contributed significantly to the environmental sustainability of the Lake region. Historically, the Bayso were under an indigenous administrative system called 'Wonno' led by a local leader who held the same title (Fekadu, Hebo, and Emirie 2024). A *Wonno* had both administrative and spiritual authority, a practice that persisted until the Bayso were integrated into the Ethiopian Empire under Emperor Menelik II in the late 19th century (Eshetu 2014). After their incorporation, local governors (*balabats*) were appointed by the emperor's provincial governor to oversee administrative functions, while a *Wonno* continued to fulfil the vital role of spiritual leadership. Each Bayso village had its own *Wonno*, responsible not only for the community's well-being but also for the health of their herds and the environment, through religious rituals and local practices (Fekadu, Hebo, and Emirie 2025). The Bayso are currently one of the three ethnic groups that make up the administration of the Gamo Zone, and their heritage plays a significant role in the region's identity (Epplé 2016). The study reveals that four decades ago, Gidicho Island and its surrounding coastal areas were renowned for their rich vegetation, fertile soil, grazing lands, and disease-free environment, making them ideal places to live, herd livestock, and

farm. However, they have experienced significant damage to their natural resources, such as pasture and arable land, due to recurring drought and overgrazing since the late 1980s (Seid and Teferi 2019). Over the past four decades, population growth, poverty, and climate change have exacerbated overgrazing and deforestation, resulting in environmental degradation and hardship on the island and in the surrounding areas (Petros 2019). This has forced the formerly affluent community into poverty and led them to engage in practices that were previously considered taboo, such as charcoal production and firewood sales, which further damaged the environment. Traditionally, the Bayso were pastoralists who herded cattle, goats, and donkeys, supplementing their income with small-scale farming and apiculture (Sava 2011). They were renowned for their milk and dairy products (Epple 2016). However, environmental degradation and cattle diseases have decimated their herds. Since the 1980s, this dire situation has forced them to adapt, shifting their primary focus to agriculture and showcasing their resilience in the face of adversity. A few others, especially the youth, are engaged in fishing (Fekadu, Hebo, and Emirie 2025).

3.2 Study design and methods

To realize Bayso's insights into TEK, local practices of environmental conservation and religious rituals, the researcher employed a qualitative design. Accordingly, two study sites, Gidicho and Alge, were purposely selected. Each study site has its own unique significance. Gidicho is home to the Bayso's heritage and is steeped in vibrant traditions and practices that reflect their profound connection to the land. Alge, the administrative center of the Bayso people, has accommodated the majority of the population since the 1980s and embodies their local governance and community spirit. On the other hand, informants with essential local knowledge and expertise in environmental conservation were recruited for the study using a snowball sampling method involving participant referrals. The researcher initiated the process by selecting the first participant who met the necessary criteria (possessing relevant local conservation knowledge), with the valuable assistance of research assistants. This participant then provided referrals to additional informants until data saturation was achieved. Snowball sampling not only proved to be efficient and cost-effective but also facilitated connections with individuals who are often hard to reach (Naderifar, Goli, and Ghaljaie 2017). Data were collected through in-depth interviews, focus group discussions (FGD), and field observations. The researcher successfully conducted in-depth interviews with 20 informants, including respected community leaders, former ritual leaders (Wonnos), *woreda* (district) officials, including environmental protection experts and agricultural extension workers (see Table 1).

Table 1: Interview participants' profile

Participant group	Sex			Age range	Distribution across study sites	
	Male	Female	Total		Alge	Gidicho
Professionals	3	1	4	27-45	3	1
Youth	4	2	6	20-30	4	2
Ritual leaders	2	2	4	73-85	4	0
Local leaders	2	0	2	60-75	2	0
Elderly	2	2	4	66-87	3	1
Total participants	13	7	20		16	4

This comprehensive approach ensured a detailed and nuanced understanding of the local context. The interviews centered on themes: Bayso's local conservation mechanisms and factors that risked these conservation practices. Additionally, the researcher conducted six FGDs (with 10 participants in each focus group, having representatives from all age groups and social categories) that is four in Alge and two in Gidicho. The interviews were purposely designed to resonate with the key research themes identified earlier, validating and enriching the insights gathered from the in-depth interviews. In addition to engaging in thoughtful discussions, the researcher made field observations in forests, pastures, farmland, and ritual sites. These observations were enriched by informal yet informative conversations with elders, youth, and ritual leaders, which provided profound insights into their unique methods of environmental conservation. While research assistants played a crucial role by organizing and recording interviews and group discussions, the researcher took essential notes during these interactions. Verbal consent was secured to record participants' responses, and assured of their anonymity and safety throughout the study. During the final synthesis stage, field observation notes and discussion transcripts were systematically reviewed to identify and reconcile data gaps. This enhanced both textual clarity and empirical validity. The finalized dataset was evaluated using manual coding and thematic analysis to reveal broad cultural patterns in their deep contextual settings. Specifically, the analysis examined how religious and cultural practices, such as rituals, prayers and resource taboos, maintain spiritual-environmental balance, while also evaluating the community's local conservation practices, such as soil terracing, controlled fire usage, seasonal mobility, and floodwater use. Finally, the analysis took into account the institutional and contextual challenges disrupting these systems, critically investigating the impact of external pressures such as environmental degradation, cultural erosion, and conflicting state policies on local autonomy.

4. Findings and discussions

4.1 Bayso's local mechanisms of environmental conservation

The Bayso are known for their TEK and practices, which have played a vital role in environmental conservation and improving their livelihoods. These include religious rituals (prayers and sacrifices), climate monitoring and early warning, and local practices.

4.1.1 Religious rituals

Various scholarly research on African Traditional Religions (e.g., Ndemanu 2018) shows that praying is not only an act but an essential aspect of their spirituality in which they aim to connect with God and the mighty spiritual elements that impact their lives. Ndemanu adds that prayers are often concise, extemporaneous, and direct, reflecting the urgency of the needs they address. Many are prayed with sacrifices and offerings, specifically designed to mitigate threats like drought and floods. The Bayso serves as a compelling example of this belief, viewing their religious practices as crucial tools for overcoming environmental challenges. The study reveals that prayers are an indispensable part of every Bayso's life, whether in private or in public. They work diligently to ensure their well-being, safeguard their herds, and promote abundance in their *ul*. The Bayso hold a deeply rooted belief system centered around a Supreme Being known as *Wa'a*, the creator of all living things (*nefo kaabo*) and non-living things (*nefo-kaliki*). Equally, ancestral spirits (*gaariun en'tano*) are honored for their continued influence on the lives of their descendants, serving as a reminder of the past and the importance of lineage. Additionally, the Bayso recognize the presence of malevolent forces, such as the devil (*durisa*), an invisible power that lurks on the outskirts of villages, burial sites, riverbanks, and the shores of Lake Abaya. This spiritual thought instils a strong belief in the power of individuals and the collective, emphasizing the significant impact of communal curses (*hiliko*) and blessings (Epple 2016). The Bayso view these forces not only as vital to their existence but as essential for sustaining their herds and enhancing their *ul*.

Therefore, any actions that defy the will of these spiritual entities, like showing disrespect to ritual leaders and elders, neglecting regular sacrifices and offerings, or violating established community norms, can provoke their wrath. The consequences of such transgressions can be damaging, resulting in curses that manifest as droughts, floods, pests, and epidemics (Fekadu, Hebo, and Emirie 2024). This implies that honoring these traditions and beliefs is crucial for the well-being of the Bayso community and their *ul*. To restore harmony with these divine forces and their *ul*, the Bayso community actively engages in prayer and performs conciliatory rituals and sacrifices. During times of environmental crises like drought, *Wonnos* would zealously pray, saying: "*Wa'a, Wa'a, edamun kenina... Oh God, oh God, please give us rain. Barar kenina... please bestow upon us abundance.*" These prayers highlight the profound connection between their spirituality and the abundance of their *ul*. They also carry out a ritual called *hulluuqaa* to save them from natural calamities such as drought, flood, and epidemic outbreaks. This is carried out in every village under the leadership of elders and *Wonnos*. In the event of drought, flood, epidemic, and other adversities, according to a former *Wunno* in Alge village, *Wonnos* would tie a creeper between two trees to form the right and left sides. Then, all the villagers and their animals, except goats, had to pass through it. As they emerged on the other side, the *Wonnos* would sprinkle the blood of an animal sacrificed for the ritual onto the villagers and their animals. It was strongly believed that a person with a guilty conscience could not take part in such rituals for fear of unwanted consequences against him or his family. Secondly, the neglect of the ritual could invite disaster to the community. Similarly, the Bayso practice a ritual using a mixture of honey and milk called (*obooro*). The study highlights that *Wonnos* spat this mixture onto individuals and animals upon their arrival on the island from nearby villages and markets. It is believed that this sacred practice protects against the spread of disease. Equally, *Wonnos* play a crucial role in blessing their villages, inhabitants, herds, and *ul* by spattering *obooro*. The Bayso regard it as the finest remedy offered by *Wonnos*, helping to restore the health of people, animals, and their *ul*. This finding supports TEK frameworks, showing how religious practices and rituals act as crucial institutional mechanisms for environmental conservation by 'sacralizing the natural world' (Berkes et al., 2000). By regarding ecosystems, water bodies, and forests as sacred, spirit-inhabited spaces or divine creations, rather than just economic resources, these rituals foster deep spiritual accountability and a cultural ethic of restraint (Berkes et al., 2000).

4.1.2 Climate monitoring and early warning

The study indicates that the Bayso people have long benefited from the know-how of religious specialists, who, alongside the *Wonnos*, play vital roles in their ritual system. One such expert is particularly skilled at interpreting environmental signs and predicting natural disasters, such as drought. For instance, they predict drought by noting that the popular Bayso plant, *mayala*, turns green during periods of intense heat and dry air accompanied by a foggy sky (*eyotte saare*) (Fekadu, Hebo, and Emirie 2024). Climate prediction and early warning systems are not unique to the Bayso; many pastoralist communities across Africa also rely on local knowledge of weather forecasting to enhance their livelihoods. By understanding and forecasting climatic changes, pastoralists can manage their livestock effectively, mitigate risks during harsh seasons, and seize opportunities when conditions are favorable. For instance, the Gabra pastoralists in southern Ethiopia have a wealth of knowledge about weather patterns, which helps them prepare for important climate-related events such as rainfall and drought (Alemayehu and Hizkel 202). This posits that context-based weather forecasting in rural communities aligns with modern climate monitoring through a shared reliance on systematic observation and pattern recognition (Berkes, 2012). While modern meteorology tracks macro-scale atmospheric dynamics using satellites and computer models, local communities utilize micro-scale biocultural indicators, such as plant phenology (blooming cycles), altered animal behaviors, and local wind directions, to predict immediate, site-specific weather shifts. In general, context-based weather forecasts, which are rooted in deep local knowledge and lived experience, are crucial for local communities because they identify patterns that are often overlooked by broader climate monitoring models.

4.1.3 *Gondossa*

The livelihoods of pastoralists have recently become increasingly at risk due to severe environmental changes, which have significantly reduced the availability of grazing land and caused their herds to decline. In response to these challenges, many pastoral communities have adopted seasonal migration as a vital strategy to address grazing shortages (Jebessa and Zelelalem 2014). For instance, the pastoral community in Itang Special *Woreda* in the Gambella region moves with their cattle during the dry season (Gadet, Adino, and Petors 2024). Regarding the Bayso, the findings reveal that they had had similar experiences. One of the key informants from Alge village shared the following insight:

During extreme droughts, which lead to severe degradation of resources, we migrate with our herds (*gonodossa*) either east of the lake to the Guji-Oromo territories or west to the coastal regions (to the Gamo areas) in search of better pastures. These migrations (*gondossa*) are not without challenges, such as the attacks by deadly Nile crocodiles while crossing the lake, and competition for resources in the new areas can put a strain on our relationships with the local communities. However, to ensure the survival of our cattle, we are compelled to take these risks. Knowledge of traditional migration routes and the ability to read signs of environmental change are crucial skills passed down through generations. These skills guide our movements and help us navigate the harsh realities in the region. We also rely on complex social networks and oaths (*chaaqo*) with other communities in the region to facilitate movement and minimize potential conflict (Chumbaro Assefa, Alge, 13 Nov. 2023).

The above excerpt suggests that the *Gondossa* practice of the Bayso people is a traditional adaptive management system that prevents the overexploitation of the fragile ecosystems of Lake Abaya. This practice formalizes ecological rest periods and reflects a deep cultural ethic of resource conservation, linking human survival to local natural cycles.

4.1.4 Setting fire on grazing lands (*golla*)

As can be inferred from the findings, the Bayso also have a tradition of setting fire (*golla*) to grazing lands essentially for two main reasons. Firstly, they believe that burning a grazing land during the dry season encourages new growth after the rainy season in July and August (*badhessa*). Secondly, they view this practice as a means of controlling pests that threaten their herds. This tradition has been passed down through generations and is deeply ingrained in the life of the Bayso. In regard to the timing of *golla*, informants posited that it is usually performed just before the *badhessa* begins. Through experience, they have learned that new grass sprouts quickly on dusty land, providing better grazing for their cattle. While some educated individuals question the *golla*, arguing that it damages natural resources, for the layman, Bayso, it has always been the most effective method of ensuring good grazing and keeping pests. In TEK, controlled fire is a sophisticated conservation strategy, not a destructive force. It is an intentional and adaptive tool for landscape management, ecosystem modification, habitat regeneration, and pest control.

The above two findings underscore that *gondossa* and *golla* exemplify the resilience and adaptability of pastoral communities in response to environmental challenges, accentuating the importance of sustainable strategies. The TEK inherent in these practices offers valuable insights into climate change adaptation and resource management. For instance, *gondossa* strategically moves livestock to diverse grazing areas based on seasonal rainfall and vegetation patterns, ensuring livestock well-being and preventing overgrazing. Similarly, *golla* manages grazing lands for regrowth, ensuring sustainable pasture and contributing to cattle health through pest control.

4.1.5 Taboos/prohibitions

Scholarly works report that taboos/prohibitions limit people from cutting down trees from sacred sites, killing animals, and injuring them carelessly (Yosef, Aster, and Getahun 2020). In regard to the Bayso, cutting trees and collecting firewood from ritual and burial sites is taboo. Besides, cutting trees or clearing forests for agricultural land or any other purpose without the permission of a *Wonno* was prohibited. Even cutting trees for construction purposes (e.g., houses, granaries, fences) with the consent of a ritual leader restricts excessive destruction. In collecting firewood, it was a must to pick fallen trees or cut branches only. Besides, according to FGDs in Gidicho Island, children were not allowed to go to the forest with hatchets for the reason that they may naively damage trees. The Bayso believed that ritual sites, burials, and lakesides were considered an abode of gods and ancestral spirits. Thus, doing activities in these areas was restricted. Violating these prohibitions is taboo, resulting in grave punishments, including environmental hazards such as drought. Therefore, it is logical to argue that these taboos/prohibitions informally contribute to environmental conservation by limiting inhabitants from damaging natural resources carelessly.

4.1.6 Hay saving

The study reveals that the Bayso have a tradition of saving hay during the bountiful seasons to feed their livestock during the dry months, when pasture becomes scarce. An elderly person from Alge village made the following comments in his interview on this subject.

During the rainy season in July and August, Gidicho Island and the surrounding areas of the lake are covered by rich grass that our cattle cannot possibly consume. Conversely, during the dry season, our herds suffer from a shortage of grass due to a lack of rain. We address this issue by seasonal migration (*gondossa*) to resourceful areas and accumulating hay. To this end, we cut the grass during the dry season and leave it out in the sun for at least three days to prevent mold. Once dry, the hay is collected and stacked in trees to protect it from termites and moisture (Dergu Darota, Alge, 09 Nov. 2023).

Equally, FGDs in Gidicho Island noted that they gather hay from both pastures and crop residues, such as sorghum and maize, storing it on stone bases or hanging it from tree branches to safeguard it against moisture and termite damage (see Fig. 1).



Figure 1: Hay stored on a tree branch in Alge village. (Photo by the author, Alge 2023)

According to Tesfaye and Chiratanayuth (2007), crop residues, particularly cereal straw and maize or sorghum remains, are crucial for sustaining livestock during long dry periods in Ethiopia. The Bayso wisely allocate their stored hay during times of scarcity, particularly during droughts, prioritizing the feeding of milking cows, calves, and sick animals. This practice highlights their detailed understanding and concern for animal health, as they believe that these vulnerable members of the herd deserve exceptional care during challenging times, ensuring the health and productivity of their livestock.

4.1.7 Terracing (*dem*)

Accounts posit that Indigenous communities in Ethiopia possess valuable local mechanisms for maintaining soil and grazing land fertility across generations. Notably, Birhanu and Wudinesh (2020) reported how the Gamo, Konso, and Derash people have effectively used stone terraces to combat soil erosion. In this regard, the Basyo have employed innovative terracing (*dem*) practices to combat soil erosion in the hilly areas of Gidicho Island. Findings reveal that they constructed these structures using small logs, stones, grass, and soil, placing them four to five meters apart. At a time of ploughing, they purposely redirected soil onto the *dem* and planted a running grass called (*sordi*) to enhance the strength of this structure. This structure meaningfully reduced soil erosion and helped to maintain soil moisture in farmlands. Usually, elders cautioned their families against damaging the *dem*, warning that such actions would lead to soil loss. While visiting north of the Haro village on the island, the researcher observed some remnants of these local structures (see Fig. 2).



Figure 2: Age-old terrace (*dem*), Gidicho Island. (Photo by the author, Gidicho Island, 2023)

Unfortunately, the Bayso people have largely abandoned this invaluable practice due to their migration. Moreover, the modern conservation mechanisms introduced by government officials do not take into account contextual differences, such as local knowledge and environmental realities. Consequently, the Bayso now faces ongoing challenges with resource degradation exacerbated by severe droughts and floods. This highlights the urgent need to bridge the gap between the sustainable practices of indigenous communities and modern conservation strategies.

4.1.8 Crop rotation

Crop rotation stands as a pillar of sustainable agriculture, honored for centuries for its remarkable benefits to soil fertility, crop yield, and overall farm productivity (Birhanu and Wudinesh 2020). Informants emphasize that crop rotation involves systematically alternating crops in a specific area over time.

This helpful method protects against soil mineral depletion, as each type of crop draws on different minerals, facilitating their natural replacement. Particularly, informants mentioned the role of legumes in their context. In the study area, legumes, including chickpeas and beans, are often planted following maize or sorghum harvests, and they believe that this rotation has significantly contributed to the soil fertility of farmlands on both Gidicho Island and coastal areas of the lake. Correspondingly, Thompson (2025) noted that crop rotation is not just a traditional practice; it is a science-driven strategy that boosts soil fertility, reduces reliance on chemical fertilizers, and paves the way for sustainable and eco-friendly farming systems. Likewise, studies by Abereha et al. (2019) in Tigray, Ethiopia, and Norman et al. (1995) in Hausa and Bambara, Nigeria, show that local farmers have historically used TEK for soil fertility management through legume-cereal interactions. The point is that such local communities' understanding of legumes' contribution to soil health mirrors contemporary scientific knowledge, suggesting that integrating local practices into modern conservation efforts could boost Indigenous communities' capacity for environmental protection.

4.1.9 Floodwater

Soil salinity poses a persistent challenge to agricultural and pastoral communities in Ethiopia. Forecasts indicate that approximately 50% of the land in Ethiopia could become saline within the next 50 years (Mustafa and Akhtar 2019). According to these authors, effective coping techniques can significantly mitigate the harmful effects of soil salinity. In the Bayso context, rising lake levels are already inundating large areas of grazing and agricultural land along the coast. The main issue here is not the flooding of the lake water itself, but the salinity of the lake water and the saturation of salt in the soil (known locally as *gorra*, see Fig.3), which damages crops and grazing fields.



Figure 3: Impact of earth salt (*gorra*) on coastal farmlands. (photo by the author Alge, 2023).

Congruently, Yalelet, Kinfu, and Samuel (2022) reported that the saline nature of Lake Abaya's water is unsuitable for direct irrigation due to the risk of soil degradation. In response to this crisis, the Bayso used to divert floodwaters that comes from the Gamo Highlands to the affected areas, as can be seen in (Fig. 3). Findings indicate that the diversion of flood water to saline soils has two benefits: Firstly, it reduces salinity neutralizing the salt in the soil, and secondly, the loam soil transported by the flood from highland areas, add to the fertility of the soil affected by salinity. Similarly, Tedeschi, Schillaci, and Balestrini (2023) asserted that applying excess fresh water during the growing season, or even before planting to saline soils, can help wash away some of the salts from the root zone. Studies of cultural communities in arid and semi-arid regions suggest that they use seasonal floodwaters to reclaim salt-affected land through a process known as salinity leaching. For example, Van Steenberg et al. (2020)

noted in their study of the Afar and Amhara regions of Ethiopia and the Wadi Tuban and Zabid regions of Yemen that agro-pastoralists and smallholders divert heavy, sediment-rich seasonal floods from the highlands onto low-lying arid fields using traditional earthen channels. This process flushes accumulated salts deep below the crop root zone, thereby sustaining staple crops.

The discussions so far have highlighted the Bayso's unique TEK, which is strictly bound by an insular environment and anchored by a deeply spiritual worldview centred on *ul*. For the Bayso, *ul* is an extension of the self, a philosophy encapsulated by the phrase '*ul hiki enijuromaya*' that is to mean damaging the *ul* (environment) is self-damage. Although such practices are deeply localized, they mirror global paradigms of indigenous resource management. Like that of the Maasai and Samburu of Kenya, the Bayso utilize structural mobility (*gondossa*) and controlled burning (*golla*) to regulate grazing and regenerate pastures. Furthermore, their sophisticated landscape modifications, including terracing (*dem*) and the strategic diversion of floodwaters to mitigate soil salinity, indicate the advanced agro-ecological engineering seen in Amazonian Terra Preta¹. However, unlike the expansive plains of East Africa or the humid forests of the Amazon, the Bayso operate within the strict confines of a fragile Rift Valley Lake ecosystem. Consequently, their TEK represents a highly specialized form of adaptation in response to profound ecological constraints, generating remarkably resilient and intensive conservation strategies.

5. Factors that endangered Bayso's environmental conservation practices

5.1 Decline of their indigenous belief system (IBS) and the introduction of Christianity

The findings indicate that the decline of Bayso's IBS has significantly weakened their commitment to environmental care and conservation. Once deeply rooted in religious principles and values that fostered a harmonious relationship with nature, the loss of their IBS has weakened their ability to protect the environment. Furthermore, the advent of Christianity, especially Protestantism, introduced a perspective among new converts and missionaries that considers Bayso's rituals, taboos, and local environmental protection mechanisms as diabolical. A study by Fekadu, Hebo, and Emirie (2024) reinforces this remark, revealing that the Bayso, in abandoning their IBS, have rejected the foundational principles, values, and customs of their belief system. This shift has led them to overlook the vital role of ancestral spirits and to undermine the authority of ritual leaders and experts who once played pivotal roles in the community's lives. Their reluctance to adhere to the sanctions, taboos, and guidance of these spiritual leaders has significantly weakened their environmental conservation efforts. Equally, Freeman (1999) reported a similar trend in the Gamo highlands, where the Derg regime's socialist ideology, known for its anti-religious sentiment, devalued the IBS of the Doko community, labeling it as 'backward' and coercing adherents to abandon essential religious practices. This historical context underscores the critical connection between belief systems and environmental conservation, illustrating the profound impact that religious shifts can have on communities dedicated to sustainable practices.

5.2 Ageing and death of knowledge custodians

Indigenous knowledge faces growing threats from sociocultural and environmental pressures. In this regard, Haines et al. (2017) highlighted how disregard for local knowledge and migration due to resource degradation accelerates the loss of indigenous practices. Informants from Alge village emphasized the detrimental impact of the loss of knowledge custodians on local knowledge systems.

¹ (Hecht, 2003)

For example, Ato Balamo Woreba, a Bayso elder in Aige Village, noted that the death of these individuals has weakened local environmental conservation practices. Equally, as highlighted in the theoretical framework of this study, TEK is often confidential and depends on the willingness of custodians to share it, and this has caused permanent loss as knowledgeable individuals age or die. Likewise, Afolayan (2009) argues that the loss of knowledge custodians, migration, and the overwhelming influence of Western culture threaten the sustainability of invaluable cultural traditions in Africa. Afolayan adds that resource degradation forces communities to abandon their cultural lands, forcing them into unfamiliar lifestyles that often clash with their deeply held values. This disruption not only undermines their traditional way of life but also threatens the rich local knowledge and practices that have been cherished for generations.

5.3 Government policy issues

Before the 1980s, the Bayso maintained their local knowledge and traditions, likely for generations, due to their Island's isolation, facilitated by Lake Abaya (Epple 2016; Sava, 2011). However, environmental degradation caused by droughts and human activity led to resource scarcity, forcing the Bayso to migrate. In response to this crisis, the military government initiated a villagization program in 1987 along Lake Abaya's western shores (Fekadu, Hebo, and Emirie 2024). Some informants were critical of this plan, arguing that although it is logical to move citizens from drought-affected areas to resource-rich areas to save the lives of those affected and to create favorable conditions for the revitalization of degraded areas, it was not successful in the context of the Bayso for the following reasons: Firstly, the way pastoral communities value and interact with their environment is very much different from that of peasants. In those days, they had a land tenure system in which each clan had its plot of land for living, grazing, cultivation, and burial. As this was the cultural set that guided their land use, they were not prepared to accept a concentration of people in a given area and share a village with other ethnic groups. This was because they feared that other ethnic groups would indulge in their values and traditions. Secondly, the villagization program brought the Bayso, Gamo, Wolayta, Haro, and others together in one village, so the sociocultural life of these people was affected in some ways. For example, the Bayso lost their local knowledge and practices that played an important role in protecting their *ul*, such as *gondossa*, *hulluuqaa*, *golla*, and *dem*. This implies that the government's development plans and strategies that neglect local contexts pose a serious threat to the socio-economic and cultural vitality of Indigenous communities in Ethiopia. Ignoring these unique circumstances not only undermines local knowledge and practices but also risks the very foundations of cultural traditions and the natural environment that sustains them. Such initiatives must embrace and integrate the voices of the communities they aim to support to ensure a future where both cultural richness and environmental integrity flourish.

6. Conclusion

The Bayso are a minority group in the Abaya Lake region who have a wealth of local knowledge embedded in their spiritual and cultural practices. It had a supreme role in sustaining the well-being of the community, their livestock, and their *ul*. The Bayso view their relationship with the environment through a religious lens, where their sociocultural traditions and religious beliefs drive their conservation initiatives. The study reveals that the Bayso consider themselves inextricably linked to their *ul*, emphasizing that it is the basis of their lives and herds. Accordingly, they argue that harming the *ul* is just like harming themselves, a notion that highlights the profound link between personal well-being and environmental wealth. This insight illustrates that communities that feel deeply intertwined with their environment are more likely to foster harmonious relationships that promote mutual benefit and value the environment as an extension of themselves.

Based on their religious thoughts and concern for environmental values, the Bayso developed robust religious rituals, including prayers and sacrifices directed towards supernatural forces such as the Supreme Being (*Wa'a*) and ancestral spirits (*garun et tano*). These religious thoughts were instrumental in creating harmonious relationships with supernatural forces, protecting the Bayso from natural disasters like droughts and floods, and ensuring regular seasonal rainfall. In addition to religious rituals, they implemented essential cultural practices like periodical moves with their herds (*gondossa*), controlled burning of pastures (*golla*), terracing (*dem*), and redirecting floodwaters to saline soils. These techniques were effectively designed and executed to revitalize the fertility of agricultural and pasture lands, significantly boosting both animal and plant productivity. As highlighted in the theoretical deliberations of this study, since indigenous knowledge is a reflection of the spiritual and cultural life of distinct groups and is essentially adapted to fit specific environments, its contribution to environmental conservation is enormous. Recently, however, the TEK of the Bayso people has been increasingly under threat due to several factors. The decline of traditional beliefs, the introduction of Christianity, the loss of knowledge custodians, and government policies like villagization contribute to the loss of local conservation mechanisms. Studying conservation practices in communities like the Bayso helps preserve valuable knowledge and offers practical lessons for similar communities. Sharing these insights fosters collaboration and allows communities worldwide in similar contexts to adopt effective strategies. What is more, integrating local wisdom into modern conservation strategies strengthens community-led initiatives and necessitates a shift from top-down methods to participatory, community-based approaches.

Ethical statement: The study was fully based on voluntary and informed verbal consent, along with the assurance that participants could withdraw at any time. As the study involved no laboratory testing or direct human experimentation, ethical clearance from the Arba Minch University Ethical Review Board was not sought. However, the study adhered to the accepted principles of research ethics for qualitative fieldwork, including respecting individuals, minimizing risks, and maintaining confidentiality.

Author contribution: The corresponding author, Eshetu Fekadu, carried out all the research work and wrote this manuscript.

Conflicts of Interest: The author declares no competing interests.

Disclosure of AI use: The author used Grammarly to proofread the paper and improve its language.

Acknowledgement: I would like to extend my heartfelt thanks to my informants and research assistants for their unreserved effort in the accomplishment of this study.

References

- Abreha, A., Assefa, F., & Belay, M (2019) The role of traditional practice of cereal-legume cropping systems in the improvement of soil fertility by enhancing soil microbes in Tigray, Ethiopia. *International Journal of Environmental Sciences*, 18(1):1–9.
- Afolayan, A (2009) We are all postmodernists now! African philosophy and the postmodern agenda. *Wisdom and Philosophy*, 5 (2): 53–78.
- Alemayehu, D., Hizekeal, Y (2022) The Relevance and Practices of Indigenous Weather Forecasting Knowledge among the Gabra Pastoralists of Southern Ethiopia. *Journal of Agriculture and Environment for International Development*, 116(1): 59–76. <https://doi.org/10.36253/jaeid-12295>
- Alemu, B., Tsendbazar, N., & Speelman, xE. N (2025) Land-use change and Lake Eutrophication: Stakeholders' perceptions on practices and policies in Ethiopia, DOI: 10.1016/j.indic.2025.100880
- Armstrong, C (2024) The biodiversity crisis and global justice: a research agenda, *Critical. Review of International Social and Political Philosophy*, DOI: 10.1080/13698230.2024.2380218

- Berkes, F (1993) Traditional ecological knowledge in perspective. In J. T. Inglis (Ed.), *Traditional ecological knowledge: Concepts and cases* (pp. 1–9). International Development Research Centre (IDRC).
- Berkes, F (2012) *Sacred Ecology*. 3rd edition. <https://doi.org/10.4324/9780203123843>
- Berkes, F., Colding, J., & Folke, C (2000) Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications*, 10 (5): 1251–1262. [https://doi.org/10.1890/1051-0761\(2000\)010](https://doi.org/10.1890/1051-0761(2000)010)
- Birhanu, W., Wudinesh, N (2020) Documentation of Indigenous and Introduced Soil and Water Conservation Practices in Southern Ethiopia. *Agriculture and Veterinary*, 6(20)
- Engdawork, A., Hans-Rudolf, B (2017) Indigenous resource management practices in the Gamo Highland of Ethiopia: challenges and prospects for sustainable resource management. DOI:10.1007/s11625-017-0468-7
- Epple, S (2016) The Bayso people of Gidicho Island, Southern Ethiopia. An Ethnographic Sketch. <https://www.academia.edu/.../>
- Eshetu, F (2014) Socio-Cultural Factors that Affect the Role and Status of Women among the Bayso Community of Gidicho Island. *International Journal of Recent Research in Social Sciences and Humanities* 1, (1): 21-28, www.paperpublications.org
- Ethiopian Biodiversity Institution (2022) National Ecosystem Assessment of Ethiopia: Syntheses of the Status of Biodiversity and Ecosystem Services, and Scenarios of Change. <https://www.ecosystemassessments.net/content/uploads/2022/06/Composite-Book->
- Fekadu, E., Hebo, M., & Emirie, G (2024) Impact of Environmental Change on the Indigenous Belief System of the Bayso Community of Gidicho Island, Southern Ethiopia. *International Journal of Anthropology and Ethnology*, 8 (16), <https://doi.org/10.1186/s41257-024-00117-3>.
- Fekadu, E., Hebo, M., & Emirie, G (2025) Trends and Triggers of Environmental Change on Gidicho Island and Its Environs, Southern Ethiopia. *Island Studies Journal*, 20 (2): 103–125. <https://doi.org/10.24043/001c.132185>.
- Fletcher, M. S., Hamilton, R., Dressler, W., & Palmer, L (2021) Indigenous knowledge and the shackles of wilderness. *Proceedings of the National Academy of Sciences (PNAS)*, 118(40), e2022218118. <https://doi.org/10.1073/pnas.2022218118>
- Freeman, D. G (1999) *Transforming traditions: The dynamics of cultural variation in The Gamo Highlands, Southwest Ethiopia*. Department of Anthropology: London School of Economics, University of London.
- Gavin, M. C., McCarter, J., Mead, A., Berkes, F., Stepp, J. R., Peterson, D., & Tang, R (2015) Defining biocultural approaches to conservation. *Trends in Ecology & Evolution*, 30(3): 140–145. <https://doi.org/10.1016/j.tree.2014.12.005>
- Gatdet, C., Adino, K., & Petros, T (2024) The patterns of pastoralists' seasonal migration in Gambella region: the case of Itang special district. *Cogent Social Sciences*, 10(1). <https://doi.org/10.1080/23311886.2024.2354967>
- Global Diversity Foundation (2009) What are cultural practices of conservation, and what do they look like? <https://global-diversity.org/2019/12/23/what-are-cultural-practices-of-conservation>
- Gutema, G (2023) Conservation and indigenous peoples' struggle for livelihoods: Suba Park (Ethiopia), *Environmental Conservation*, 50 (4): 251 – 258. DOI: <https://doi.org/10.1017/S0376892923000218>
- Haines, J., Du, J. T., Geursen, G., Gao, J., & Trevorrow, E (2017) Understanding Elders' knowledge creation to strengthen Indigenous ethical knowledge sharing, 22 (4), <http://www.informationr.net/ir/22-4/rails/rails1607.html>
- Hecht, S. B (2003) Indigenous soil management and the creation of Amazonian Dark Earths: implications of Kayapó practices. In *Amazonian Dark Earths* (pp. 355-376). Springer, Dordrecht.
- Jakes, V (2024) The Role of Traditional Knowledge in Sustainable Development, *International Journal of Humanity and Social Sciences*, 3(2): 40 – 55
- Jebessa, T., Zelalem, B (2014) A literature review report on understanding the context of people transitioning out of pastoralism (TOPs) in Ethiopia. *PRIME*, Haramaya University.
- Kimmerer, R. W (2021) Weaving Traditional Ecological Knowledge into Biological Education: A Call to Action, *BioScience*, 52(5).
- Khosravi, M.A., Escobedo, F (2025) The role of traditional ecological knowledge and ecosystem quality in managing ecosystem services. *Sci Rep* 15. <https://doi.org/10.1038/s41598-025-17611-z>
- Ludwig, D., & Macnaghten, P (2019) Traditional ecological knowledge in innovation governance: a framework for responsible and just innovation. *Journal of Responsible Innovation*, 7, 26–44. <https://doi.org/10.1080/23299460.2019.1676686>
- Ludwig, D., & Polisel, L (2018) Relating traditional and academic ecological knowledge: mechanistic and holistic epistemologies across cultures. *Biology & Philosophy*, 33. <https://doi.org/10.1007/s10539-018-9655-x>

- Maru, Y., Gebrekirstos, A., & Haile, G (2020) Indigenous ways of environmental protection in Gedeo community, Southern Ethiopia: A socio-ecological perspective. *Cogent Food & Agriculture*, 6(1). <https://doi.org/10.1080/23311932.2020.1766732>
- Mustafa, G., Akhtar, M.S (2019) Crops and Methods to Control Soil Salinity. In: Akhtar, M. (eds) *Salt Stress, Microbes, and Plant Interactions: Mechanisms and Molecular Approaches*. Springer, Singapore. https://doi.org/10.1007/978-981-13-8805-7_11
- Mistry, J., & Berardi, A (2016) Bridging indigenous and scientific knowledge. *Science*, 352 (6291): 1274–1275. <https://doi.org/10.1126/science.aaf1160>
- Naderifar, M., Goli, H., & Ghaljaie, F (2017) Fereshteh Snowball Sampling: A Purposeful Method of Sampling in Qualitative Research. *Strides DevMed Educ*, 14(3), <https://doi.org/10.5812/sdme.67670>
- Ndemanu, M. T (2018) Traditional African religions and their influences on the worldviews of Bangwa people of Cameroon: Expanding the cultural horizons of study abroad students and professionals, *The Interdisciplinary Journal of Study Abroad*, 30(1): 70-84
- Nepal, T. K (2024) The Role of Traditional Ecological Knowledge in Environmental Stewardship: Beyond Poverty and Necessity, doi: 10.20944/preprints202406.
- Norman, D. W., Worman, F. D., Siebert, J. D., & Modiakgotla, E (1995) *The farming systems approach to development and technology transfer*. FAO.
- Petros, A (2019) Adaptations to a Changing Lacustrine Environment: Ethiopian Bayso Perceptions of and Responses to Ecological Risks [Unpublished manuscript]. MA Thesis, Arba Minch University
- Sava, G (2011) Endangered Bayso (Cushitic): Interesting typological and historical aspects. In Luca Busetto, Roberto Sottile, Livia Tonelli, and Mauro Tosco (Ed.), *He bitaney lagge: Studies on language and African linguistics in honor of Marcello Lamberti*, (pp.163–174). Milan: Qu. A.S.A.R.
- Seid, M., Hatuye, T (2019) A History of the People of Gidicho Island: An Overview From 1520s to 1995 [Unpublished manuscript]. Arba Minch University
- Tedeschi, A., Schillaci, M., & Balestrini, R (2023) Mitigating the impact of soil salinity: recent developments and future strategies. *Italian Journal of Agronomy*, doi:10.4081/ija.2023.2173
- Tesfaye, A., Chairatanayuth, P (2007) Management and feeding systems of crop residues: The experience of East Shoa Zone, *Ethiopia. Livestock Research for Rural Development*, 19 (3), <http://www.lrrd.org/lrrd19/3/tesf19031.htm>
- Thompson, E (2024 March 05) Understanding the Impact of Crop Rotation on Soil Fertility <https://husfarm.com/article/understanding-the-impact-of-crop-rotation-on-soil-fertility>
- Van Steenberg, F., Lawrence, P., Mehari Haile, A., Salman, M., & Faurès, J. M (2010) *Guidelines on spate irrigation (FAO Irrigation and Drainage Paper No. 65)*.
- Wassie, S.B (2020) Natural resource degradation tendencies in Ethiopia: a review. *Environ Syst Res*, 9 (33), <https://doi.org/10.1186/s40068-020-00194-1>
- Yalelet, A., Kinfe, K., & Samuel, D (2022) Impact of irrigation with Lake Abaya water on soil quality – southern Rift Valley, Ethiopia, *Water Practice and Technology*, 17 (7): 1433-1444. <https://doi.org/10.2166/wpt.2022.070>
- Yoseph, M., Aster, G., & Getahun, H (2020) Indigenous Ways of Environmental Protection in Gedeo community, Southern Ethiopia: A socio-ecological perspective. *Cogent Food and Agriculture*, 6. <https://doi.org/10.1080/23311932.2020.1766732>

Publisher: CLM Publishing Resources Malaysia



Open Access: This article is licensed under a [Creative Commons Attribution 4.0](https://creativecommons.org/licenses/by/4.0/) International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The images or other third-party material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

Data Availability Statement: All relevant data are within the manuscript and its [Supporting Information](#) files.