

Impact of environmental change on the indigenous belief system of the Bayso Community of Gidicho Island, Southern Ethiopia



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Abstract

The environment and human existence are inextricably intertwined. Consequently, alterations in the environment's natural characteristics can lead to severe resource shortages. This affects the institutions that have been crucial in shaping and guiding human lives and preserving the environment's richness, as well as the endeavours of communities to sustain their livelihoods. This article examines the impact of environmental change on the indigenous belief system of the Bayso community of Gidicho Island, southern Ethiopia. Ethnographic data were collected through interviews, focus group discussions, observation, and photographs. The results showed that environmental change on Gidicho Island and its environs has disrupted the socio-economic and cultural life of the Bayso, essentially their religious rituals. Thus, we advise the federal government to amend the country's development policies that exacerbate environmental degradation and intervene to reduce the effects of poverty on the resource-use behaviours of its people.

Keywords Bayso · Environmental change · Gidicho island · Indigenous belief system

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1 Introduction

The environment is human beings' immediate surroundings, including the physical and social systems (Kumar 2018). According to Kumar, while the physical environment includes natural features such as water bodies, soil, vegetation, and air, the social environment consists of the settings in which people live, cultures, and institutions created by humans to monitor and regulate their living conditions. The physical environment has been a source of life for humanity around the globe, providing goods and services since time immemorial. More recently, however, while the demand for natural resources has continued to increase, the environment's potential to provide these goods and services has been reduced due to environmental change (Global Resource Outlook 2024). Although the environment constantly changes with or without human involvement, the rate of change and its impacts have recently intensified due to industrialization, urbanization, and population growth (Millennium Ecosystem Assessment 2005).

According to Smil (2005), environmental change is any alteration/transformation of the environment. Indeed, the alteration/transformation in the environment can have either positive/ negative impacts on the environment and human life. For example, according to Kippe (2002) and Claus, Chan, and Satterfield (2010), environmental sustainability and socio-economic growth are facilitated by human activities including agroforestry, reforestation, the use of renewable energy, and support for laws that promote environmental protection. We argue that while human activities contribute to the conservation of natural resources and promote economic and socio-cultural developments, these developments are not easily maintained in the absence of environmentally friendly policies and practices, and sustainable usage customs. Conversely, deforestation, overgrazing, and burning fossil fuels, among others, trigger a depletion of natural resources and negatively affect human life (Goudie 2000; Nyssen et al. 2004). In this study, "environmental change" refers to both structural and natural forces, as well as human acts, that negatively impact the environment, the livelihoods of the Bayso people, and, fundamentally, their indigenous belief system.

Similarly, the term "indigenous belief system" (IBS) represents a religion that has its roots in Africa and is based on belief in supernatural forces (gods and spirits), inherited from ancestors and practised today in different ways and intensities, embedded in the culture of the people and manifested in stories, customs, and practices, among others (Appiah-Opoku 2007; Anthony 2014). In contrast, cultural practices refer to the shared and inherited traditions and practices within a particular culture or society. This means that cultural practices are shared perceptions of how people in a culture routinely behave Olupona (2021), including a wide range of activities that serve different roles and purposes, such as parenting, funerals, food customs, interpersonal tasks, and adornment (Frese 2015). Therefore, although there would seem to be an overlap between IBS and cultural practices, given that

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indigenous beliefs operate within the context of culture, we argue here that indigenous beliefs are not the same as cultural practices.

Studies show that environmental change is the consequence of multiple factors, including human actions, natural hazards, and structural factors. For instance, according to Goudie (2000) and Nyssen et al. (2004), human actions such as clearing forests for agricultural land and settlement, cutting trees for construction, firewood and charcoal production, overgrazing, and burning fossil fuels cause environmental damage. Similarly, natural hazards such as droughts, floods, and forest fires contribute to environmental change (Mata-Lima et al. 2013). Also, Amechi (2009) argues that structural factors such as population growth, poverty, and government policies aimed at socio-economic development, including villagization and investment activities, trigger resource degradation in developing countries. Indeed, environmental change and the resultant resource degradation have become a threat to almost all aspects of human life across the globe, causing hunger, widespread poverty, and increasing mortality (Jack 2017; Millennium Ecosystem Assessment 2005; and Thakur 2010). However, its impact on developing countries, especially in sub-Saharan Africa, is detrimental because inhabitants' lives in this part of Africa are inextricably linked to the natural environment (Christian 2014; Sakariyahu et al. 2024). Accordingly, it is argued that any harm to the natural environment affects all aspects of inhabitants' lives, including their religious rituals. For instance, according to Kippe (2002) and Schliesser (2024), because of resource degradation, inhabitants failed to maintain not only their livelihoods but also religious institutions and socio-cultural values that have played a crucial role in shaping and guiding their lives and sustaining the affluence of the environment.

The Bayso (the study community) are the inhabitants of Gidicho island in Lake Abaya and villages on the western shore of the lake in the South Ethiopian Region. As one of the minorities in the region, they had their own traditional administrative and belief system called *Wonno*, marriage customs, land tenure, and religious rites, among others (Epple unpubli.). Decades ago, Gidicho island and coastal areas were known for their rich vegetation, fertile soil, and disease-free environment, which were conducive to living and herding (Hodson 1927). In the early days, the Bayso were able to maintain the affluence (*mogossa*) of their environment through religious rituals, taboos, prohibitions, and local mechanisms such as building *dem* (terraces). The practice of religious rituals entails animal products such as milk, blood, meat, and the contents of animal stomachs (Epple unpubli.).

In recent decades, however, the local environment experienced drastic changes due to human activities and natural disasters such as droughts and floods. As a result, the area has lost its affluence, and life in the region has become increasingly difficult (Abinet unpubli.). Consequently, a community that once led a prosperous life has been reduced to poverty and forced to perform taboo activities, such as cutting down trees to burn charcoal and collecting firewood for the market, which also exacerbated the damage. According to Sava (2011), severe resource degradation and growing poverty forced the Bayso to flee to areas on the west coast of Lake Abaya, a move that threatened their culture.

To date, no studies have focused on human–environment relationships in the study area, except for Abinet's (unpubli.) study, which was designed to explore Bayso risk

perceptions and the adaptive strategies they have developed and used to respond to ecological risks. Abinet's report itself does not explore how environmental change has adversely impacted Bayso's IBS. Thus, this study will assist practitioners and policymakers in understanding how long-standing environmentally friendly relationships are undermined by governments' development plans that ignore contextual variations and communities' resource-use traditions shaped by sociocultural values. This, in turn, jeopardizes the sociocultural and religious lives of communities as well as their means of subsistence. Accordingly, the study is based on the following research questions: 1) How is environmental change manifesting in the study area? 2) What are the effects of environmental change on the Bayso IBS? 3) What are the lessons and policy implications of this study?

2 Methodology

2.1 Methods

The study employed a qualitative research approach to benefit from the rich data provided by participants in their own words, guided by open-ended interviews. It also helped us to address informants' perceptions and narratives of their experiences and observations of the changing environment and its impact on their IBS.

Data for this study were collected from primary and secondary sources. Accordingly, primary data were collected from ex-religious leaders, prominent figures, political officials, laypeople, and employees through interviews and focus group discussions (FGD). Secondary data came from books, articles, official documents, theses, photographs, and web sources. However, all these data were carefully edited and checked for authenticity. The triangulation of data sources allowed us to enhance the credibility and validity of the study.

Three study sites (Alge, Gidicho, and Mulato, see Fig. 1) were purposively selected because they represent different aspects of Bayso's life.

Accordingly, Alge was chosen for two reasons: politically, it is the centre of the Bayso local administration, and demographically, it is home to the most significant portion of the Bayso community on the western shore of Lake Abaya. Gidicho represents what the Bayso call their "homeland" and the basis of their culture and traditions. In contrast, Mulato represents diversity, as the Bayso share villages with other ethnic groups, especially the Gamo in Wajifo village.

Similarly, individuals who assumed to have relevant knowledge of the socio-economic, cultural life, and environmental conditions of the Bayso were selected purposively based on the advice of our research assistants. Accordingly, 37 in-depth interviews (24 male and 13 female) were conducted with former ritual leaders, government officials, older people, and employees, and 78 informants participated in 10 FGDs (39 male and 39 female). Each focus group discussion (FGD) on the relationship between the environment and IBS and how environmental degradation affected their IBS typically involved 7 to 8 informants. A total of 115 informants were included in this study based on their sex (male and female) and age (adolescent and adult), which allowed us to understand the perspectives of all categories

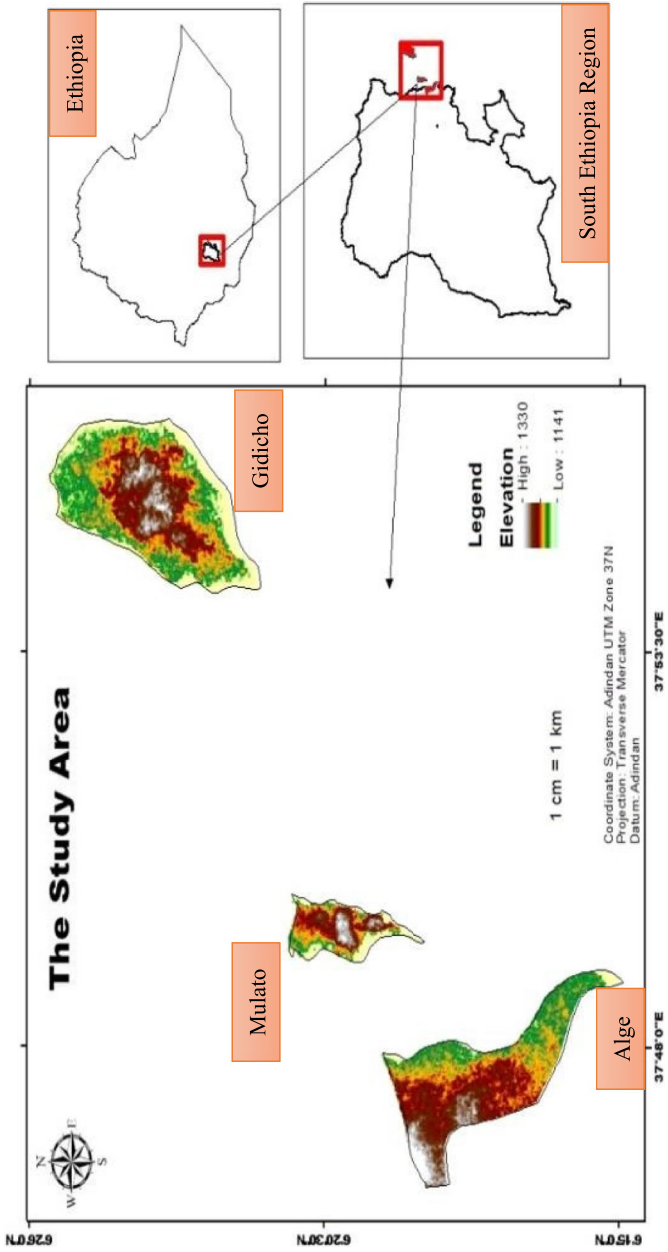


Fig. 1 The study area

of the community on the study theme “impact of environmental change on IBS”. Additionally, to fill the data gap in the absence of a longitudinal study, we conducted follow-up interviews with two former *Wonnos* (ritual leaders) and an older person from Alge village, who foreign authors refer to as a “local professor” for expertise on Bayso culture. From these interviews, we obtained comprehensive information on how environmental changes affected the Bayso’s livelihoods and their IBS.

Group discussions were held in public areas, whereas interviews took place at the members’ homes to ensure a secure environment for informants. In this process, the research assistants had the role of organizing and recording the interviews and group discussions while the authors took notes of the interviews and discussions. Interviews and FGD were conducted in Bayso (their mother tongue) and translated into Amharic by research assistants and English by the authors. Finally, the field notes and transcripts of the interviews and FGD were carefully edited for gaps, and irrelevant information was carefully removed to increase the readability of the text and the validity of the data. All data were then reorganized according to the study theme, followed by thematic analysis and the writing of this article. Photographs were used to substantiate our arguments.

2.2 The study area

Gidicho is the largest island on Lake Abaya, located in Mirab Abaya *Woreda* (district), Gamo Zone, South Ethiopia Regional State. There are three villages in Gidicho: Shigma in the north, Bayso in the south, and Haro on the eastern shore (Sava 2011). The Bayso people, who speak the Cushitic language, inhabit Shigma and Bayso villages, while the Haro people live in the village also called Haro (Epple unpubli.). According to the Population Census Commission (2007), the population of the Bayso was 5491 in 2007¹, and the latest projection is 9800 (Joshua Project 2023). About a century ago, the coastal parts of Lake Abaya and the islands of Gidicho and Golomaaka were covered with thick acacia forests and extensive grasslands. Essentially, the grasslands on the western shore of Lake Abaya were full of wild animals, including elephants and lions (Neumann 1902). Likewise, Hodson (1927), who visited the lake, was amazed by the soil fertility along the lake shore. The region is also known for its diverse plant and animal species composition and is considered one of Ethiopia’s biodiversity hotspots (WoldeYohannes et al. 2018.). According to informants, the region has faced significant resource degradation due to recurrent droughts, agricultural expansion, overgrazing, and the *Derg* regime’s villagization program since the 1980s. They were originally pastoralists, but as their herds declined, they shifted their livelihood to agriculture.

The Bayso are one of the minorities in Ethiopia, endowed with unique sociocultural traditions, values, and religious rituals. The IBS of the Bayso was known as a *Wonno* system, and the head priest was also called *Wonno*. At present, they are one of the three ethnic groups that make up the administration of the Gamo Zone and are

¹ Since 2007, Ethiopia has not conducted a population census for various reasons.

represented in all the administrative structures of the country, from the local to the federal level.

2.3 Theoretical framework

No single theoretical perspective could fully capture complex relations and multiple dimensions of environmental and cultural changes. Thus, we employed three different yet complementary theories, namely cultural ecology, political ecology, and diffusionist perspectives, to explain factors of environmental change and the nexus between environmental and cultural change in the Bayso of Gidicho island.

Cultural ecology focuses on human adaptation to the social and physical environment (Hirst 2018). According to Hirst, cultural ecology aims to study the relationship between humans and their environment, identifying the environment as a fundamental variable that influences culture and human adaptation. Equally, Piccardo and Canepa (2021) posited that humans adapt to their environment. Still, they can change their physical environment according to their needs and wants. In addition, Schutkowski (2006) suggests that the sociocultural traditions and values of a community influence its resource use traditions.

Likewise, political ecology is an approach that attempts to understand the complex relations between the environment and society through carefully analyzing access to and control over resources, as well as its implications for environmental health and sustainable livelihoods (Robbins 2012; Watts 2000). Additionally, Robbins contends that people are compelled to participate in resource-degrading activities since there are no other options due to policies that fail to take contextual variations and economic conditions into account.

The diffusionist perspective argues that contact between societies results in cultural change through the diffusion of ideas, customs, or practices from a culture of origin to other societies. Alderman (2012) categorized diffusion into relocation and expansion, in which relocation diffusion is about disseminating cultural ideas by changing residential areas, whereas expansion diffusion deals with the movement of ideas through a fixed non-relocation population. The concept of relocation diffusion was employed in this study to demonstrate how the cultural practices of the Wolayta, Gamo, and other indigenous people in the area impacted the Bayso's way of life and thought after they migrated to places along Lake Abaya's western shore.

These theoretical assumptions gave us better insight into the factors that triggered environmental change in the study area, how this change affected their IBS, and, reciprocally, how the decline of their ritual system affected the environment.

3 Results and discussion

3.1 Manifestations of environmental change in the study area

Environmental change in the study area manifests itself in several ways. First, it is manifested in the decline of the vegetation cover. In this regard, a respected Bayso

man, Balamo Worba, elucidated that “Gidicho island and its environs were covered by dense forests and grass species decades ago, including *qontir* (acacia *abyssinica*), *girar* (acacia *nilotica*), *wanza* (*cordia africana*), *qinchib* (*euphorbia tirucalli*), *qul-qual* (*euphorbia abyssinica*), *sordi* (*cynodon dactylon*)², and *soke* (*aescynomene elaphroxylon*)³ among others, which had socio-economic and ecological values”. For this reason, the older people repeatedly used the term *mogossa* (affluence) in their interviews to describe the dense forests, vast grasslands, fertile soils, sufficient periodic rainfall, and a favourable environment for living, herding, and crop production, where there were no diseases and alien plant species, among other things. These informants’ views correspond to the accounts of WoldeYohannes et al. (2018), who regarded the area around Lake Abaya as one of Ethiopia’s biodiversity hotspots.

The second manifestation is lake sedimentation. According to informants, lake sedimentation has become both the consequence and cause of environmental change in the region. Informants from the local administration and agricultural office argue that the silt accumulation in Lake Abaya is mainly due to the vast deforestation in the surrounding highlands, which exposed the topsoil to water soil erosion. As for these informants, in times of torrential rain, a huge flood that rises from the Gamo highlands washes away the topsoil and accumulates the silt in the lake. Equally, lake sedimentation is considered a cause of environmental change in the region since the lake water pushed out by the silt accumulation has submerged large farmlands and crops in coastal areas. In this regard, a report from the *Woreda* environmental protection office indicates that in 2019/20, the lake submerged 110.5 hectares of cropland.

The third manifestation is the spread of invasive alien plant species. In Ethiopia, there are about 35 alien plant species, but the dominant ones are *Prosopis juliflora*, *Parthenium hysterophorus*, *Eichhornia crassipes*, *Lantana camara*, and *Acacia* species (Shiferaw, Sebsebe, and Tamarat 2018). These species have become a major threat to the country’s water bodies, wetlands, agroecosystems, and grazing lands (Taye 2003). In our field stay in the Bayso, we noticed that living areas, farmlands, roadsides, and coastal parts of the lake are invaded by *Parthenium hysterophorus* and *Eichhornia crassipes*. They have associated the introduction of *Parthenium hysterophorus* with food aid in their localities since the 1980s, following the devastating drought and famine in the region. *Parthenium* is known as *faramsiisa* in Bayso. Their naming of this plant species is mainly related to its aggressive spread and impact on the people’s socio-economic life and ecology. As for the older men, farmlands invaded by *faramsiisa* are unproductive, since it sucks fertility, and prevents the growth of other plants such as crops. Besides, so far, there is no cultural or modern mechanism to get rid of it. Therefore, the only chance for desperate peasants in this regard is to leave such lands permanently. Furthermore, during droughts when pasture was scarce, cattle were fed this weed in desperation, which had an adverse effect on their health and altered the quality of their milk and meat. Congruently, Shiferaw, Sebsebe, and Tamrat (2018) posited how much *parthenium* deteriorated the meat and milk quality of cattle and sheep on the consumption of this weed.

² Refer <https://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:397065-1>

³ Refer <https://www.dictionary.com/browse/ambatch>

Ecologically, it also impacted native grasses like turf (*sordi*), which played a significant role in preserving soil fertility and preventing erosion. The damage to *sordi*, a major grass species for fodder, and the building of the traditional terrace called *dem* has aggravated the environmental degradation of the region. Equally, *eichhornia crassipes* is another alien plant species in the study area. *Eichhornia crassipes* is known as (*hauri*) in Bayso. According to an expert from the Gamo Zone Environmental Protection office, presently (during our fieldwork), almost 680 hectares of Lake Abaya are covered by *hauri*. The fishermen who spoke with us in the villages on the island and the west coast claimed that the heavy mat of this weed had devastated fish spawning grounds and was now impeding traditional boat mooring and sailing. Consequently, fishing has become tiresome and production is declining from time to time. Correspondingly, Enyew et al. (2020) reported that a heavy mat of weed considerably affected fishing and navigation in water bodies in Ethiopia.

The fourth manifestation is a decline in productivity. In this regard, an older man from the village of Mulato explained how much environmental degradation has caused a decline in production. Consider this excerpt:

Due to massive deforestation and recurring droughts, we faced significant resource degradation in our area. For example, we have lost a significant portion of our livestock as a result of the degradation of grazing lands and the spread of cattle diseases, leading to a significant reduction in animal products that were the mainstay of our lives. Similarly, crop products were also reduced due to soil infertility and the impact of alien plant species such as *faramsisa*. Therefore, as you can see today, our people are fleeing their homeland in search of a means of survival (Sharkole Biramo, July 13, 2020).

Thus, as emphasized in the premises of cultural and political ecology, the efforts of the Bayso to satisfy their needs and wants and the pressure of recurrent droughts have caused significant resource degradation in the study area, which has manifested itself as discussed above.

3.2 The IBS of the Bayso

The IBS of the Bayso was known as “Wonno”. It shares virtually all the major tenets of African Traditional Religions indicated in the account of Appiah-Opoku (2007). Of these, the first one was a belief in one higher Supreme Being called *Wa’a*, the creator of living things (*nefo kabo*) and non-living things (*nefo kaliki*). The second was a belief in ancestral spirits (*gaariun en’tano*), which are assumed to reside at burial sites. Thirdly, they believed in a spirit called *durisa*, an invisible force supposed to dwell in the outskirts of villages, graveyards, riversides, and Lake Abaya. Equally, there was an understanding and firm belief among adherents of this religion on the power of individuals, including communal cures (*hiliko*) and blessings⁴. The Bayso people believe that both good and malevolent spirits lurk around them. They made regular sacrifices and offerings to appease the ancestral spirits, who they

⁴ Interview with Ballamo Worba, Alge, August 9, 2020

believed to be benevolent and beneficial to the people, the environment, and their herds. Conversely, *durisa* is a malevolent spirit that can bring about disasters. They, therefore, engaged in offerings and sacrifices to lessen its effects.

The expositions above on the nature of their IBS imply that supernatural forces, essentially *Wa'a*, and spirits of different types, were sources of well-being to the Bayso, their environment, and their herds as far as they maintained harmonious relations with these forces. That means if they fail to keep the will of these forces, such as practising religious rituals, sacrifices, and offerings, or/and disregarding taboos, disrespecting ritual leaders and older people among others, were considered a transgression. Thus, irritated by such immoral acts, these forces used to punish the Bayso by drought, heavy rain, famine, epidemics, etc. However, to get their mercy and avert these calamities, the necessary condition was practising propitiatory sacrifices and offerings to these forces. This is consistent with the deliberations of Fentimana and Zabbey (2015) and Verstraelen and Asante (2021) on the belief systems of the Igbo of Nigeria and the Shona of Zimbabwe, respectively. Overall, these religious ideas mirrored how the Bayso realized their world, socio-economic and cultural life, and relationship to their environment.

3.3 Religious specialists of the Bayso

The Bayso had different specialists in their ritual system, comprising ritual leaders (*Wonno*) and his wife (*Oriwonno*), ritual assistants (*Woycha* and *Oddobaddo*), and ritual experts (Maganencho and Abbaddo) who had diverse roles in maintaining the well-being of their community and their herds and sustaining the affluence of their environment. Correspondingly, Turaki (2000) reported that African Traditional Religions have specialists with different roles and responsibilities.

3.3.1 Ritual leaders: *Wonno* and *Oriwonno*

In the religious life of the Bayso, a *Wonno* was considered a head priest who mediated the Bayso with *Wa'a*. Therefore, in their religious life, the Bayso viewed a *Wonno* as a person among whom *Wa'a* represented. During his office, they regarded him as sacred. The position of *Wonno* was assumed through election based on certain criteria, viz., the person had to be male, firstborn of his family, generous, wealthy (possess cattle), and had no physical and mental deformity. The term of office of a *Wonno* ranged between two to three years. Being at the top of the religious hierarchy, *Wonno* served as a ritual leader and was responsible for prayers, initiating public rituals and funerals, blessing conformists, and cursing transgressors⁵. In their spiritual duties, *Wonnos* were assisted by their wife, *Oriwonno*, and *Woycha*.

⁵ Interview with Dabalko Amanu, Alge, August 7, 2020

3.3.2 Ritual assistants: *Woycha* and *Oddobaddo*

A *Woycha* held the second-ranking post within the religious hierarchy. It was attained by periodical election, and the chief criterion in this regard was cattle wealth since *Woychas* were expected to practice numerous rituals and sacrifices to *Wa'a* and spirits. In the Bayso religious tradition, a *Woycha* was expected to assist his *Wonno* in organizing public rituals and sacrifices, largely at a time of calamities, and in collecting contributions in kind and cash (*marancha*) from the community and initiating funerals. A *Woycha* was also responsible for receiving patients who came to his home seeking the healing services of a *Maganencho* (his wife) and communicating her orders to patients. Likewise, *Oddobaddo* supported his wife *Abbaddo* by taking in women and girls who came to her for pollution-related cleansing assistance. The *Oddobaddo* and *Abbaddo* were beneath the *Woycha* on the religious hierarchy.

3.3.3 Ritual experts: *Maganencho* and *Abbaddo*

In their religious beliefs, the Bayso associated all sorts of illnesses, epidemics, reproductive health problems, and environmental disasters such as drought, flooding, and pests with transgressions and pollution. Therefore, they believed that the way out of such problems was to practice conciliatory rituals and sacrifices to *Wa'a* and spirits. Accordingly, they established a spiritual healing and cleansing system led by two women (*Maganencho* and *Abbaddo*). *Maganencho* had expertise in healing, while *Abbaddo* had in cleansing impurities. A former *Maganencho* in Alge village has elaborated on the case:

Whenever one of our villagers had a health issue, they would come to our house and tell my husband (*Woycha*). Then, as soon as I had the information, I went to my special room (*girdi*) to appeal the case to *Wa'a* through prayers, rubbing my bracelets made from animal leather (*haraffa*) with my hand. While I was praying, I would hear a humming voice of my spirit. As I heard that particular voice, I told the spirit about the problem. Then, the spirit communicates the problem to *Wa'a*. After a while, the spirit recounts measures that have to be taken for me. Forthwith, I recount what I was dictated by my spirit to the *Woycha*. Finally, it was the *Woycha* who notified the guest about the source of the problem and possible solutions to fix it. During this ritual, we used to slaughter animals provided by individuals who came seeking our help (Ayelech⁶ Toma, July 15, 2020).

Regarding the type of animal slaughtered in the ritual, Epple (unpubli.) argued that spirits dislike sacrifice in the form of goats. If an individual touched a goat or consumed goat milk, he or she was obliged to cleanse their body with cattle urine to visit the house of a *Woycha*. Besides, the Bayso culture considers the bodily fluids of women as impure and polluting. As a result, they seek the cleansing specialist *Abbaddo* for help. A former *Abbaddo* explains:

⁶ Pseudonym

We believed that the bodily fluids of women and girls, such as menstruation, the blood a woman loses after childbirth and miscarriage, and breast milk, could pollute that particular family and its homestead. In essence, a drop of blood as a result of miscarriage (*metebiaano*) was believed to defile the woman, her family, and even the entire land. Therefore, such a woman was considered unclean (*tunne*) and was ostracized until she underwent a purification ritual (*elabo*) performed by the *Abbaddo*. Then, when I was in the position, a family that had experienced a *metebiaano*, or some kind of pollution, reported the case to my husband (*Oddobaddo*). On that occasion, the husband of a polluted woman was expected to offer a sheep to my husband for the ritual. With my husband and the older persons, I report the case to a *Wonno* to get his consecration for the cleansing processes. Then, with the older women, I go to the house of a woman who has pollution (*tunne*). We all blessed her by putting a handful of butter on her head while she held the sheep and said, “the spirit of *Wa’a* may be with you”. “The spirit of *Wa’a*’s mother shall be with you...”. “May she treat you”. “May she give you strength”. After that, I slaughtered the sheep and sprinkled its stomach contents in the house, especially on the spot where the blood or other flood had dropped (Alge, June 23, 2020).

The discussions so far and the above excerpt show that religious rituals have a supreme role in maintaining the well-being of the community through spiritual healing and cleansing, and animal products are crucial to practising religious rituals. Correspondingly, Léo Neto et al. (2009) posited that, in different parts of Africa, religious rituals are crucial in Africans’ lives, and animal products are used for liturgical purposes.

3.4 Rituals and sacrifices to maintain the affluence of the environment

Informants proudly noted that their ritual system was very concerned about the environment (*ul*) since their entire life in general and ritual system in particular were inextricably linked to it. Therefore, in addition to taboos, sanctions, and local mechanisms used to maintain *ul*, *Wonnos* were expected to organize religious rituals in their respective villages and public areas. One of the former *Wonnos*, Chumbaro Assefa, illustrated the case as follows:

... You see this soil, that tree, the lake water...these all entities of *ul* contribute to our life in one or another way. Thus, we believed that any damage to these entities of *ul* meant damage to our community, as *ul* is the base of our life (*ul hiki enijorumaya*). So, as a ritual leader, our main concern was maintaining *ul*’s affluence with the spiritual power and wisdom that *Wa’a* anointed us. In this regard, we had individuals who could decipher some environmental features and forecast the onset of natural hazards such as drought. For example, they assumed the onset of drought, as a popular plant among the Bayso,

Mayala, turns green amid a hot and dry temperature and when the sky is befogged (*eyotte saare*). So, with the advice of such individuals, we used to take two measures: *gondossa* (periodic movement with our herds) and praying to *Wa'a* for rain, believing that rain is a blessing from *Wa'a* that gives fertility, abundance, and life to *ul*. Likewise, in times of drought and pestilence, I would call my villagers to perform a *hulluuqaa*⁷ ritual to ask *Wa'a* and the ancestral spirits for forgiveness, believing that such rituals would smooth our relations with these forces who might be outraged by our misdeeds. We also practised a *gaa-wogo*⁸ ritual when we encountered such dangers, seeking their blessing by saying *Wa'a Wa'a edamun kenina* (Oh *Wa'a*, oh *Wa'a*, please give us rain) and *bararsina, kefina* (Please bless the land and let the earth be abundant). On both occasions, we would slaughter an ox or a cow and offer the meat to the deities. In this way, we maintained the affluence of our *ul* for generations, and in return, it offered us lush pasture and land, as well as an environment that was ideal for farming, fishing, herding, and habitation. (Alge village, October 12, 2020).

These informants' views imply that the Bayso's devotion to conserving natural resources stemmed from their religious cosmology that conceives human beings as part and parcel of their environment. The environment is the basis of life, *ul hiki enijorumaya*. Therefore, they established religious rituals cited above and local mechanisms to sustain natural resources. Besides, religious rituals practised for spiritual purposes influence the natural environment mainly plants, to be preserved and exist naturally (Ta'a 2012). In this regard, Diawuo and Issifu (2015) indicated that religious rituals are crucial in conserving natural resources among many African rural communities. However, the death of custodians of the knowledge, migration, and the introduction of Western culture have ruined these practices (Afolayan 2009).

3.5 Impact of environmental change on the IBS

Data gathered from interviews and FGD from Alge and Gidicho villages indicate that the growing number of livestock and the drastic drought that the Bayso experienced in the last decades are responsible for the decline of pasture on Gidicho Island. Regarding the Bayso's livestock wealth, Gula Zeleke, an older person from Alge village, stated that they culturally value having large herds since cattle wealth was a source of social status, an essential requirement to compete for the position of *Wonno*, animal products were needed for religious rituals, and above all, herding was a mainstay of their subsistence. This implies that the Bayso's sociocultural value of having large herds, the need for animal products to practice religious rituals, and support their subsistence have forced the Bayso to have large herds. Accordingly, some of the Bayso were able to own up to 1000 heads of cattle. This view coincides with the findings of Epple (unpubl.), who noted that

⁷ All inhabitants and animals, except goats to pass through a creeper tied on two trees on the right and left sides.

⁸ It was held three times a year: at a rainy season (*badhessa*), a dry season (*gillaal*), and between *badhessa* and *gillaal*.

on Gidicho island, individuals had hundreds of cattle, and the area was known for its milk and milk products. However, recently, pastures have been degraded mainly because of overgrazing, which has exceeded the replenishment capacity of grazing lands. Therefore, together with the recurring drought in the region that changed grazing lands into dusty areas and the spread of cattle diseases, Abinet (unpubli.), the Bayso lost a significant part of their cattle. Therefore, it is believed that the loss of cattle has impoverished the Bayso, causing a scarcity of essential animal products to support their livelihood and religious rituals.

Similarly, an agricultural promotion worker from Alge and an older man from Mulato villages claimed that extensive deforestation to get a plot of land for cultivation, forest products for construction, firewood, and charcoal for the growing population has hampered crop production, causing soil erosion, infertility, and flooding. It follows that the degree to which the Bayso's ways of life, in general, and their religious rituals, in particular, have been impacted by the abuse of natural resources is reasonable. According to Pearson et al. (2023), degradations of natural resources lead to a decline in animal and plant products that pastoralists use from the land, endangering their sociocultural lives and ability to support themselves. So here, the Bayso, who realized the crucial role of the natural environment in sustaining their livelihoods in general and their IBS in particular, have enunciated the impact of environmental change on their IBS in terms of the decline of animal wealth, and migration and its consequences.

3.5.1 Decline of animal wealth

According to Gesa (2023), cattle play a crucial role in pastoral societies around the globe, providing food security, income, and religious roles and their loss erodes these livelihood assets and jeopardizes pastoral livelihoods. From the context of the Bayso, a decline in animal wealth means disruption of the sociocultural, religious, and economic life of the community. Consider the following excerpt:

In those days, herding was our survival, so in one way or another, our lives were closely tied to livestock. For example, ritual leaders and other ritual personnel used animal products to bless us, our herds, and the environment, to curse wrongdoers, and to avert diseases, evil spirits, and misfortune. Even animal excrement was used for washing clothes and treating diseases. At present, however, due to resource degradation and the spread of disease, we have lost our herds, and this has disrupted our ritual system, which was the basis of all aspects of our lives (Gulla Zeleke, Alge, June 25, 2020).

The above findings highlighted that the severe environmental change in Gidicho Island and its surroundings has significantly affected the Bayso's livelihoods and religious rituals due to a decline in cattle wealth and crop production. As a result, the desperate Bayso were forced to migrate to villages on the west coast of Lake Abaya to save their lives. Refer to Table 1 for the cause-effect relationship between some environmental change and the decline of specific religious rituals.

Table 1 Cause-effect relationship between environmental change and the decline of IBS

Human activities	Environmental change	Impact on the belief system of the Bayso
Overgrazing	Degradation of pasture. This affected cattle health (death) and caused a decline in animal products (meat, milk, blood, and content of animal stomach). Triggered soil compactness, infertility, erosion (reduced crop products)	Imperiled the practice of religious rituals such as <i>obooro</i> , <i>ga-wogo</i> , and <i>hulluqaa</i> . Together with the decline of cattle wealth, it weakened the Bayso's effort to practice the <i>gabasano</i> ritual (memorial feast for ancestral spirits)
Deforestation (clearing forests and shrub-lands)	Soil erosion, infertility, and flooding (caused a decline in crop products).	Weakened the Bayso's means of income and hence, they were not able to sustain the <i>marancha</i> system (contribution in kind and cash to uphold religious rituals).

3.5.2 Migration and its consequences

According to Black et al. (2011), migration provides both benefits and challenges for migrants. In this regard, informants believed that their migration brought them some socio-economic benefits (e.g., access to social services and agricultural land). At the same time, they faced severe challenges in maintaining their cultural lives in general and religious rituals in particular due to their exposure to dominant cultures in their destination areas.

Culturally, the Bayso move their herds periodically (*gondossa*) to nearby and distant areas in search of better pastures during drought. However, since the 1980s, due to drastic environmental changes and the resulting scarcity of resources, the Bayso lost a significant portion of their herds. As a result, the desperate Bayso were forced to migrate to villages on the western shore of Lake Abaya, leaving their homeland once and for all. In light of this, some older people believed that the turning point for their mass migration was the 1984/5 drought, which caused considerable damage throughout the country. To reinforce the negative impact of their migration, the Bayso associated it with a fish coming out of the water, arguing that since a fish dies once it is out of the water, their migration had already detached them from their cultural base and caused a decline in their cultural values and belief system.

In this regard, they argue that, first, it damaged their extended family (*agud*), which played a vital role in raising children who followed their cultural traditions with the help of the older people of the *agud* (*Abbo Kanjin*) to ensure the continuity of their cultural values and traditions. Second, the usual contribution in cash and kind (*maranacha*) to the ritual leaders to support the *Wonnos'* efforts to maintain the ritual system was interrupted as the majority of the followers left the island, and it was culturally taboo for *Wonnos* to cross water bodies.

Third, it brought them into contact with other ethnic groups on the west coast of the lake and exposed them to new cultures that contradicted their values and traditions. For example, due to their daily exposure and interaction with groups and individuals in local life, schools, markets, and social gatherings, exposed them to new ideas and experiences (e.g., alcoholism, dishonesty, idleness, and Christianity). Of these, Christianity had far-reaching consequences for the sociocultural life of the Bayso.

One of the former *balabats* (local leaders) related the introduction of Christianity to the island with the opening of the first and only elementary school. As to him, after the opening of the school, the Sudan Interior Mission sent teachers to Gidicho at the request of the Bayso people but used the opportunity to preach Christianity along with secular education, and thus, it is said that Christianity attracted the majority of the youth on the island. Conversely, some informants associated their exposure to Protestant Christianity with their migration and contact with the dominant cultural groups (Gamo and Wolayta) in areas along the western shore of Lake Abaya. However, its introduction and expansion into the lowland areas of Mirab Abaya was primarily associated with the arrival of non-governmental organizations such as World Vision Ethiopia (WVE), which came to provide aid following the severe drought in 1984/5. One of our informants, who was an employee of WVE at the time, revealed that although WVE came to the region to provide food aid and

facilities, including schools and health centres, to the drought-affected people of the region, it used the opportunity to influence the destitute Bayso and others to favour Protestant Christianity. Of course, some informants disagreed with the assertion that food aid was used to attract the Bayso and others to Protestant Christianity, but the majority of the Bayso corroborated it. Congruently, the findings of Tesfaye (2021) revealed that missionaries in Gedeo used donations to attract IBS's adherents to Protestant Christianity. The point is that although Protestant Christianity was indeed preached on the island by the school teachers, the claim that it won the support of the majority of Bayso youth was a fallacy since in the Bayso migratory tradition it was the youth and adults who took the risks of migration. Therefore, we argue that the majority of the Bayso were exposed to Christianity of any denomination in the villages along the western shore of Lake Abaya because of their migration and contact with other cultures in the area. Congruently, Gumo et al. (2012) reported that the migration of Africans from their home areas exposed them to a mode of change that hindered the development of their spirituality.

Fourth, the informants were also critical of the *Derg's* villagization program⁹. In this regard, they pointed out that in 1984/5, due to the severe drought, the military government introduced a villagization program for drought-affected communities (Gamo, Wolayta, Bayso, etc.) along the western shores of Lake Abaya. However, they claim that although it is logical to move citizens from degraded areas to resourceful areas to save the lives of those affected and to create favourable conditions for the revitalization of degraded areas, it was not successful in the context of Bayso for the following reasons:

1. The way pastoral communities value and interact with their environment differs significantly from peasants. In this regard, an older person from Alge village explains:

On the island, we had a land tenure system in which each clan had its own plot of land for housing, grazing, cropping, and burial. Because of our cultural beliefs, we were not comfortable with the idea of having a large number of people living in one area and sharing a village with members of other ethnic groups. We were afraid that their presence might threaten our values and traditions. We also believed that herding cattle, essentially milking cows in crowded areas, would expose them to strangers' eyes, which induce illness and unexpected death. Therefore, following our migration and inclusion in the villagization program, we sold out our few cows, suffered from a pasture shortage, and were exposed to the consequences of strangers' eyes (Machuqe Gaie, Sep. 27, 2021).

⁹ *Derg* is an Amharic term to mean a committee or council, officially it was known as the Provisional Military Administrative Council (PMAC). It was the Marxist-Leninist military dictatorship that ruled Ethiopia from 1974 to 1991 under the leadership of Colonel Mengistu Hailemariam. (see Gebeyehu 2010).

2. Local officials who executed the villagization program recklessly used grazing lands for settlement, considering them as vacant land, and such actions exacerbated the shortage of pasture and affected the already exhausted cattle wealth.
3. Since the villagization program brought together the Bayso, Gamo, Wolayta, and others in one village, the sociocultural life of these people was affected in some aspects. For instance, they lost their sociocultural traditions and institutions, such as *gondossa*, *marancha*, and *agud*, as elucidated elsewhere in this study following their migration and contact with other cultures. These informants' views are congruent with the premises of political ecology, which contends that environmental change and ecological conditions are a product of political processes. In this regard, the *Derg* regime's villagization program, intended to improve the socio-economic life of rural communities and revitalize environmental conservation efforts, failed since it did not consider the sociocultural and ecological contexts at the grassroots level. Accordingly, we argue that this indicates how government policies meant to solve one problem could cause other problems in Ethiopia.

Informants' effort to relate and interpret the decline of their IBS in terms of environmental change and the ensuing resource degradation that caused migration could also be justified by the notion of diffusionist perspective. As to the relocation diffusionist perspective of Alderman (2012), the Bayso were relocated from their homeland to areas of Gamo and Wolayta, hence, the dominant cultures of these communities, including the ideas of Protestant Christianity, are diffused to the Bayso. Likewise, according to Rapoport, Sardoschau, and Silve (2020), environmental change-induced migration causes inhabitants to lose some or all of their cultural beliefs and values through contact.

In addition to the aforementioned factors, we also believe that the socio-economic and political dynamics in the region since the 1960s have contributed to the decline of their IBS. For example, according to informants, during the *Derg* regime, local officials threatened followers not to practice religious rituals and broken ritual objects. Likewise, Freeman (1999) reported that in the Gamo highlands, the socialist ideology of the *Derg* regime, known for its anti-religious stance, labelled the IBS of the Doko community as "backward" and forced adherents to abandon religious rituals. Besides, Balamo Worba, an older person from Alge village, indicated that the opening of a road between Arba Minch and Sodo in the 1960s facilitated the flow of missionaries from Sodo (then a hub of Protestant Christianity) to Arba Minch and areas around Lake Abaya.

3.6 Efforts made to revive their IBS

Finally, alarmed by the decline of their ritual system, the older people mobilized adherents under the motto *sera watanenko kaumulane watano*, which means it is better to lose a child than to lose a culture. Accordingly, they reinstated their IBS and installed a new ritual leader named *Wonno* Dabalko in November 1989 after an arduous struggle. *Wonno* Dabalko then made some adjustments to their ritual system (e.g., slaughtering sheep instead of an ox/cow, mixing honey with water instead

of milk, and reducing the number of ritual meals), realizing the burden of resource scarcity on the followers. However, attracted by the teachings of Christianity that reject their tradition of sacrifices to deities and spirits and emphasize that God sacrificed His only Son to save the world, they abandoned their IBS in 1991/2. This indicates that they replaced their system of rituals with Protestant Christian beliefs because they thought Christian cultural traits would improve their lives.

As the interviews with informants from the villages of Alge and Mulato indicate, after the decline of their IBS, the Bayso were unwilling to reconsider the principles and values of their IBS and the role of deities in their lives. They abandoned the rituals and sacrifices associated with protection, healing, and purification, considering them an act of the devil. Likewise, they rejected the power of ritual leaders who had once played an inimitable role in their lives. Therefore, they were reluctant to observe the sanctions, taboos, and orders of these religious leaders. From the interviews, however, we found two conflicting feelings about the decline of their IBS. Some saw it as a new era in their lives, moving from darkness to light. An old woman from the village of Alge explains:

My family and I are pleased about the decline of our belief system because it was the dark part of our lives that led us into the trap of the devil. But today, we are enlightened by the spirits of Jesus and have conquered the darkness of the evil spirits (Alemitu, May 13, 2021).

Conversely, some others (chiefly ex-*Wonnos* and elders) felt remorse for the decline of their IBS. They argued that they lost their IBS and cultural traditions, which defined them. A former ritual leader from Alge village highlighted that:

This whole mess (socio-economic problems) has ensued; since we have forgotten *Wa'a*...we dishonoured His principles and values. I presume that the main reason for the current environmental crisis and socio-economic mishaps is the decline of our belief system. In the early days, our belief system had solutions for the problems that we were suffering from (Chumbaro Assesfa, August 18, 2020).

Even though the IBS of the Bayso has gone forever, some elements of it persist in Bayos's present life. The best examples of this are the *Shashafano*¹⁰ ritual and their belief in the power of individuals (old men) to bless and curse. This confirms that the influence of their IBS is still strong in their Christian lives.

4 Conclusion

The study revealed that the Bayso assumed that they are an integral part of their environment (*ul*) and it is the base of their life (*ul hiki enijorumaya*). Accordingly, they believed that their entire life, including their religious rituals, relied

¹⁰ Bayso believed that each family had a guardian spirit that kept its well-being. Therefore, to thank their guardian spirit each family practiced a *shashafano* ritual (at a coffee ceremony or mealtime, an elderly of his/her family throws a small amount of the food they are going to consume in all directions of the house saying, *heike amine* (let you eat this), *nugoda kankentata* (thank you for your protection).

on the provision of *ul*. Reciprocally, they sustained the affluence of their *ul* through rituals and sacrifices, besides local mechanisms such as taboos, sanctions, and terracing (*dem*), among others. This demonstrates that, first, the human–environment interaction in the study area was predicated on mutually beneficial relationships decades ago. Secondly, the Bayso had a well-elaborated ritual system that helped them sustain the affluence of their *ul*. Recently, however, they have faced severe resource scarcity due to environmental change triggered mainly by human activities (e.g., overgrazing and deforestation) intended to satisfy their basic needs and sociocultural traditions, recurrent droughts, and government policies that do not take into account contextual variations (e.g., villagization). Thus, due to the scarcity of pasture and the spread of cattle diseases, they lost a significant part of their herds, which were the mainstay of their livelihoods and religious rituals. This forced them to move to areas on the western shore of the lake, disrupting their cultural institutions, such as the *marancha* and *agud* system, and exposing them to dominant cultural groups, the Gamo and Wolayta. For these reasons, we argue that environmental change is essentially responsible for the decline of their IBS. What is important in this regard is that the decline of their IBS has weakened the principles and values of the belief system and the local mechanisms of care and protection of the environment for the following reasons: First, the decline of the ritual system means a complete collapse of the *Wonno* system. Thus, ritual leaders have lost their former power and acceptance by their followers. Second, because of their conversion to Christianity, the Bayso regarded religious rituals and sacrifices as acts of the devil, and formerly respected and protected ritual sites (e.g., *gaa-wogo*) became sources of logs and firewood.

In general, findings reveal that the Bayso have long maintained their livelihoods, cultural traditions, and IBS, establishing a harmonious relationship with the environment through local mechanisms and religious rites. But recently, they have experienced severe resource scarcity, which has upended their lives. This has been brought on by the expanding human and animal populations, the recurrent drought, and government policies failing to recognize contextual variation. Therefore, we believe that conclusions drawn from these findings provide policymakers and practitioners with valuable insights into the role that local knowledge and religious rituals play in environmental conservation and the impact of government development plans on the environment and people's lives. Accordingly, we recommend that the federal government amend the country's development policies that exacerbate environmental degradation and intervene to reduce the impact of poverty on the resource-use behaviour of its citizens. We advise practitioners to develop strategies that enhance the resilience of indigenous communities' cultural traditions, and local officials to mobilize and engage residents in environmental restoration activities within the study area.

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Author's contributions Eshetu Fekadu is a principal investigator who conducted the fieldwork, data analysis, drafting, and editing of the manuscript. Dr. Mamo Hebo supervised the fieldwork and reviewed the subject matter and theoretical aspects of the study. Dr. Gudaye Emirie supervised the fieldwork and edited the language of the manuscript.

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Declarations

Ethics approval and consent to participate In this regard, firstly, we produced a letter of support from Addis Ababa University and presented this letter to officials at Zonal and *Woreda* and this eased our communication with concerned bodies. Secondly, we informed officials and the layman about the research objective, and their participation is fully on informed consent, which means they have the right to quit at any time if they feel discomfort. Finally, where needed, we have used pseudonyms in the text to protect informants from possible threats.

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Comments

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