LIVESTOCK WATER SOURCE MONITORING AND RISK MANAGEMENT (LWSM) PROJECT

Uncovering Gender Inequities: Bridging gender gaps in water access, control, and utilization among Borana Pastoralists in a changing climate

The Alliance of Bioversity International and the International Centre for Tropical Agriculture (CIAT)

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Acronyms

CGIAR	Consultative Group on International Agricultural Research
CSA	Climate Smart Agriculture
ESS	Ethiopian Statistics Service
FGDs	Focus Group Discussions
GTF	Gender Transformative Framework
ICT	Information and Communication Technology
LLRP	Lowland Livelihood Resilience Project
LWSM	Livestock Water Source Monitoring and Risk Management
m.a.s.l	meters above sea level
NGO	Non-Governmental Organization
NRM	Natural Resource Management
SDG	Sustainable Development Goal
SMS	Short Message Service
SPEI-12	Standardized Precipitation-Evapotranspiration Index (12-month scale)
UNESCO	United Nations Educational, Scientific and Cultural Organization

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Executive Summary

This study, undertaken as part of the Livestock Water Source Monitoring and Risk Management (LWSM) project, delves deeply into how entrenched gender norms influence the way water is accessed, controlled, and utilized within Borana pastoralist communities. It examines how societal expectations, customary practices, and cultural traditions shape the division of responsibilities between men and women-affecting not only who collects and manages water, but also who has the authority to make decisions about its allocation and use. By documenting these gendered patterns, the research reveals how they either enable or constrain individuals' and households' capacity to adapt to climate-related stresses. In doing so, it underscores the intricate and often invisible linkages between gender roles, local water management systems, and the broader culture of pastoral resource governance. The study further situates these relationships within the rapidly changing climate context of Borana, where recurrent droughts, shrinking water availability, and shifting rainfall patterns are placing unprecedented strain on both social systems and ecological resources. By highlighting these interconnections, the research offers critical insights into how gender-responsive water governance can strengthen adaptive capacity and resilience in a region highly vulnerable to climate shocks.

Borana's kebeles are predominantly livestock-based economies, complemented by small-scale farming and the production of milk, hides, and crafts. Women contribute significantly to the local economy through agricultural processing and sales yet have limited control over household and community resources. Social customs, while fostering strong communal ties, reinforce traditional gender divisions-men manage cattle, camels, and water sources, while women oversee sheep, goats, and domestic water needs. This division often restricts women's access to key resources, decision-making, and climate adaptation opportunities.

Water scarcity has intensified over the past five years due to unreliable water points and recurrent droughts, forcing households-particularly women and children-to travel long distances for water. Traditional community-managed water systems are under strain, and unsafe drinking water exacerbates health and productivity challenges. Climate shocks reduce livestock health, incomes, and food security, with women bearing the brunt as household managers and caregivers. Despite their central role in adaptation, women are often excluded from water management committees, limiting the impact of their innovations.

The study stresses the need for inclusive governance, ensuring women's participation in water resource management, and for investments in climate-resilient infrastructure. Expanding access to climate information, training, and diversified livelihood options-particularly through women's associations and community networks-can strengthen resilience. Addressing restrictive gender norms and bolstering women-focused networks are key to fostering equitable access to water, improving livelihoods, and enhancing climate adaptability. By integrating gender-sensitive approaches, the LWSM project aims to help Borana communities overcome climate-related challenges while advancing social and economic equity.

1. Introduction

The Livestock Water Sources Monitoring and Risk Management System (LWSM) Project is a collaborative initiative implemented by the Alliance of Bioversity International and CIAT, in partnership with the Ethiopian Institute of Agricultural Research (EIAR) and the Ministry of Agriculture (MoA). The project aims to strengthen the Ethiopian government's capacity to monitor and manage drought-related risks affecting pastoral communities in the Oromia and Somali regions, thereby enhancing the resilience and adaptive capacity of livestock-dependent livelihoods. At its core, the project seeks to institutionalize a near-real-time water information dissemination system that can reach pastoralist communities-particularly those with limited access to technology and low literacy levels-by integrating digital satellite imagery to monitor livestock water availability, identify areas of high vulnerability, and provide timely, actionable insights. This initiative has been complemented by a user-centered water and pasture monitoring and early warning system (ET - Monitoring), designed to make water-related information accessible to both male and female pastoralists with limited ICT literacy. It is further supported by a capacity enhancement program that promotes gender-responsive water information systems through workshops, training sessions, learning modules, and feedback mechanisms involving key stakeholders.

Access to and control over water is a critical factor in the livelihoods and well-being of pastoralist communities in Ethiopia's Borena Zone-an arid, climate-sensitive region where pastoralism and small-scale agriculture form the backbone of local economies. Here, water scarcity is not only a pressing daily challenge but also a mounting threat under climate change. Beyond environmental constraints, water access is profoundly shaped by social structures, particularly gender norms and roles. In Borena, women are central to household water use and the management of small livestock, yet they often face limited participation in decision-making and restricted access to resources. Traditional systems of water governance tend to exclude women, perpetuating inequalities that weaken both gender equity and community resilience to climate shocks.

To address these intertwined environmental and social challenges, the study "*Uncovering Gender Inequities: Bridging Gender Gaps in Water Access, Control, and Utilization under the Changing Climate in Borena*" was undertaken as part of the LWSM project. This gender analysis examines the Borena Zone's resources, services, constraints, barriers, climate vulnerabilities, adaptive capacities, and opportunities for technology adoption among male and female pastoralists. Its findings provide essential evidence to guide project implementation, inform the design of monitoring and evaluation tools, and shape strategies that promote inclusive and climate-resilient water governance. Beyond the project scope, these insights are expected to be of significant value to policymakers, development practitioners, researchers, government agencies, private sector actors, and donors working to strengthen water security and gender equity in pastoralist communities.

1.1. Study Setting

The study was conducted in a pastoral community of Borana zone in Ethiopia. Borana zone is located 3◦30′ N and 5◦25′ N latitude and 36◦40′ E and 39◦45′ E" longitudes in the southern part of Oromia regional state in Ethiopia, one of the twenty (20) zones in the region. The landscape is characterized by slightly undulating peaks up to 2473 meters above sea level (m.a.s.l) in some areas. It shares borders with East Borana zone in the east, Somali regional state in the East and Southeast, West Guji zone in the north, Southwest Ethiopia People's Region in the west, and Kenya in the south. Borana zone enables Ethiopia to have an international border with Kenya spanning 521 kms. The zone consists of thirteen rural pastoral woredas, including Arero, Dhas, Dillo, Dirre, Dubluk, El-woye, Gomole, Guchi, Miyo, Moyale, Taltale, Yaballo and Wachile. Additionally, there are two town administrations namely Yabello town and Moyale town. However, following the creation of another new zone known as East Borana zone, Arero, Wachile and Dhas woredas are no longer parts of Borana zone but parts of the new East Borana zone with its capital at Negelle Borana. In terms of administrative divisions, there are 134 rural kebeles and 11 town kebeles in the zone.

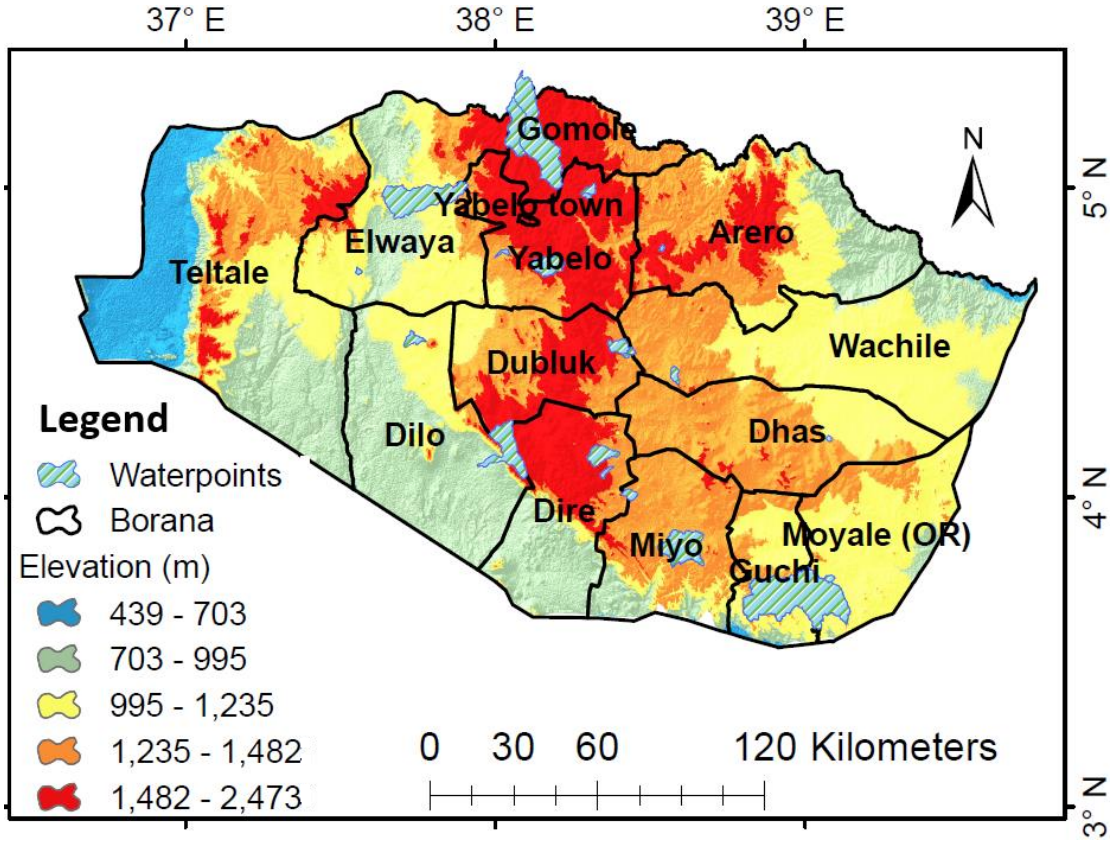

Figure 1: Geographical Location of Borana Zone (Tegegne et al. 2025).

According to the projection by the Ethiopian Statistics Service (ESS,2023), the zone has a total population of 1,431,922. Out of this, 49.6 percent is female. Additionally, approximately 87% of the population resides in rural pastoralist areas. The rural community's livelihood activities

primarily rely on pastoral and small rain-fed agro-pastoral practices. While district and small-town residents are engaged in small-scale trading, others are employed in various government and non-government organizations. The area experiences frequent erratic rainfall, often leading to drought, which results in the death of numerous cattle almost every year. For instance, Ethiopia has recently faced one of the most severe droughts caused by La Niña in the past forty years.

That prolonged drought had negatively impacted the livelihoods of millions of Ethiopians who heavily depend on livestock and its products, leading to increased food insecurity, malnutrition, and a decline in coping mechanisms for the most vulnerable members of the community. The recurring nature of droughts in Ethiopia has resulted in a scarcity of water resources, affecting pastoralist communities, especially in Borana. The changing climate, uncertain situations, and variable conditions pose a greater risk to pastoralist women, making them particularly vulnerable. Accordingly, pastoralists are required to constantly adapt and learn to respond effectively to changing circumstances.

This study, therefore, aims at comprehending diverse and unpredictable situations from a gender perspective, enabling better project implementation, monitoring, and evaluation. Additionally, it helps in managing resources, sustaining livelihoods, adjusting to climate change, navigating markets, relocating, handling disasters, and more. By incorporating improved gender/cultural norms and social relations into their everyday practices, pastoralists are better equipped to tackle uncertainty.

1.2. Statement of the problem

Water plays an indispensable role in all productive and reproductive activities, including agriculture, industry, energy generation, hygiene, and sanitation. Equally, access to safe and affordable drinking water is recognized as a fundamental human right essential for health, dignity, and sustainable development (UN Water, 2023; WHO, 2023). Despite the above facts, millions of pastoral people (female and male) who live in arid and semi-arid parts of Ethiopia are challenged by water shortage due to frequent climate change, and this affects the livestock production and livelihoods, also triggers conflict among different ethnic groups. Recent evidence shows that deeply rooted gender relations in pastoralist societies intensify inequalities in the access, use, and governance of water resources (Alliance of Bioversity International & CIAT, 2022).

In Borana, southern Ethiopia, these dynamics are particularly visible: while women and girls shoulder the daily responsibility of securing water for household consumption and livestock, they remain largely excluded from local water governance institutions such as *Ella* (deep well) management councils and water user committees. As recurrent droughts dry up traditional wells and surface sources, women are forced to travel longer distances-often four to six hours a day-to fetch water, increasing physical strain and exposure to risks. Despite their central role in sustaining household and community resilience, their voices rarely influence decisions on water allocation, infrastructure repair, or drought management.

This imbalance exposes a critical research gap: limited empirical understanding of how gendered power structures, labour burdens, and decision-making asymmetries shape adaptive capacities and water governance outcomes in Borana's pastoralist systems.

Addressing this gap is essential for designing gender-responsive and climate-resilient water management strategies that truly reflect women lived realities and agency in the face of intensifying climate stress.

Sanitation and hygiene for good health are their responsibility. Women are not only victims of climate change but also contribute to adaptation of climate change. Rural women and girls are the first to learn about declining water quality and quantity. Despite national water and gender strategies, pastoralist women in Borana remain largely excluded from water governance and decision-making. They have little control over water use or allocation and limited access to technologies and training-revealing a persistent gap between policy commitments and women's actual participation and influence at the community level.

The acknowledgement of the relationship between gender and water is crucial to achieving progress on water security and gender equality, and to the achievement of the Sustainable Development Goals (Aoyagi *et al.,* 2011). While gender shapes both men's and women's lives, the tendency is for women to have a more disadvantaged position in comparison to men. This can have significant implications for the adoption and sustainability of practices under a Climate Smart Agriculture (CSA) approach. Cognizant of the above facts, a Real-Time Livestock Water Source Monitoring and Risk Management System (LWSM) project makes gender central of its interventions.

1.3. Study Rationale

A preliminary situational assessment was conducted by the project team to gain a better understanding of the local context of pastoralists in Borana zone. The team visited about eight water ponds and interviewed women living in the area. They also consulted with a local NGO to learn about their strategies for reaching out to women in remote parts of Borana. The assessment revealed that climate change (particularly drought) significantly impacts the lives and livelihoods of pastoralist women in Borana.

Despite efforts by the society, government, and non-government organizations to address water shortage through harvesting rainwater, constructing alternative water sources like water wells or boreholes, motor pumps and providing water through water trucks, women still face challenges due to malfunctioning equipment/motor pumps, long queues, and distance. Women require water for various household purposes, but during water shortages, they prioritize essential uses such as cooking and drinking. Field observations showed that water management committees across all visited Borana sites were entirely male dominated, with no female representation. Women's access to information and communication tools such as mobile phones and radios was also limited, leaving many dependents on indirect channels like children or neighbours. While some recent studies have begun to apply gender frameworks-such as the CGIAR Gender Transformative Framework (GTF)-to water governance in pastoral systems, systematic application remains rare in Ethiopia. Consequently, critical knowledge gaps persist on how gender norms, social hierarchies, and intra-household dynamics shape access, control, and decision-making in pastoral water systems. Addressing these gaps requires context-specific, gender-transformative research and policies that strengthen women's participation and leadership in local water governance and enhance their adaptive capacity under growing climate stress.

1.4. Objective of the study

3.2.3 General Objective

The general objective of the study is:

- To assess the socio-cultural, economic, and gender dynamics of water access and resource management in Borana to inform inclusive and context-specific models that enhance equitable participation, particularly for women and marginalized groups, in water governance and livelihood development.

3.2.3 Specific Objectives of the Study

1. Assess the socio-economic and cultural context of Borana, with particular attention to how livelihoods, resource access (especially water), and social norms shape gender roles and relations.
2. Evaluate the water management practices and decision making, water access and utilization, time spent by women and men to access water in wet and dry seasons, impact of water access on productive activities,
3. Analyse influence of gender norms on women access and control over productive resources (including water), assets, services, and water information,
4. Identify and analyse areas where gender roles heighten women's vulnerability and exposure to risk
5. Recommend exemplary inclusive model that promotes active engagement of women and other marginalized groups.

2. Research Methodology

2.1. Description of the study area

The Borana are a sub-section of the wider Oromo nation and are ethnically Cushitic-speaking pastoral people who inhabit mainly Ethiopia's southern region and northern Kenya. They inhabit the Borana Zone (including the newly created East Borana zone seated in Negelle Borana) in Ethiopia's Oromia Regional State and Marsabit County in Kenya. It has semi-arid and arid environments, open savannah, hilly and flat landscape with widely dispersed acacia forests, and the terrain is sufficiently conducive to extensive livestock grazing (Oba, 2013). The overall population of people belonging to the Borana people is counted in millions with a very proportional gender ratio though accurate estimates are shifting according to movement of population as well as for census variation (CSA, 2021).

As of 2022, the Borana Zone in the Oromia Region of Ethiopia has an estimated population of 1,402,530 represents one of its major zones. The most recent sex-disaggregated data available are from the 2007 Central Statistical Agency of Ethiopia Census, which reported a total population of 962,489 comprising 487,024 males and 475,465 females. Their economy is pastoral-based, and their mainstay is cattle herding with small-scale crop agriculture and trade being ancillaries. Income source includes livestock trading, dairy products, and, increasingly, remittances from relatives based in the urban areas (Tache & Oba, 2009).

Ethnically, the Borana are part of the larger Oromo nation but have maintained their distinct cultural and social organization. They adhere to the Gadaa system, indigenous democratic

system of government that structures society in terms of age grades responsible for leadership and decision-making (Legesse, 2006). The religion of the Borana people is heterogeneous with the majority following traditional Oromo religious beliefs but others adhering to Islam or Christianity. Their social structure is structured based on their clan system, where there are prominent clans like the Sabbo and Gona with further divisions into small lineage groups influencing marriage, affiliation, and power (Bassi, 2005).

Their language of Afan Oromo (language of Oromo), which belongs to the Cushitic family and is a lingua franca as well in this region, is what they speak. Their native agro-ecology ranges from arid rangelands to arable land patches and supports drought-resistant crops like sorghum and maize. However, repeated droughts and climate change have endangered their conventional livelihoods and therefore changes in their migration patterns and livelihood diversification have occurred (Coppock, 1994). The Borana landscape is dominated by sacred wells (Tulaa) and water pans, which are most vital within their socio-economic system, especially during times of drought. In general, their rich cultural heritage, strong social institutions, and coping mechanisms continue to be a part of their resilience and identity in the face of environmental and socio-economic changes.

Characteristics of Study Kebeles

Data were collected from purposely selected four kebeles in four woredas, namely Hallona (Arero Woreda), Arboro (Gomole Woreda), Bokola (Moyale Woreda), and Gayo (Dhas Woreda) of Borana Zone that have both common features and different characteristics. Approximately, each kebele (village) has households ranging from 682 to 2,000 with its own unique characteristics.

Hallona

Hallona is a kebele (the smallest administrative unit) located within Arero Woreda, which is part of the Borana Zone in the Oromia Region of southern Ethiopia. Hallona Kebele is a well-established rural community in Arero Woreda. Founded approximately 40 years ago, Hallona has grown into a structured and organized kebele, currently home to about 547 households. Hallona Kebele was well established and structured during the Gada of Liban Jaldesa, making it about 24 years old in Gada time, which means it was structured and recognized before three successive Gadas (Liban Jaldesa, Guyo Goba, and Kura Jarso). This connection to the Gada system, the traditional socio-political governance of the Oromo people, highlights its deep cultural roots. Unlike many newly established kebeles, Hallona was carefully structured from its inception, ensuring a strong foundation for social, economic, and administrative organization. It functions within the traditional Borana governance and resource-sharing systems, reinforcing community cohesion and stability. The community primarily depends on pastoralism, with livestock-especially cattle, camels, and goats-playing a central role in the local economy. Some agro-pastoral activities supplement livelihoods, particularly in seasons of favourable rainfall.

Hallona is part of the semi-arid Borana rangelands, characterized by savanna grasslands, acacia trees, and seasonal water bodies. It experiences climatic variability, with alternating dry and wet seasons impacting both livestock and water availability. Hallona is embedded within the Borana Oromo culture, maintaining gada leadership principles, customary laws, and

resource-sharing traditions such as the Tulaa wells and Dheeda grazing systems. The community's resilience in adapting to environmental and economic challenges is rooted in its social structure and indigenous knowledge. Hallona Kebele is a historically significant and well-structured community in Borana Zone, deeply connected to the Gada system and Borana pastoral traditions. Despite facing environmental challenges, its strong social fabric, traditional governance, and adaptive pastoral lifestyle continue to sustain and define its unique character.

Arboro

Arboro Kebele, established in 2001 E.C., was formed by separating from Dhadim and Dida Yabello kebeles. It is in a strategic position bordered by several kebeles including Malka Bora, Haro Bake, Buya, Abuna, Bakke town, and Dase. The kebele is home to approximately 682 households, predominantly pastoralists who also engage in small-scale crop production. Historically, the community relied heavily on livestock, but the past two years have seen a dramatic decline due to prolonged droughts, leading to widespread livestock loss. Despite these challenges, some households continue to raise cattle, camels, and goats, maintaining their pastoral way of life to a limited extent.

Arboro has seen recent developments in basic services, notably the construction of a four-classroom school building by LLRP in collaboration with the government, as well as a health center in the Bule Roba area. Water infrastructure has also improved, with the development of wells and a pond nearing completion. However, access to water remains a significant issue due to natural challenges such as heavy flooding and dangerous land depressions that have damaged existing wells. Natural disasters, particularly severe floods and droughts have displaced families and devastated livelihoods. The impact of climate extremes has driven many residents to migrate, especially to areas like Dabeli in Northern Kenya in search of alternative survival options like traditional gold mining.

Bokola

Bokola Kebele, formerly part of Tuka Kebele, has a rich cultural and historical legacy rooted in its identity as a land of livestock and pastoral tradition. Known in Borana oral heritage and songs as "the land of Bokola," it is celebrated for its association with cattle, goats, and camels-the three key livestock central to the Borana way of life. Places like Bokola Sure River, Sole's Pond, and Cilako are emblematic of this heritage, serving as references in traditional songs, especially those sung by women to honour and care for livestock. The kebele is characterized by a desert-like yet livestock-friendly environment, supporting the sustenance and productivity of pastoral livelihoods across generations.

Established as an independent kebele in 1999 after separating from Tuka, Bokola has made significant strides in developing its infrastructure and public services over the past 17 years. It now has essential facilities such as a health station, a livestock health center, and an elementary school offering education up to grade 8. Electric power is available, and clean drinking water has been accessed in two out of its three sub-kebele divisions. With a population of approximately 2,000 households, Bokola Kebele has grown into a self-sustaining administrative unit, gradually expanding its services and improving the quality of life for its residents.

Gayo: The Sacred Heart of Borana Gadaa System

Gayo Kebele stands as the sacred heartland of the Borana Oromo people-a place steeped in history, ritual, and deep cultural identity. Revered as the birthplace of the Gada system, Gayo is far more than a geographical location; it is the spiritual and cultural axis around which Borana life rotates. The Gada system, an indigenous democratic socio-political and cultural governance structure recognized by UNESCO, is believed to have originated here. Every eight years, all five Gada lines converge at this spiritual center to perform the Gumi Gayo, a grand assembly where leaders, elders, and communities revisit and reaffirm their values, refine their traditions, and pass on essential norms and laws that govern all aspects of life.

At the center of Gayo lies the Kurkura shade, a gathering site under the sacred *Ziziphus mauritiana* tree, where age-set groups, ritual leaders, and Abba Gadaas (traditional leaders) conduct symbolic and spiritual ceremonies. This site is sacred to all Gada lines - Konnitu, Arboro, Oditu, and Kallu spiritual class—who gather here to reaffirm their responsibilities and conduct leadership transitions. Before age-set groups such as the *Ijoollee Nyaachisa* (those transitioning to the next age-grade) begin their ceremonial activities, they must first visit Gayo. A key ritual involves drawing water from the holy well of Ababa, symbolizing purification and readiness to take on new social roles. Touching the water with their ceremonial garments and receiving their swords here are prerequisites for participating in the *Nyaachisa*, a rite involving the ritual slaughter of bulls from their fathers' herds.

Gayo is not only a spiritual capital but a legislative one, where the cultural codes and taboos of Borana pastoral life are refined. During the Gumi Gayo assembly, rules governing the treatment of livestock, gender relations, and environmental stewardship are proclaimed and enforced. Each livestock species-cattle, camels, goats, sheep, horses, and donkeys-has its own culturally defined roles, rights, and accompanying rituals. For instance, the law concerning rams (uncastrated male sheep) includes severe punishments for theft or harm, reflecting their high cultural value. Even the misuse or abuse of donkeys carries cultural consequences. These laws are grounded in ethical treatment, ancestral wisdom, and the protection of community livelihoods. Women's roles and identities are also honoured and protected through specific cultural laws established at Gayo. Women participate in events with dignity and authority. For example, during the *Jila* (celebratory events), the woman who prepares and beautifies the mother of the ceremony is entitled to receive a *Qundhii*-a short leather strap symbolizing respect and honour. Failing to fulfil such obligations lead to significant social consequences, highlighting the central role of women in sustaining cultural integrity.

Geographically, Gayo occupies a central and strategic position, surrounded by neighbouring kebeles including Gorile, Annole, Web, Dhas, and Sodda. This expansive area is characterized by traditional pastoral landscapes-wells, open rangelands, and community settlements. It is from this landscape that the Borana's intimate knowledge of livestock, nature, and communal life has evolved over centuries. Gayo is considered the source of all Borana culture; every law and tradition regarding animal husbandry, water access, social relations, and intergenerational responsibilities is said to have been shaped here. Despite the region's deep-rooted pastoral identity, contemporary challenges such as recurrent droughts are increasingly pushing the community toward crop cultivation-an unfamiliar and historically unintended livelihood

strategy. Still, the pastoral way of life-centered on the raising of cattle, goats, and camels-remains the primary economic and cultural foundation. Milk, meat, and live animal trade continue to define local livelihoods, even as the pressures of climate change and resource scarcity mount.

Lastly, Gayo remains the ceremonial stage for vital age-grade transitions. A poignant example is the naming ceremony of newborn boys from *Ijoollee Nyaachisa* families. If a child is born the night before the *Nyaachisa*, he must be named the next morning at Gayo. The newborn is ritually adorned with traditional attire, a small knife, and a sword-symbols of his future societal role-and brought to the site for his first communal identity ritual. In essence, Gayo Kebele is not just a physical place-it is the embodiment of the Borana worldview. It is where generations reconnect with their past, define their present, and envision their future through the lens of a dynamic and living cultural heritage. The continued preservation, recognition, and study of Gayo are vital not only for the Borana community but also for the broader understanding of indigenous governance and cultural resilience in the Horn of Africa.

2.2. Sampling Processes and Techniques

The study employed a purposive sampling approach across four woredas-Yabello, Moyale, Dhas, and Arero-selected based on their representativeness of pastoralist settings and relevance to the research objectives. Within each woreda, one kebele was chosen purposively to capture variations in livelihood systems, gender roles, and climate vulnerability. Data were collected using focus group discussions (FGDs) and in-depth interviews. For each kebele, three FGDs were conducted: one with women (8-12 participants), one with men (8-12 participants), and one mixed group of both genders (8-12 participants). In addition, eight in-depth interviews were carried out per kebele-four with women and four with men-to obtain deeper individual perspectives and experiences. This multi-level sampling design ensured diversity in voices and perspectives while maintaining a balanced representation across gender, location, and social roles.

The primary research methods utilized in this study include focus group discussions (FGDs), individual interview and semi-structured key informant interviews. Using FGDs, the study team were able to facilitate group dynamics and encouraged participants to share their perspectives and experiences openly. Additionally, the semi-structured key informant interviews provided an opportunity to gather targeted information from individuals who are well versed with deep knowledge or experiences of the local specific contexts. Together, these research techniques ensure a comprehensive and multifaceted approach to data collection. The study compares contexts like area to area, household to household, male, female and mixed FGD participants and male and female individuals. Community profiles were obtained from key informants, while FGDs were conducted separately with female, male, and mixed groups with equal number of females, male participants. In-depth interviews were conducted with individuals from different categories, each with unique characteristics, to gain a comprehensive understanding of socio-economic dynamics and enable meaningful comparisons.

Key informants were identified from the development agents, women pastoralists, elders, kebele administration, schoolteachers and principal, women leader, and youth. A total of 154

participants (49 % of them were Female) drawn from four study woredas participated in the FGDs. The selection criteria for FGDs participants include sex, marital status, livelihood category, age, and family size. In-depth group discussions were held with FGDs participants in each Woreda to generate data for the study. The FGD members were clearly informed about the objective of the study and were encouraged to express their opinion and knowledge freely.

2.3. Data collection techniques

Qualitative data collection techniques such as key informant interviews, focus group discussions, and in-depth interviews were deployed using OXFORD-gender analysis tools. The purpose of each tool and the number of participants, additionally, approaches used to collect the data, the number of participants per woreda, the characteristics of the key informant participants, and the details of the focus group discussion participants (such as sex, age, marital status, family size, education, religion, ethnicity, and means of life) are described below. Furthermore, a framework was utilized to analyse the collected data in this session.

Given the homogenous nature of social practices and cultural norms of Borana community as shaped and maintained by Gada system across the Borana rangelands, Gomole-Moyale corridor, running from one end of Borana zone to the other end and stretching more than 200 kms to the north-east and south-east of Yabello town; Moyale, Dhas, Arero and Gomole woredas respectively represented by Bokola, Gayo, Halona and Arboro kebeles were believed to be representative of the wider community and hence selected for gender analysis study in Borana. Considering livelihood mainstay of the four woredas, Moyale and Dhas are dominated by pastoralism whereas Gomole and Arero practice both livestock herding and rain-fed crop farming. As such, Moyale and Dhas fairly represent pastoralist communities whereas Gomole and Arero woredas represent livestock-crop mixed farming communities. Besides, the availability of access road, proximity to the main tarmac road, logistics and overall ease of undertaking the study were also considered in the selection of the woredas represented by those kebeles.

2.4. Data collection tools

The data collection instruments were first validated and contextualized in collaboration with project implementing partners during a workshop held in Adama. This was followed by a half-day practical training for data enumerators in Yabello. A total of six enumerators-three women and three men-participated in the training. Enumerators were selected based on their background in social sciences, fluency in the local language, and prior experience in qualitative data collection.

The tools were piloted in Bakke Kebele of Yabello Woreda, which was excluded from the main study area. Feedback from the pilot was used to refine question flow, translation accuracy, and cultural relevance.

- Data collection was then conducted across the four targeted woredas, each represented by one kebele. The tools employed included:
- Literature review - to establish the conceptual and policy context for gender and water governance.
- Community profiling-to capture demographic, socio-economic, and livelihood characteristics.

- Focus Group Discussions (FGDs) -to explore gender norms, access to water resources, and adaptation strategies across different social groups.
- In-depth interviews (Key Informant Interviews)-to gather insights from local leaders, government officials, and technical experts on governance structures and institutional dynamics.
- All data were subsequently compiled, coded, and analysed to generate evidence for the gender analysis across the four study woredas.

2.5. Data Source

Both primary and secondary data sources were used. Primary data sources include a group of women and men community members drawn from each village of the study sites and key informants from community representatives. Secondary data sources include various project documents and studies conducted and official reports of the study woredas. The study utilized a range of methodological tools and techniques in a bid to gather in-depth information regarding community-level factors in terms of water access, gender norms, and decision-making. These tools included literature reviews, community profiling, focus group discussions (FGDs), and in-depth interviews, each serving a specific purpose in the study.

The literature review was undertaken with the aim of establishing a general background for the case study area, basing this on previous studies. It helped in defining key concepts and building conceptual frameworks for analysing data. A community profile was later prepared in a bid to understand the socio-economic, agricultural, and civic characteristics of the community around water points. This was with the aim of establishing factors that influence gender norms, agency, and innovation in agricultural and NRM, with reference to water. Data for this activity were collected through key informant interviews with eight respondents from each woreda, divided evenly between male and female informants.

The study also included focus group discussions to gauge community water access and implications. These discussions mapped the community water sources and asked questions about issues such as who has access, what the reasons for water use were, and what contributed to inequalities in access. The discussions also asked about economic opportunities and challenges in terms of water, with a focus on gendered experiences. Other areas that were critical in the exploration included water resource management, ownership of critical assets, and climate issues. The FGDs were conducted with 12 different groups, which were divided by gender, marital status, and social roles, to provide a variety in views.

Finally, in-depth interviews were conducted in a quest to learn about gender norms in home water access and resource allocation decision-making. These were focused on norms in home water accessing, asset purchase, and accessing commodities that would ease the physical labour in water fetching. A total of 16 interviews were conducted, with equal numbers of men and women from all kinds of household structures, e.g., monogamous and polygamous, youth, elderly, widows, and divorced people. This was done to ensure that gender roles in water decision-making at the home level were captured in their complexity. Overall, these tools were methodologically strong in that they gave a balanced view of how gender norms, economic opportunities, and social structures in the community intersect with water access.

2.6. Data Analysis Framework

The analysis of the findings is conducted using the CGIAR gender transformative framework (GTF). The GTF focuses on understanding and changing the discriminatory social institutions and unequal power relations, which are considered the fundamental aspects of the framework. Furthermore, it recognizes the significance of evaluating the depth and sustainability of any changes made up until now. (European Union, 2020; Mullinax, Hart and Garcia, 2018; Hillenbrand *et al.,* 2015; Morgan, 2014; Kantor and Apgar, 2013;). Gender inequality is rooted in social institutions that perpetuate and reinforce unequal power dynamics between men and women (Cerise and Francavilla, 2012). These institutions consist of both formal and informal rules and norms that govern social, political, and economic interactions (Carter, 2014) or "the underlying rules of the game" (North, 1990, p. 3). Transforming these social institutions to promote gender equity leads to make them more gender equitable which fosters more cooperative power dynamics and relationships, while also recognizing and affirming people's capabilities, aspirations, critical awareness, and dignity (Hillenbrand et al., 2015).

The concept of power encompasses various forms that are interconnected with individual and collective agency, which are central to the process of empowerment (Van Eerdewijk et al., 2017; Kabeer, 1999). Therefore, gender transformative change encompasses three key dimensions: **agency / power relations / and social institutions** (DeMerritt-Verrone and Kellum, 2021).

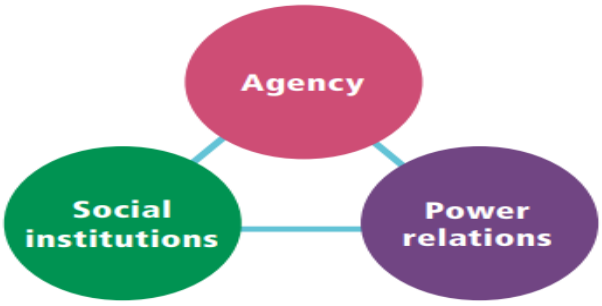

Figure 2 Gender Equality and Empowerment Triangle

Gender transformative change involves (1) building agency, (2) challenging unequal power relations that disfavour women and girls, and (3) making formal and informal social institutions more gender equitable, which can ultimately lead to more equitable social structures (e.g., macroeconomic structures, governance structures). Changes in the three dimensions of gender transformative change are mutually reinforcing. Increases in individual and collective agencies, for example, can bring about changes in power relations among individuals, groups, and organizations. Concurrently, changes in power relations can promote changes in formal and informal social institutions and give impetus to individual and collective agencies. Changes in social institutions can also create space for individual and collective agency, thereby leading to more equal gender relations. As such, gender transformative

change is non-linear, but ultimately, changes in all three dimensions are required to empower women and achieve SDG 5 (Gender Equality).

Building agency is the ability to define one's goals and act upon them (Kabeer, 1999). It refers to "the capacity for purposive action, the ability to pursue goals, express voice and influence and make decisions free from violence" (Van Eerdewijk *et al.,* 2017). Building agency entails building confidence, consciousness, aspirations and self-esteem, as well as improving knowledge, skills and capabilities (DeMerritt-Verrone and Kellum, 2021).

2.7 Data validation

During data collection, data validation was conducted to ensure the accuracy, consistency, and reliability of the gathered information. This process involved cross-checking data sources, verifying responses, and engaging stakeholders to confirm the validity of findings. By incorporating multiple perspectives and expert reviews, potential errors and inconsistencies were identified and corrected, enhancing the credibility of the dataset. Data validation was an essential step in ensuring that the information collected accurately represented the real-world context and could be used confidently for analysis and decision-making.

The data was validated at a workshop conducted in Adama on 20 December 2023, bringing together key stakeholders from various institutions. Representatives from Borana University, Yabello Pastoral and Dryland Agriculture Research Center, Borana Zone Busa Gonofa Office (Drought Risk Management Office), and Yabello Pastoral and Dryland Agricultural Research Centre gender expert, played a crucial role in reviewing the findings and ensuring their alignment with local realities. Additionally, experts from the Borana Zone Agriculture Office, NGOs, the Oromia Bureau of Agriculture, the Oromia Disaster and Risk Management Agency (ODRM), the Oromia Institute of Agricultural Research, the Ethiopian Institute of Agricultural Research, the Ministry of Agriculture, and the Agriculture Transformation Institute provided valuable insights and feedback. These participants engaged in thorough discussions, cross-referenced data with their own institutional records, and highlighted key observations to enhance data integrity. Their contributions helped refine the dataset by identifying potential gaps, inconsistencies, and areas requiring further verification. This collaborative validation process not only strengthened the credibility of the collected data but also ensured that it could effectively inform policy decisions, program development, and research initiatives.

3. Study Findings

This section provides a comprehensive overview of various aspects related to the livelihood patterns and gendered distribution of assets, income sources, locally produced pastoral and agro-pastoral goods and dietary practices. It also delves into the distribution of valuable assets within families, the intrahousehold dynamics, and the accessibility of services and information in relation to the residents' proximity to these resources. In addition, this section elaborates about sources of water and changes that have occurred in the past five years. It also examines water management and decision-making processes, water access and utilization, and water treatment practices. The time required to access water during both wet and dry seasons is also considered and investigated, along with the impact of varying levels of access to water for productive activities.

The section also addresses the seasonality of food availability with particular emphasis on season of food scarcity and the coping mechanisms employed during such periods. Moreover, this section provides information on climate risks that exist in the area, including trends in drought occurrences over the past decade and the strategies employed to cope with them. It also explores the accessibility of climate advisory services for both male and female pastoralists, as well as the sources of information available to them. The impact of climate change and associated risks on different water sources is examined, along with potential solutions and recommendations to mitigate these challenges.

Additionally, the section highlights the most significant trainings that have been delivered to the community, as well as the various groups, associations, networks, and organizations that are currently active in the area. Lastly, it identifies the institutions that hold the most importance for women within the community.

3.1 Livelihood Patterns and Gendered Distribution of Assets in Borana Society

3.1.1 Livelihood and Income

In most parts of Borana, pastoralism remains the main source of livelihood and income, centered on livestock such as cattle, goats, sheep, and camels. Livestock trade has long sustained local economies, while milk and meat form the basis of household diets. However, recurrent droughts and extreme climatic shocks have caused severe livestock losses, eroded household assets and pushing many families into chronic poverty. The economic impact is not uniform: male-headed households generally recover faster due to greater livestock ownership and mobility, while female-headed households, often with fewer animals and limited market access, experience deeper and more prolonged income decline.

In response, communities are gradually diversifying their livelihoods. In Hallona and Arboro kebeles, key informants noted a growing shift toward small-scale rainfed crop farming-mainly for subsistence-alongside a transition from cattle to goats, valued for their resilience to heat and feed scarcity. Men in Hallona reported resorting to manual ploughing due to the loss of draught animals, underscoring the depth of asset depletion. Comparatively, women have begun experimenting with small backyard gardens, producing vegetables such as tomatoes and cabbage to supplement food and income.

These changes reflect a broader transition from pure pastoralism to mixed livelihood systems driven by necessity rather than choice. Yet, gendered differences in resource ownership, labour division, and income opportunities continue to shape who adapts, how quickly, and with what long-term outcomes-an area that remains underexplored in current research on Borana's climate adaptation pathways.

3.1.2 Pastoral and Agropastoral Agricultural Products and Dietary Practices

In the Borana pastoralist community, dietary practices are shaped by a mix of livestock products and cultivated crops. Livestock, particularly cattle, play a central role, with milk being a key dietary staple consumed at home and sold commercially. While maize serves as a primary subsistence crop grown in all kebeles, other crops contribute to both home consumption and income generation. In Hallona and Arboro, teff and wheat are cultivated mainly for commercial purposes, whereas in Bokola and Gayo haricot bean and tomato are grown for household consumption. Additionally, backyard poultry and egg production, managed primarily by women in Bokola, provides an important source of nutrition and income. This combination of livestock rearing and crop cultivation reflects the community's adaptive strategies to sustain their livelihood and dietary needs.

There are also other income-generating activities and value addition practices in all areas, such as Aloe vera soap production in Hallona and Arboro, charcoal and firewood production in Hallona, Bokola, and Gayo, as well as local processing of milk, beans, and maize fermentation, locally known as "Tella," in Arboro. Furthermore, incense and gum production takes place in Gayo. Small scale irrigation schemes are present in Bokola and Gayo, utilizing micro dams and large ponds for fruit and vegetable cultivation. Regarding water sources for production and processing, pond water is used in Hallona and Bokola, while motor pumps are utilized in Arboro. Wells serve as a water source in Gayo, particularly for livestock and homestead tomato production.

Rainwater is used for crop production across all areas, and micro dams support irrigation efforts. Roto water tanks and boreholes are used for Aloe vera soap production in Arboro, while rainwater is utilized for maize fermentation in three kebeles (Arboro, Bokola, and Gayo). When it comes to decision-making on incomes from agricultural commodity sales, husbands and wives jointly decide on income from livestock and crop sales in all areas, Aloe Vera soap sales in Arboro, and charcoal and firewood sales in Bokola and Gayo. Women alone make decisions regarding income from milk sales across all kebeles, egg sales in Bokola, and firewood sales in Gayo. Meanwhile, men exclusively decide on income from irrigation-based commodity sales. Youth are responsible for making decisions on income from incense and gum sales.

Table 1: Locally produced agricultural goods and income generating activities

Item Descriptions	Hallona	Arboro	Bokola	Gayo
Locally produced agricultural goods for commercial purpose only	Teff, wheat	Teff, wheat	Egg	-
Locally produced agricultural products for home consumption only	Maize	Maize	Maize, teff, haricot bean and tomato	Maize, haricot bean, and tomato
Locally produced agricultural products for home consumption and commercial	Livestock, beans, and milk	Livestock, beans, and milk	Livestock and milk,	Livestock and milk
Other Income generating activities/Value addition on agricultural products	Aloe Vera soap making, charcoal making, and firewood collection.	Aloe Vera soap making, milk, haricot bean, maize (fermentation)	Charcoal making and firewood collection.	Charcoal making, firewood, collection Incense and gum production,
Irrigation practices	No irrigation practices	No irrigation practices	Fruits and vegetables	Fruits and vegetables
Main decision maker in relation to incomes from selling	Joint decision on sales from livestock and crops. Women only on sales from milk	Joint decision on sales from livestock, crop, and aloe vera soap sale. Only women on sales from milk.	Joint decision on sales from livestock, crops, charcoal, and firewood sales. Women only on sales from egg and milk.	Joint decision on sales from livestock, tomato, and charcoal. Women only on sales from firewood and milk. Men only on sales from irrigation products. Youth on sales from incense and gum.
Water source for production and processing	• Pond for livestock • Rainwater for crops	• Pond and motor pump for livestock • Rainwater for crops & maize fermentation • Roto water tank and borehole for making Aloe Vera soap.	• Pond for cattle • Rainwater for crops (maize, teff and haricot bean) • Wells for tomato • Micro dam for irrigation	• Wells for livestock and tomato • Rainwater for crops (maize and haricot bean).

3.2.3 Sharing Meals Practices

In Borana society, meal sharing follows a clear hierarchy shaped by age, gender, and social norms-a pattern that aligns with more recent ethnographic studies on food distribution and intra-household dynamics in pastoralist communities (Watson, 2021; Tache & Oba, 2020; Megersa *et al.,* 2019). The youngest children eat first, followed by older children and teenagers. After they have been served, husbands take their meal, and finally, wives eat last. This hierarchy extends to the serving order, where children are prioritized, followed by husbands, and wives serve themselves last. However, husbands closely monitor food availability to ensure their wives receive a share. If a wife has served everyone and finds nothing left for herself, the husband may discreetly offer his portion, pretending to be full, even if he is not. This aligns with findings from studies on food security and gendered food distribution, which highlight male authority in ensuring household sustenance while reinforcing traditional gender roles (Quisumbing et al., 1995).

Key informant interviews with female-only groups in Hallona, Arboro, and Gayo confirm that household members eat separately, maintaining the same hierarchy-children eat first, followed by fathers, with mothers eating last. In cases of food scarcity, mothers may go without food entirely. This underscores the significant burden women bear in ensuring their families are fed, a phenomenon well-documented in gender studies on food insecurity (Agarwal, 1997; Kabeer, 2000). Expanding on these meal-sharing customs, Mr. Shebala corroborates that children are always fed first in order of age, starting with the youngest. He further mentioned that while wives may sometimes have little to nothing left to eat, they are generally aware of the food proportions they prepare for the family. This knowledge helps them manage portions strategically to ensure sustenance for all members. Such strategies are characteristic of women's role in household food management, as highlighted in rural livelihood studies (Carr, 2014).

Boru Dida echoes Mr. Shebala's observations, emphasizing that wives often sacrifice their meals to feed their children. However, he asserts that attitudes are gradually shifting, and some husbands are becoming more attentive to their wives' nutritional needs. He shares his personal commitment to monitoring food distribution within his household, ensuring his wife does not go hungry. Boru highlights a critical nuance: during times of food scarcity, priority is given to children. Yet, when children reach adolescence, the prioritization shifts-wives begin prioritizing their husbands over their older children. This shift in prioritization is consistent with findings on intra-household food allocation patterns, where cultural expectations dictate the distribution of limited resources (Devereux, 2001).

The practice of husbands reserving a portion of their meal for their wives is a well-established tradition in Borana culture. Mr. Guyo recounts a personal experience from the 1977 Ethiopian drought and the 1984 famine when he and his mother migrated with their livestock to escape the crisis. He recalls how his father consistently shared his food with his mother, while two village elders traveling with them did not follow this practice. As a child, he noticed the discrepancy and advised his mother, saying, "Those elders are not like my father-they don't leave any food for you. Don't be foolish; take some for yourself." This anecdote illustrates the

interplay between personal agency and cultural expectations in food-sharing behaviour, reflecting similar accounts from famine literature (Sen, 1981; De Waal, 1997).

In urban settings, meal-sharing dynamics differ slightly. A female informant from Bokola explains that in town, food is shared based on family size and capacity, with no differentiation in food type between men, women, and children. In her household, children still eat first, but the mother and father eat together, reflecting a shift from traditional rural customs. This evolution in food-sharing practices aligns with studies on urbanization and its impact on gender roles, where increased access to resources and changing social structures modify traditional norms (Tacoli, 2012).

These findings illustrate both continuity and change in Borana meal-sharing practices. While deeply rooted traditions persist, evolving social attitudes and urban influences are shaping new patterns of food distribution within households. The persistence of hierarchical food-sharing customs highlights the endurance of cultural norms, while observed shifts underscore the adaptability of these practices in response to changing socio-economic conditions. Further research is needed to explore the implications of these changes on household food security and gender relations within Borana society.

3.1.3 Distribution of Valuable Assets at Household and Community Levels in the Borana Community

The Borana community, an indigenous pastoralist society in Ethiopia, practices both monogamous and polygamous marriages. Household structures in Borana are diverse, with some households being female headed due to widowhood, divorce, or separation. Additionally, in cases of polygamous marriages, women may also head their own separate households while still being part of a larger extended family network. These household dynamics significantly influence the distribution of assets and resources within the community.

Asset inheritance and distribution in Borana are deeply rooted in customary laws and traditional norms. Inheritance typically occurs at two critical life stages: birth and marriage. According to Borana customary law, the first-born son (*angafa*) holds the exclusive right to inherit all his father's resources, including livestock and land use rights. This patrilineal system reflects a broader pattern observed in many African pastoralist societies, where the transmission of wealth follows a male lineage (Agarwal, 1994). However, recent trends show a shift in inheritance practices, as fathers increasingly provide formal education to their children, particularly daughters, as a form of wealth transfer. This change aligns with broader development trends emphasizing education as a tool for economic and social mobility (Dercon & Singh, 2013).

Women in Borana society receive gifts from their natal and marital families, reinforcing the cultural significance of gift-giving at marriage. These gifts, often in the form of livestock, jewellery, and household items, serve as economic support and social capital for women in their new households. This practice echoes findings from studies on dowry and bride wealth systems in East Africa, which highlight the role of marriage transactions in stabilizing family relations and ensuring women's economic security (Anderson, 2007).

The Borana community identifies livestock as the most valuable asset, followed by land, farmland, and housing. Livestock not only serves as a source of livelihood but also holds social and symbolic importance, reflecting an individual's wealth and status within the community (Tache & Oba, 2009). Land ranks second in significance due to its multifaceted uses, including herding, ploughing, and intergenerational transfer. Historically, Borana pastoralists primarily depended on communal land tenure systems for grazing, a characteristic feature of many indigenous pastoralist societies (Hogg, 1997). However, recent shifts toward crop farming have led to the increased valuation of farmland as an essential asset, signifying an adaptation to changing environmental and economic conditions.

Land ownership in Borana remains a complex issue. Across various woredas and communities, key respondents unanimously indicated that land is officially owned by the government, with communal usage rights extended to all members of the community. This aligns with Ethiopia's broader land tenure policies, where the state retains ownership while granting usufruct rights to rural communities (Crewett & Korf, 2008). Despite this communal arrangement, there are instances of private land ownership, particularly regarding farmland, which individuals cultivate for agricultural production. This gradual transition towards individualized land tenure may reflect broader regional trends where communal land management systems are being restructured to accommodate agricultural expansion and land commodification (Pankhurst, 2002).

The dynamics of asset distribution in Borana reflect the interplay between traditional inheritance practices and emerging socio-economic changes. While customary laws continue to favour male primogeniture, increasing access to formal education for girls signifies a progressive shift in wealth transfer mechanisms. Similarly, the transition from exclusive pastoralism to integrated agro-pastoral livelihoods underscores the evolving nature of asset valuation and ownership in the community. These changes highlight the importance of adapting traditional norms to contemporary socio-economic realities while ensuring equitable resource distribution at both household and community levels.

3.1.4 Gender dynamics at the household level

The study team conducted individual interviews with diverse male and female household members to understand the gender dynamics at intra household level related to access, utilization and decision making of assets (including water). The in-depth interview confirms key informants and FGDs, but this session further elaborates more about the intrahousehold dynamics, such as sexual division of labour between men, boys, women, and girls in diverse households and discusses about most important assets that are important to access water, who controls and who utilize them.

It indicates that it is women's responsibility to ensure water is available in the household unless she is sick or pregnant or gives birth. If a women can't fetch water, the responsibility is changed to young girls or (men if the distance of the water source is too far). Sometimes there is conflict between husband and wife when a woman fails to fetch water because in Borana culture it is women's responsibility to fetch water, carry out all the household tasks and feed

the family. Men are breadwinners and their responsibility is to bring income to the family. Culturally, girls follow their mother's role while boys follow their father's role.

Widow, separated woman, woman in polygamous marriage take all responsibility unless they have young children. There are times that a woman gets support from young girls or boys in sharing workloads even if that affects their education. There are times that women travel long distance to fetch water because wells are closed in wet seasons. No one is allowed to fetch water from well even if it is accessible (very nearest to their home).

In most households, decision related to assets (including assets that are most important to access water) are given by men. Most important assets that are important to access water are donkey and motorbike. A woman who uses donkey and motor bike have more access to water source in wet and dry seasons than others. Conflict may arise between husbands and wives in some households, and in polygamous marriages, it can even become a reason for divorce, when husbands show favouritism among wives in the utilization of assets that are essential for accessing water.

Summary of Key Informant Interviews and Focus Group Discussions

Water Access and Utilization: The respondents highlighted their dependence on multiple water sources that change based on the season. Water ponds, wells, and motorized pumps are the primary sources in the wet season, whereas pipe water and distant boreholes become essential during dry periods. Water fetching duration varies widely, ranging from 30 minutes to four hours depending on the water source and season. For instance, Madam Kabala Shebala from Arboro Kebela spends up to four hours fetching water from Surupha town, while Madam Ware Abduba from Arboro kebele, takes about two hours to access a motorized pump. Pipe water is often the preferred choice for drinking due to its relative safety, though it comes at a cost of 1 ETB per 20 litres.

Women overwhelmingly bear the responsibility of ensuring water availability in households. In cases where they are unable to fetch water due to sickness, pregnancy, or childbirth, young girls or male family members take on the duty, particularly when the distance is too far. Decisions regarding water sources are primarily made by women, considering distance, availability, and affordability. However, in some cases, men assert decision-making authority, particularly in polygamous households where husbands allocate resources such as donkeys to assist with water transportation.

Household Responsibilities and Gender Roles: Household labour is heavily gendered, with women shouldering most of the domestic work, including cooking, cleaning, washing, and firewood collection. Men, on the other hand, are responsible for livestock herding, land ploughing, and other productive labour outside the home. Women also have limited personal assets, with jerry cans and jewellery being among the few items they own outright. Some women, like Madam Ware Abduba from Arboro kebele, receive donkeys as gifts, which significantly aid in water transportation. However, others, such as Madam Sheka Abdulah from

Bokola kebele, face restrictions from their husbands on using household donkeys for water collection, which forces them to rent transport or carry heavy loads themselves.

Climate Risks and Impact on Livelihoods: Drought and flooding are identified as the most pressing climate risks. Drought leads to the drying up of water sources, mass livestock deaths, and economic strain, forcing some families to migrate in search of water. For example, Liban Dika's family had to travel up to eight hours to access water during severe droughts, disrupting education and livelihoods. In other cases, flooding damages water infrastructure, contaminates water sources, and displaces families. For instance, Mr. Nura Kitu described how flooding displaced his family for a week and washed away their food supplies.

The economic toll of climate change is severe. Many respondents reported losing significant number of livestock, which serve as their primary economic assets. Mr. Nura Kitu stated that his cattle stock dropped from 158 to just 23 due to drought. The financial strain has driven some individuals to seek alternative incomes, such as small businesses and selling goods within their kebeles.

Coping Strategies and Adaptation Measures: Several coping mechanisms have emerged in response to the worsening climate crisis. Women and men alike advocate for livestock banking, hay storage, and engagement in small businesses to create financial resilience. Some, like Madam Asli Liban, aspire to invest in backyard farming to enhance household food security. Additionally, some families are shifting towards more sustainable water management strategies, such as purchasing donkeys for transport or digging private boreholes.

The importance of climate information is widely acknowledged. Many respondents rely on traditional forecasting methods, such as star observations and advice from elders, as well as modern sources like radio, SMS alerts, and discussions with development agents. However, some respondents, such as Liban Dika, expressed frustration over the lack of reliable and timely climate information.

Decision-Making and Resource Control: The control of financial and material assets largely rests with men, although women influence household decisions related to water use. While some households, such as Mr. Kuli Guyo's, have joint discussions on asset purchases, the final decision-making power remains with men. In cases of polygamous households, men allocate resources such as donkeys and motorbikes among their wives but often retain control over their use. Some women, like Madam Sheka Abdulah, struggle to access household assets due to restrictions imposed by their husbands.

Conflicts over water access and household responsibilities occasionally arise. In some cases, as reported by Mr. Guyo Oda, village elders mediate disputes between husbands and wives regarding water collection responsibilities. The gendered division of labour continues to shape household dynamics, influencing who has access to critical resources and decision-making power.

Finally, the findings from key informant interviews and focus group discussions underscore the significant challenges that communities face in securing water access and adapting to climate change. Women remain at the forefront of water management but face structural limitations in accessing resources and making broader financial decisions. Climate risks, particularly drought and flooding, continue to threaten livelihoods, prompting families to adopt various coping strategies. Moving forward, interventions that enhance water infrastructure, support alternative livelihoods, and provide timely climate information could greatly improve community resilience.

ASSET INHERITANCE AND DISTRIBUTION IN BORANA

Regarding how resources are shared in this community, there are many ways to own resources. Traditionally when Borana son is born and reach for warrior stage, his father buys him spear weapon. This means the spear weapon is used for preparing him to be a warrior. Once he becomes a warrior, he can fight with his enemy to obtain cows. If someone is destitute- doesn't have any livestock/cows, he can herd other person's livestock/cows and gets one heifer from him in a year. And the one that he gets will give birth to calf and any calf from that cow belongs to him. In addition to this, resources are distributed in many ways. The first way to get livestock asset is from father. Father is responsible to give cows for all his sons called *handhura* literally mean navel and this is affected by cutting the umbilical cord of the newborn baby boy and putting on the back of a cow/heifer after the birth of the baby boy. Then, the cow/heifer and its calves are boy's property-when he gets married, he can take all with him. The first-born son *(angafa)* is responsible for managing this family after his father's death, so he inherits all his father's resources.

The other way to get asset for baby boys is Gubbisaa event which is a naming ceremony for the baby boy. In this naming ceremony, his family and relatives bring livestock, which he owns and takes after marriage. Concerning girls, Liban indicated that girls get assets through ***Siqqee***, called loon siqqee- cow/heifer given to bride by father in-law; ***Aabbaa***- cow given to bride by father few days after wedding ceremony; ***Obboli***-cow given to the bride by her married brother or paternal male cousin; ***Heessuma***- Cows or Heifer given to bride by maternal uncle; ***Anuna***- A male calf or heifer given to the mother of bride by her son-in-law and etc. The difference here is that boys are entitled to get those gifts on birth days and naming ceremony, while female gets asset through gifts on their wedding ceremony and after marriage. She can't get resources/property before marriage. Respondents were also asked about why she can't inherit her father. They have responded that, because marriage arrangement is between the opposite moiety, ***sabboo*** and ***gona***, once married, woman clan is changed to that of husband. So, if she is given property from her father- it means you are giving resources to another clan. That is why she only receives *siqqees*' as a cultural practice. For polygamous case, they said that the woman has **siiqqee** from her husband upon her marriage. Husband gives heifer to her, exactly the day he marries her. The second way a woman gets asset is all what she gets as gifts from her relatives on her marriage. Thirdly, like any other marriage, she receives *Aabbaa, Obboli, Heessuma, Aanunaa* etc. from her parents, family and relatives.

3.1.5 Community Level Social Services and Access to information

This part presents the available services and access to information in studied areas of Borana, distance from the resident areas and water sources used by service providers. The services are 25-50 kms away from the resident area and it takes 30 minutes to 1:30 hours by motorbike or public transport. Most women access climate information from traditional source, but men access both from traditional and scientific sources. The literate men can access climate information from social media in addition to SMS and Radio but still affected by the prolonged drought.

Services like security/, health and agricultural extension are commonly found in all areas, and the services are provided by government. The government also offers mobile telephone network services in three kebeles (Hallona, Bokola and Gayo). Nutrition for mothers and children and emergency services are provided by either government or NGOs or by both in all areas. Primary schools are found in all kebeles, but secondary schools are available in two kebeles only (Hallona and Gayo). Private sectors provide services like veterinary clinics and sell mobile phone apparatus in two kebeles (Hallona and Gayo). In addition, private sectors are involved in pharmaceutical businesses and selling motorbikes in Hallona. Water purification chemical is provided by either NGOs or jointly by government and NGOs in all areas. There are also organizations who offer on- job training or vocational programs in Arboro. Private sectors provide water access for pastoralists when drought spells and all water sources dry.

Water sources used by social service providers vary from one area to another depending on availability and accessibility of water source. For instance, service providers in Hallona use only pond water, whereas in Gayo, they use hand pumps and wells. However, in Arboro, government and NGOs use water pump; primary school and health centres use roto water tank and job training centres use borehole; and security office use water track; and in Bokola NGOs use pump water; government offices use pipe water; and school, and extension services use roto water tank. There was an instance that the study team observed when private sectors use pond water (Haro Bakke) for investment purposes. (See picture below).

Figure 3: Pond water (Haro Bakke)

3.2 Water Sources Use and Management

Water sources vary across the four villages-Hallona, Arboro, Bokola, and Gayo-reflecting both environmental conditions and available infrastructure. In Hallona, the primary water sources include water ponds, open shallow wells, roto water tanks (filled by water trucks), boreholes, and seasonal water storage such as Renji and Berkad (water pans). Commonly used ponds like Haro Doyo Guyo and Haro Duba Guyo are vital for domestic, and livestock use, although the latter is located far from residential areas and primarily serves livestock. Despite the presence of two boreholes-one large and one small, none of these sources is perennial, forcing residents to migrate in search of water during the dry season.

In Arboro, communities depend on five main water sources: harvested rainwater, pipe water, motor pumps, open shallow wells, and a micro dam. While these sources offer some diversity, access remains challenging, particularly for women, who mentioned that ponds are distant from residential areas. Similarly, Bokola benefits from a wider array of sources including ponds, hand pumps, pipe water/public taps, water pans, micro dams, and wells. These are relatively better distributed and accessible, according to all focus group discussions (FGDs), suggesting a more developed water infrastructure compared to Hallona and Arboro.

Gayo has the most structured water system among the four, with a combination of traditional and improved sources. The village utilizes Tula wells, ponds, hand pumps, water pipes, and water pans. A mixed group FGD revealed the existence of four ponds, twelve traditional Tula wells, seven hand pumps, and one water pipe, with the only two permanent sources being the motorized water pump and the Gayo-Tula wells. While many ponds are seasonal, the reliance on more permanent solutions like motorized pumps and deep wells indicates some progress toward sustainable water access, although gaps remain in ensuring year-round availability for all households.

3.2.1 Change in Water Sources in the Past Five Years

Studies show that the availability of water resources in the Borana Zone has reduced significantly during the last five years because of both climatic and anthropogenic factors. The hydro-ecosystem has been impacted by temperature increase, rainfall decline, and drought increase (Tegegne et al., 2025). According to Tegegne et al. (2025), water bodies in the Borana zone shrank and disappeared because of the decline in rainfall and increase in evaporation. Furthermore, the Borana zone's water bodies are shrinking due to several issues other than climate change. Another element contributing to water body shirking is population growth, which raised demand for water. The hydro-ecosystem of the Borana zone has also been adversely affected by changes in land use and land cover brought on by deforestation and agricultural expansion. Tegegne et al. (2025) also pointed out that sediment buildup in the waterpoints from upstream watersheds is reducing the holding capacity of most water storages systems in the Borana zone.

According to key informants and Focus Group discussants, the last severe drought caused the desiccation of water ponds, resulting in the tragic loss of human life (read case in Hallona below) as well as livestock, forages (grasses, browses) and forest roots. Moreover, the drought also had resulted in far-reaching consequences such as an increase in school dropouts. The scarcity of water sources further exacerbated the situation, leading to limited access to safe drinking water and malnutrition among women, children, and elderly. In addition, the occurrence of floods caused the loss of water ponds, forced people to relocate, affected small ruminants and chickens, disrupted the functioning of power generators, damaged water pipes, triggered soil erosion, and resulted in the displacement of households. Furthermore, the flood-induced conditions also contributed to the outbreak of cattle diseases, leading to the loss of cows, camels, and goats.

Case in Hallona Kebele-Loss of human life due to water scarcity

In dry seasons, everyone is affected by scarcity of water. There was one sad incident that happened in the last severe drought event. There was a case that one mother was killed by a truck when she was trying to get water to quench her thirst. Here is what happened; Government sent water truck to Hallona village, and the driver of the truck was busy in assisting the residents in giving water one by one. During this time, a mother who carried a baby came closer to the truck. She was very thirsty, and she wanted to drink water, but no one could assist her not even by giving her a glass of water because everyone was in the same condition. Then she saw wet soil and tiny dropping water beneath the truck and out of desperation she went under the parked water truck to get drops of splashed water. Unfortunately, the truck driver was not aware that she was under the truck, and he suddenly turned the engine key on, and the glow plugs warmed up, and the pitches of gear had cut the neck of the unfortunate mother, and she died immediately but her baby survived. This is an extremely disturbing and deeply saddening incident story in the area. (FGD with women only group in Hallona.)

Table 2: Summary profile of the four kebeles

Kebele	Livelihood and Income	Major Negative Events (Last 5 Years)	Consequences on Livelihood and Community
Hallona	Predominantly a pastoralist community with supplementary agro-pastoral practices. Livestock (cattle, camels, goats) form the economic backbone. Seasonal farming is practiced in times of favourable rainfall. Embedded in traditional Borana systems of resource sharing (Tula wells, Dheeda grazing).	Recurrent and prolonged droughts- Drying up of traditional water ponds- Flooding events damaging water infrastructure (generators, pipes)- Climate variability disrupting seasonal patterns.	Severe livestock loss reducing household income- Limited access to safe drinking water leading to increased health issues and malnutrition, especially among women, children, and the elderly- Community displacement due to infrastructure damage- Decreased living standards and greater reliance on traditional social safety networks.
Arboro	Transitioning from pure pastoralism to include small-scale crop cultivation due to climate pressures. Livelihood diversification is increasing. Some families still raise cattle, goats, and camels.	Prolonged drought over the past 2+ years- Widespread livestock loss- Flash flooding damaging newly constructed water ponds and other structures- Displacement of households	Loss of pastoral income forced livelihood diversification (crop farming)- Death of small ruminants and poultry reduced food and financial security- Stored food washed away by floods- Increased migration to areas like Dabeli (Kenya) for survival- Dependency on limited public infrastructure and aid increases.
Bokola	Strong identity as a livestock-centered kebele. Known in Borana oral traditions. Predominantly pastoralist, with infrastructure supporting livestock health and human services. Some adaptive crop farming may be emerging due to recent droughts.	Droughts resulting in destruction of grazing lands and forest roots- Outbreak of livestock diseases due to weakened immunity and poor water sources- Flooding causing soil erosion and destruction of water ponds- Household displacement.	Significant livestock mortality (cows, camels, goats) leading to food insecurity- Drop in school attendance due to economic stress and displacement- Erosion of traditional grazing areas impacting sustainability of pastoralism- Disruption of animal-based cultural and economic practices- Higher dependency on local services (e.g., health and livestock centers).
Gayo	Pure pastoralist community that also serves as the cultural, spiritual, and legislative center of the Borana Gada system. Economic life revolves around livestock (milk, meat, trade). Increasing environmental pressure has led some to experiment with crop farming.	Prolonged droughts significantly reducing available pasture and water- Increasing pressure on sacred and communal lands due to environmental degradation- Traditional pastoral lifestyle increasingly threatened.	Community resilience challenged by ecological pressures- Emergence of unfamiliar agricultural practices marks a shift from traditional norms- Ritual and cultural practices continue but with growing logistical and economic strain- Reduced livestock productivity undermines ceremonial obligations (e.g., bull offerings in Gada transitions). Despite pressure, the cultural authority of Gayo remains intact, serving as a beacon for Borana identity and governance.

3.2.2 Water Sources Management and Decision Making

The management systems for each water source vary significantly. Water ponds and water wells are communal and exclusively managed by men. On the other hand, hand pump water and pipes are overseen by a committee consisting of both men and women. Boreholes, however, are solely managed by women. Lastly, the government takes charge of managing water trucking or water delivery to the roto water tanks in the communities. Asked about the management structure, decision-making power, and control over the water sources, key respondents came up with diverse responses. Some participants mentioned that both men and women have equal decision-making power when it comes to water ponds. However, there were others who stated that only men hold the decision-making power in this regard. This discrepancy highlights the varying perspectives within the community regarding the distribution of decision-making authority over the water sources.

In the Borana community, water sources such as ponds and traditional wells are communally managed under a traditional governance system. A key figure in this system is the *Abbaa Herregaa*, a male custodian appointed by community elders through an assembly called *kora eelaa*. This individual does not have to be from the owner's clan (e.g. Konfii) but must be trusted, respected, impartial, and skilled in conflict resolution. His responsibilities include protecting water sources from misuse, managing access for people and livestock, and resolving disputes. For instance, at Hallona and Bokola kebeles, *Abbaa Herregaa* ensures water cleanliness, organizes maintenance, and regulates usage fairly, often with support from water committees composed of both men and women.

The management of water is deeply rooted in Borana cultural beliefs and gender norms. A Borana saying -"haraa fi eeli abbaa niitii" ("pond and well are like a wife to a man") - symbolizes the strong male custodianship over water sources. Consequently, water governance is predominantly male led, especially in traditional wells and ponds. For example, Tula well users are assigned to specific livestock watering days based on clan hierarchy: *Konfi* day (for pond development initiator clans), *Olla* Day (for nearest clans), and *Qara Gore* Day (for extended groups), showing a structured, clan-based rotation system overseen by the *Abbaa Herregaa*. Although both male-only and female-only FGD participants acknowledged that women may have a say in decision-making, mixed groups consistently mentioned that men hold primary control over water management. Cultural expectations and gendered division of labour limit women's involvement, as water management requires long hours, travel, and physical presence, often incompatible with women's domestic responsibilities. For instance, at Hallona and Gayo kebeles, women are mainly tasked with household chores, while men manage the water points due to these logistical challenges.

Despite male dominance in water governance, there are isolated cases of female water managers, especially where water sources are near homes. At Bokola Kebele, for example, Walensu pond is managed by a woman. However, such cases remain rare, as community perceptions continue to exclude women from these roles. One female FGD participant at Bokola Kebele explained her resignation from a water management committee due to the overwhelming burden of balancing domestic duties and water governance tasks. Community justifications for this exclusion include the physical demands of water source protection and the irregular availability of women, especially during pregnancy or postpartum periods.

3.2.3 Water Access and Utilization

The water sources in Borana are accessible to all individuals regardless of clan, gender or age. However, there are certain customs in place that dictate whether someone can access a particular water source or not. The focus group discussions (FGDs) held across the kebeles revealed that while all residents technically have equal rights to access water sources, enforcement of customary rules often limits access for individuals who violate local water management norms. In Hallona Kebele, for example, due to limited water supply, the community collectively protects its pond by fencing it and locking the entrance. Access is restricted to those who follow agreed schedules set by water managers. Individuals who fetch water without permission or violate the rules may be denied access (FGDs with male-only and mixed groups in Hallona Kebele).

In addition to scheduled access, social responsibilities and obligations play a key role in maintaining one's right to use water sources. In Hallona Kebele, individuals who fail to participate in communal labour tasks related to water infrastructure-such as maintenance or cleaning-can be barred from using the water facilities. Community members who break these rules must accept punishments, such as performing extra labour, as a form of apology and reintegration into the system (FGDs with male-only and mixed groups in Hallona).

In Gayo Kebele, access to water is inclusive and extends to all community members, non-community members, and wildlife. However, there is a water fee structure based on the type of livestock: ETB 0.5 for sheep/goats, ETB 1.0 for cattle, and ETB 1.5 for camels. A jerrican of water costs ETB 1.0. The Borana cultural value of sharing water with wildlife is evident in the practice of leaving water in troughs to prevent wild animals from falling into deep water sources (FGD in Gayo Kebele). Children are prohibited from fetching water from traditional wells for safety, but they can access safer sources like hand pumps and piped water. Pregnant women, elders, and wives of community leaders get priority during water collection (FGD with female-only group in Gayo Kebele).

Disputes and rule violations in water usage can have cross-kebele implications. If someone breaks rules in one location, they may be denied access in others unless they admit wrongdoing. In Gayo Kebele, women may be restricted if they bathe in public water sources. However, restrictions on women and children must be communicated through family members; otherwise, the water manager risks punishment under traditional laws (FGD with mixed groups in Gayo Kebele). Cultural protocols thus regulate both access and the enforcement process.

Finally, coping mechanisms during water scarcity include migrating to water-rich areas with livestock or engaging in small-scale businesses like charcoal making and selling. Hallona Kebele community emphasized the urgent need for more ponds and water sources, particularly for drinking water, and requested support from both government and NGOs. In Bokola Kebele, participants advocated for strengthening the customary water management system to ensure ponds and pumps remain functional during droughts (FGDs with female-only groups in Hallona and Bokola).

3.2.4 Water Resources and Rural Resilience: Community Narratives from Four Kebeles

Water sources serve various purposes, including watering livestock, household uses -including drinking and small-scale irrigation. These sources may include ponds, hand pump water, traditional wells, and roto water tanks. Depending on the availability of water in the area, boreholes and tap water/pipe water may be used for drinking and washing.

Focus Group Discussions (FGDs) across the four kebeles Hallona, Arboro, Bokola, and Gayo-revealed diverse uses of water sources for domestic, livelihood, and economic activities. In Hallona Kebele, both men and women primarily depend on ponds and open shallow wells for drinking (after filtering), cooking, washing, and livestock watering. Roto water tanks are also used, mainly for drinking and Aloe vera soap-making, with the latter serving both household and commercial purposes. While many water sources in this kebele are temporary, they remain central to the community's daily water needs.

In Arboro Kebele, households access water from pipes, ponds, hand pumps, and open wells for domestic use and livestock needs. Rainwater is harvested for soap-making, contributing to small-scale home and commercial enterprises. The community is optimistic about a new micro dam under construction, expected to support irrigation and livestock. Gender differences emerged in water access, with women relying more on nearby ponds due to distance constraints, while men travel farther to access additional sources. Boreholes are used during emergencies.

Bokola community members use hand pumps for drinking and cooking, and pond water for cleaning, due to its favourable quality. The micro dam in this kebele supports domestic irrigation and livestock use. It also serves as a critical income-generating source for six cooperative groups-four women-only and two mixed. These groups grow vegetables, fruits, and other cash crops such as tomatoes, carrots, chillies, and papaya. The micro dam thus plays a dual role in supporting both livelihoods and food security.

In Gayo Kebele, a range of water sources is used for irrigation, domestic consumption, and livestock. Traditional Tula wells serve both drinking and ritual purposes. Men’s FGDs highlighted the use of ponds for irrigating crops like onions, carrots, cassava, and chillies, which support cooperative income generation. Women use ponds, wells, hand pumps, and pipe water for multiple domestic tasks, including cooking, cleaning, and bathing. These sources are essential to maintaining household hygiene and nutrition.

The mixed group in Gayo Kebele also emphasized the multifunctional role of water in the community-used not only for household and agricultural purposes but also for traditional ceremonies. However, the irrigation initiative faced setbacks due to past droughts and internal challenges within cooperatives. Despite receiving equipment like generators from the woreda office, lack of technical support and regular monitoring have weakened the effectiveness of these efforts. Stronger institutional support is needed to sustain and scale up irrigation-based livelihoods.

3.2.5 Drinking Water Treatment Practices

In all four study kebeles of Borana, there exists a cultural practice of treating water for drinking by using both traditional and modern methods. In the traditional approach, a clean cloth is used to filter out impurities, followed by boiling the water and adding salt. Additionally, small amount of milk is poured into the water, along with fire ashes and charcoal. Water purification tablets, known as aqua tabs, are also utilized for water treatment. However, even though all participants in the FGDs from various Kebeles claimed to treat their drinking water using either traditional or modern methods, the study team observed instances where children were seen drinking untreated water directly from the wells in Gayo, as depicted by the picture below.

Figure 4: Children drinking untreated water, Gayo Kebele

Focus Group Discussions (FGDs) across multiple kebeles revealed that communities rely on both traditional and modern methods for treating drinking water. Traditional techniques widely practiced include boiling water, filtering through clean cloth, adding salt, small amount of milk, fire ashes, charcoal, and in some cases, sand. These practices were reported consistently across male-only, female-only, and mixed groups in kebeles such as Hallona, Arboro, Bokola, and Gayo Kebeles.

Modern water treatment methods are also commonly used, including the use of water purification tablets (aqua tabs) and water purification powder provided by government and non-government organizations. For example, in Bokola Kebele, participants indicated adding one tablet or packet of purification powder to 20 litres of water. Additionally, some groups, particularly in Bokola Kebele, reported exposing water in transparent/white containers to sunlight for purification. These methods were seen as complementary to traditional practices.

Communities also take protective measures at water sources and at home to maintain water quality. At the source level, efforts include preventing livestock like cows and donkeys from contaminating the water and drawing water without entering the source. At the household level, filtration powders and hygiene practices help ensure safe storage and usage. These combined approaches reflect a strong community commitment to water safety, blending indigenous knowledge with modern sanitation practices.

3.2.6 Travel Duration to Access Water in Wet and Dry Seasons.

The time required to reach a water source varies across different kebeles during both wet and dry seasons. In the wet season, villagers typically spend a minimum of 10 minutes and a maximum of 2 hours to access water sources. However, during the dry season, the time increases significantly, with villagers needing a minimum of 2 hours and a maximum of 12 hours to reach the water sources, fetch water and return home. This has huge implication on volume of work carried out by women in Borana community.

Access to water across the different kebeles varies significantly between the wet and dry seasons, as revealed in the focus group discussions. In Hallona Kebele, residents from one sub-kebele reported spending up to 2 hours (8 km round trip) to fetch water, while for others it takes less than 30 minutes. During the dry season, most nearby ponds and storage facilities dry up quickly, forcing residents to travel 50 km (10 hours round trip) to Kafara pond. When Kafara also dries, the community relies on expensive private water trucks from Yabello, paying 25–30 birr per jerrican. Similarly, women in Hallona Kebele indicated that when local ponds and boreholes dry up, they travel up to 12 hours (round trip) to distant water points.

In Arboro Kebele, access to water during the wet season is relatively easier, with some residents fetching pond water within 30 minutes. However, when relying on pump water, the trip can take up to 5 hours due to long queues, even though the distance is just 2 km. During dry season, they walk 22 km (over 4 hours) to Haro Bakke pond; however, using donkeys or vehicles reduces the time to 2 hours. Despite the efforts, livestock continue to suffer due to water scarcity during dry spells.

In Bokola Kebele, access also varies by sub-kebele. In Amarole, for example, the average water-fetching trip takes 2 hours (8 km round trip), while for others it takes less than 30 minutes. During dry periods, local sources dry up, and residents travel between 20 to 40 km (6 to 10 hours round trip) in search of water. Women in this kebele described fetching water from far ponds (3 hours away) when local pumps and ponds dry up. When the situation worsens, humanitarian agencies like the Red Cross deliver emergency water via trucks.

In Gayo Kebele, wet-season water access is relatively better, with most residents able to fetch water within an hour. However, during dry seasons, the situation shifts significantly. While some can still use permanent water sources about 2 hours away, others rely on Gayo Tulla wells located at the kebele center. These wells attract people from surrounding areas, leading to long waiting times and additional burden, particularly for pregnant women, elders, and caregivers like the wives of *Hayyus* (wise elders and customary decision makers).

Overall, wet seasons offer relative ease in accessing water across all kebeles, significantly reducing the workload on women and children. However, in dry seasons, access becomes a major challenge, with some households walking up to 12 hours round trip. The situation particularly affects vulnerable groups, including women, children, the elderly, and livestock. The disparity in water access between kebeles underscores the urgent need for sustainable and equitable water infrastructure development across the Borana zone.

3.2.7 Drought trends in the past ten years and coping strategies

Based on the SPEI-12 results (Figure X), extreme drought conditions were observed in 2011, while no other year reached the same severity level throughout the 1982–2022 period. Severe drought events were recorded in 2000 and 2010, indicating significant moisture deficits influenced by both low precipitation and high evapotranspiration. In addition, five moderate drought events occurred in 1984, 1985, 2001, 2016, and 2017. These periods show consistent negative SPEI values, highlighting moderate but prolonged dry spells likely to impact agricultural productivity and water availability.

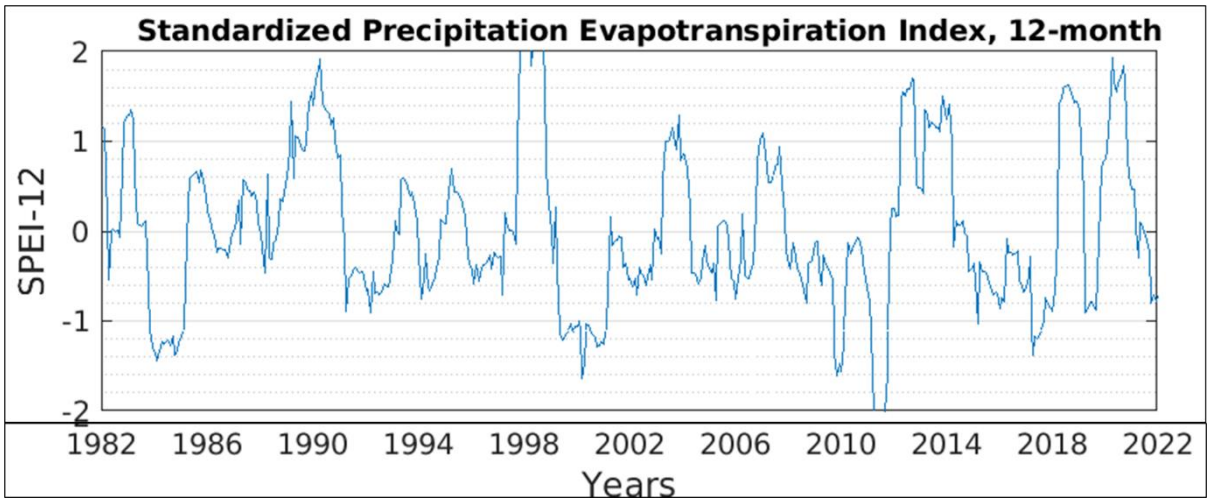

Figure 5 Standardized Precipitation Evapotranspiration Index (SPEI) values with timescales of 12-months (SPI-12) from 1982 to 2023 in Borana Zone, Southern Ethiopia (Sintayehu et al., 2025).

The spatial distribution of dry month occurrences over the Borana Zone reveals that the most severe to moderate dryness was concentrated in the central and northeastern parts of the zone, particularly in Arero, Elwaya, Dubuluk, Guchi, and Yabelo areas (Figure x). These areas experienced a higher frequency of dry months, indicating greater exposure to persistent moisture deficits. In contrast, the frequency of dry month occurrences gradually decreased toward the southern and southwestern parts of the zone, including Teltele, Dilo, Wachile, and Moyale.

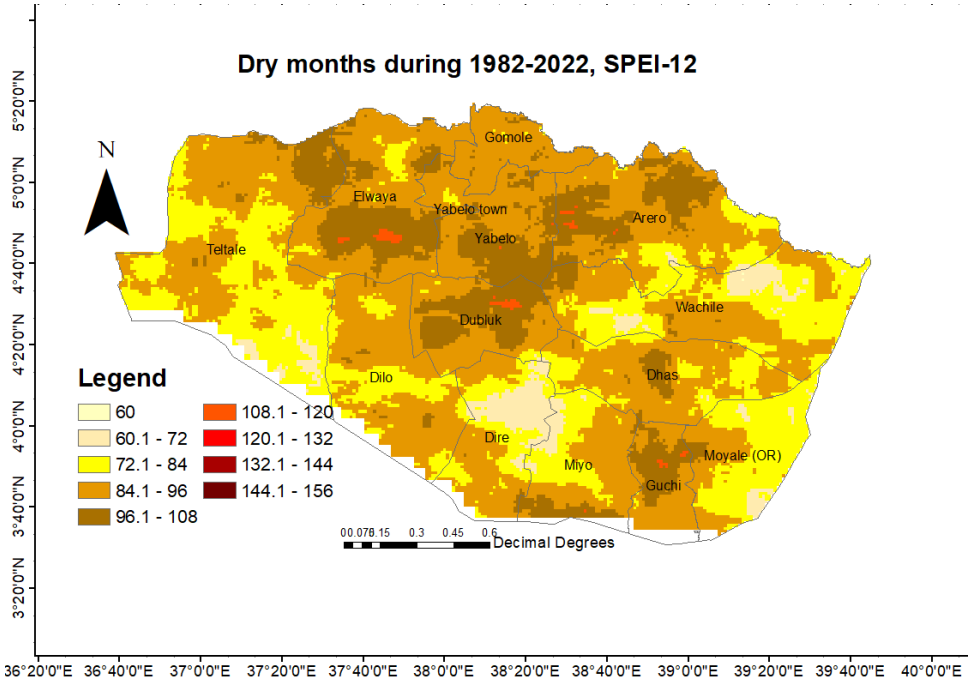

Figure 6: spatial distribution of dry month occurrences over the Borana Zone (Source: Sintayehu *et al*., 2025)

Similarly, several studies have reported an increasing trend in the frequency and severity of droughts in the Borana zone over the past decade. Sintayehu et al (2025), Tegegne et al. (2025), Iticha Hussen (2019), and Zeleke et al. (2017) noted a rising tendency of drought occurrence, highlighting the growing vulnerability of the region to climate-induced stress. Zeleke et al. (2017) reported that fifteen drought events occurred in Borana between 1978 and 1998, indicating the zone's long-standing exposure to climatic shocks. Shibru et al. (2023) documented that Borana pastoralists experienced significant livestock losses during the 1980s and 2000s, with further droughts between 2005 and 2017 contributing to continued asset depletion and food insecurity. Coppock et al. (2008) emphasized that rising temperatures and erratic rainfall have negatively impacted livestock production through the reduction of available pasture and water resources. Moreover, studies by Kassaye et al. (2021), Bekele and Kebede (2014), and Morsy et al. (2022) have consistently shown a decline in rainfall and an increase in drought severity in recent years, reinforcing the pattern identified through the SPEI analysis. These findings collectively underscore the intensifying climate pressure on pastoral livelihoods in the Borana zone.

According to Bekele and Kebede (2014), the increasing trends in drought frequency and intensity are the cause of the livestock losses in the Borana zone. Wakeyo (2024) pointed out that the drought during 2021 and 2022 resulted in a significant livestock loss in the Borana zone. The pastoral communities in the Borana zone have used different climate change adaptation strategies, including migration away from Borana rangelands deep into the highlands of Oromia like West Arsi zone with manageable herd size, livestock diversification, and emergency water and feed supplies (Busker et al., 2023, Deresse & Daba, 2022). Busker et al., 2023) also mentioned that destocking is a recognized response to drought, but it often serves as a last resort for herders who have strong emotional ties to their livestock.

Over the past ten years, the Borana Zone has typically experienced a bimodal rainfall pattern, with the main rainy season (G*anna*) from mid-February to mid-May and the short rains

(Hagayya) from September to November. Occasional light showers also occur in June. These seasonal rains are critical for sustaining the pastoralist livelihoods across kebeles such as Hallona and Arboro. However, focus group discussions (FGDs) in these areas reveal that the past three years have seen little to no rainfall-marking six consecutive failed rainy seasons-deeply affecting water availability and agriculture.

Participants in Bokola Kebele mentioned that the last drought is notably different from past events when compared across Gada periods (eight-year cycles). The then incumbent Gada of Kura Jarso contrasts sharply with the previous Gada of Guyyo Gobb in terms of drought severity and duration. This prolonged drought has led to a near-total loss of livestock and disrupted livelihoods that depend on predictable rainfall patterns, further stressing households already facing environmental and economic challenges.

In the female-only FGD at Bokola Kebele, participants described the impacts of the drought in three keyways: the visible disappearance of leaves on trees due to extreme moisture loss, a severe shortage of food and water, and the loss of livestock-the community's primary source of income and sustenance. These accounts underline the dire consequences of shifting climate patterns on both the environment and human wellbeing in the Borana Zone.

Story of Arboro-Women Harvest their Own Water Pond to reduce distance:Women Developed Their Own Pond to Reduce Distance

"Once up on a time there was a woman called Madam Wako. This woman was fetching water behind mountain that is found in Arboro. At that time, we didn't have a nearby water pond. We used to go long distances to fetch water. One day, when Madam Wako was fetching water, I was also fetching, then when we came and cross the mountain, I saw her fatigue and tiredness and I was shocked, then I dropped down my jerry cans that I carried and tried to assist her, then I supported her by filling her jerry can like mine. Then after I returned to my home, I thought to invite and tell women around my residence about the case of Madam Wako immediately. Next day, I invited the women and presented the case of Madam Wako as agenda to them. All women were shocked and felt sad by what they heard, then we reached at the conclusion to dig a water pond by ourselves. Then all of us took the responsibility to mobilise village women to contribute money to fund the development of new pond. Accordingly, we got the pond dug and developed through our own contribution near our residence. After some months that pond contained water. That is the pond that we are still using. The name of the pond is Haro Duba, named after the only man, called Duba who used to support us and was praying for us. After some time, men started discouraging us by saying "women are like bird -they can't build and control a pond". Borana community still accepts and respects their culture. In Borana community, women are mainly tasked with managing her house. The old perception is she can't do anything outside her home. Therefore, women who constructed the pond accepted this idea and handed over the management of the Duba pond to men. Following the handover of the pond management to men, the volume and quality of water in the pond has been declining from time to time because men haven't been managing the pond properly. Men do not separate water usage between human and livestock and failed to protect the pond from disposals. If men give the management of Haro Duba back to women, women will treat and protect the pond in a better way. *(FGD with mixed group Kebele 2).*

In focus group discussions across several kebeles-Hallona, Arboro, Bokola, and Gayo-women emphasized the severe impacts of climate risks, particularly drought and, more recently, flooding. In Hallona, women described drought as the primary cause of livestock death, famine, and forced migration, while flooding has emerged as a new threat. In Arboro Kebele, participants linked drought to income loss, food and water scarcity, and flooding to the destruction of homes and loss of lives and livestock. In Bokola and Gayo kebeles, mixed and male-only groups highlighted livestock diseases, drought, and floods as major challenges. Women in Gayo indicated that they receive information on climate risks through agricultural development agents.

3.2.8 Impacts of Limited Access to Water on Pastoralist Productivity

Focus Group Discussions (FGDs) across Hallona, Bokola, and Gayo Kebeles revealed that limited access to reliable and permanent water sources severely constrains pastoralist productivity. In Hallona Kebele, both male and mixed groups emphasized the total absence of permanent water for irrigation, noting that the scarce supply barely meets domestic needs. Women in this kebele highlighted seasonal migration as a coping mechanism, leading to asset losses and disruptions in livelihoods. In Bokola Kebele, men acknowledged the potential of existing micro-dams but mentioned lack of awareness on how to utilize water for productive purposes. Women indicated that the available water sources are non-renewable and insufficient for both crop agriculture and livestock need, and while some irrigation efforts are underway, only 100 women are currently engaged due to inadequate infrastructure.

In Gayo Kebele, men identified the absence of irrigation ponds as a critical barrier to productive engagement, while women pointed out that despite having water wells, livestock mortality is high, milk production is low, and there is no access to farm machinery like tractors. The mixed group highlighted a complex dynamic: while increased water access could allow more women to engage in agriculture, it may also intensify their already heavy workloads, potentially impacting childcare and household well-being. Across all kebeles, communities expressed willingness to engage in productive farming but remain constrained by structural water access limitations, limited technical support, and lack of infrastructure.

3.2.9 Impacts of Climate Change on (Water Sources in Borana)

The water resources system in the Borana zone is significantly affected by climate change (Tegegne et al. 2025; Sintayehu et al. 2025). Tegegne et al. (2025) revealed that climate change has led to alterations in precipitation patterns, increased temperatures, and more frequent droughts in the Borana Zone. The decline in precipitation and increase in temperature resulted in shrinking and diminishing of water bodies in the Borana zone. Tegegne et al. (2025) concluded that the existing water system infrastructure, including surface water points and hand-dug wells, will likely be inadequate to meet the demands for livestock and domestic use as droughts become more severe in the future periods. Therefore, it is essential to identify and develop new water points and wells in strategic locations near communities and grazing areas.

Additionally, enhancing the storage capacity of existing water points is vital, as many are losing usability due to sediment accumulation from upstream watersheds. Implementing integrated watershed management strategies can be pivotal in addressing sediment influx into water

points. Early-warning system is vital for preparing for drought impacts, allowing for timely responses before conditions worsen (Busker et al. 2023). To enhance Borana pastoralists' resilience through accesses to a near real-time water and pasture resource information, Alliance of Bioversity International and CIAT in collaboration with partners developed and installed fully working interactive and dynamic web-based digital platform (ET-Monitoring) using Human-Centered Design. The platform provides timely and accurate information on water and forage availability to livestock producers to make informed decisions.

Focus group discussions in Borana highlighted that climate risks manifest primarily through severe water scarcity, prolonged droughts, and their cascading impacts on livelihoods. In Hallona Kebele, repeated droughts have caused massive livestock losses, exemplified by a wealthy pastoralist who lost over 10,000 cattle during the last severe drought. This extreme dry period emptied the entire cattle kraals, pushing many households into economic destitution due to lack of water and pasture.

The scarcity of water has also led to tragic human consequences. In Halona Kebele, a mother had died when she was attempting to drink water trapped beneath a truck, underscoring the desperate conditions caused by drought. Additionally, prolonged drought has disrupted education, forcing students to drop out and join family migrations in search of water and pasture. Many children move toward main roads to seek government or humanitarian aid, reflecting the social dislocations caused by climate stresses (FGD, male groups, Hallona Kebele).

Flooding is another critical climate risk affecting Borana, damaging water infrastructure and displacing communities. In kebeles like Gayo and Bokola, heavy rains destroyed ponds and borehole generators, while floods displaced hundreds of households-over 300 in Gayo and more than 500 in Bokola. Flood water also carried debris, including carcasses of dead livestock, contaminating key ponds such as Hara Ketala and Dhadhawa, which serve multiple kebeles and are vital for both dry and rainy seasons (FGD, male groups, Bokola Kebele).

Overall, the combined effects of drought and flooding have caused loss of livestock, displacement of villages, and destruction of essential water sources. In Borana, the drying of pond water during droughts and damage from floods threaten the livelihoods of communities dependent on these scarce resources. The largest pond, Hara Ketala, which used to support nine kebeles, has been severely damaged by heavy flooding, signalling a critical need for sustainable water management to mitigate ongoing climate risks.

3.3 Seasonal Food Scarcity and Coping Mechanisms

The Borana Zone in Ethiopia's Oromia region experiences significant seasonal food scarcity, primarily due to recurrent droughts that adversely affect agricultural productivity and livestock health. A 2015 study indicated that approximately 82% of households in this area faced severe food insecurity, with contributing factors including large family sizes, limited education, and restricted access to water sources (Birhanu et al., 2021). The recent prolonged droughts have exacerbated these challenges, leading to widespread livestock deaths-over 3.3 million according to a 2023 report-and increased malnutrition rates among children (Mulatu, 2023).

In response to these hardships, the Borana pastoralist communities have developed various coping mechanisms. These include diversifying livestock species to incorporate more drought-resistant animals, engaging in petty trade, and utilizing traditional practices such as enclosing grazing lands for fodder preservation (Sintayehu et al. 2025; Boru, 2020). Additionally, some households have adopted strategies like splitting herds to prioritize vulnerable animals and migrating to areas with better resources (Sintayehu et al. 2025; Mengistu and Haji, 2015). However, the effectiveness of these strategies is often limited by factors such as inadequate access to markets, credit, and early warning information systems. Addressing these challenges requires integrated interventions that enhance both immediate food security and long-term resilience.

During periods of food scarcity, coping mechanisms vary notably between men and women across Borana communities. Male pastoralists typically engage in labour-intensive and mobile activities such as brokering, mineral searching (e.g., gold), moving livestock to new grazing areas, charcoal making, and selling. Women, in contrast, focus more on petty trading, including selling charcoal, tea, coffee, firewood, and other small commodities. For instance, women in Arboro Kebele save food during the wet season to use in the dry season when scarcity intensifies, highlighting gender-differentiated roles in resource management.

The dry season disproportionately affects vulnerable groups-children, pregnant women, and elders-who face malnutrition. Communities rely on saved food from the wet season, sharing among neighbours and families, and livestock banking as key coping mechanisms. Men contribute through activities like hay making and water storage. Female informants in Arboro and Gayo Kebeles confirm these adaptive strategies, reflecting collective efforts to mitigate seasonal food deficits.

Historically, Borana women practiced traditional preservation, such as preparing “Doola” containers to store butter from milk during winter for later use. However, the recent prolonged drought, especially in Bokola and Gayo Kebeles, led to near-total loss of livestock and consequently milk and butter. This shift forced women to adopt alternative income-generating activities like selling tea, coffee, onions, and vegetables. Coping strategies remain similar regardless of marital status or family size, while men primarily cope through livestock mobility in search of pasture and water.

The last extended drought, caused by failure of rain of multiple consecutive rainy seasons over three to four years, severely disrupted livelihoods. Men in Bokola Kebele coped the drought by engaging in traditional mineral extraction, hay making, and moving livestock, while women used saved food, shared with neighbours, and pursued small businesses. In Hallona Kebele, coping has included negative livelihood shifts such as changing from herding to charcoal burning and selling, and firewood collection and selling, illustrating forced adaptation due to environmental stress.

Responding to livestock loss, Borana communities have diversified livelihoods: those with capital have invested in tractors for farming, while others provide labour for land preparation. Women in Hallona Kebele now cultivate crops like maize and haricot beans. Small-scale income activities such as selling salt, sugar, and beverages, limiting meal portions, and mobility are common strategies in Hallona and Bokola Kebeles. Development efforts, particularly in Arboro Kebele, focus on water harvesting, pasture management, micro-dams for irrigation,

and Aloe vera soap making for income, reflecting a push for stronger, sustainable coping mechanisms.

Overall, the Borana communities are learning from repeated droughts, which are occurring more frequently and with greater intensity. The last drought started unusually from east to west, differing from past patterns, causing massive livestock loss and economic impact. Flooding has added new challenges, damaging infrastructure and displacing people, especially in Gayo Kebele. Communities now emphasize crop cultivation, diversification of livestock (like drought-resistant chickens), and small business ventures such as selling sugar, perfume, and operating barber shops, showing adaptive resilience amid ongoing climatic and economic shocks.

3.4 Climate Advisory Services in Borana

FGD participants in all target kebeles of the study indicated that they are currently receiving climate related information through digital (modern) and traditional ways. Traditionally, they receive information from traditional weather forecasters who read animal intestine, community elders, animals' behaviour, moon, stars, traditional astrology, and stone) whereas modern sources of climate information included mobile phone (SMS text message), TV, OBN radio, community gathering, scouts from the community, local markets, development agents (DAs) and church.

Focus Group Discussions (FGDs) conducted in Borana revealed that communities access climate advisory services through both traditional and modern channels. Traditional sources include *Uuchuu*-individuals who forecast weather by interpreting animal intestines, live animal behaviour, and natural elements like stones-and A*yyaantuu* (time-reckoning experts). Male-only groups in Hallona Kebele and mixed groups in Bokola Kebele emphasized the role of these traditional experts, including *Jaarolee argaa Dhageetti* (experienced community elders). During a cross-border meeting of traditional forecasters from Kenya and Ethiopia, FGD participants have mentioned that they had encountered a female *Uuchuu*, highlighting the presence of women in this traditionally male-dominated traditional climate forecasting role.

Modern sources of climate information are accessed primarily through mobile phones. Female-only FGDs in Arboro and Bokola Kebeles reported receiving SMS-based updates on weather forecasts, early warnings, pasture conditions, planting and harvesting times, market information, droughts, floods, and other advisory services. Participants across groups also mentioned the Yabello weather station, community gatherings, radio, and TV as additional sources of information. This blend of indigenous and modern knowledge systems reflects a diversified climate advisory landscape in Borana.

3.5 Community-suggested Climate Risk Mitigation Strategies

Focus group discussions across Borana's kebeles revealed a range of locally grounded strategies for reducing climate risks, reflecting both shared priorities and gender-specific perspectives.

In Hallona Kebele, men emphasized technical and production-oriented measures such as the use of early warning information, fencing and maintaining existing ponds, developing large water-harvesting structures, constructing micro-dams for irrigation, and adopting drought-tolerant or early maturing crop varieties. They also proposed improved pasture management through communal enclosures, bush clearing for farming, and the introduction of fodder-baling technologies to preserve animal feed.

Women, particularly in Arboro and Bokola Kebeles, focused on access and reliability of water supply, calling for the establishment of permanent water points, maintenance of malfunctioning pumps and generators, and household-level water-harvesting systems. They also suggested small-scale livelihood diversification-such as backyard vegetable gardening and poultry-to reduce dependency on climate-sensitive livestock production.

Mixed groups across several kebeles, including Gayo, stressed the need for coordinated stakeholder action, capacity building, and technical support from government and NGOs. They also highlighted the importance of improving rural road access and encouraging settlement near service centers to facilitate access to markets, information, and emergency relief.

Overall, the analysis shows distinct gendered dimensions in adaptation priorities: men tend to emphasize infrastructure and livestock management, while women prioritize household water security, time reduction in water collection, and alternative income sources. However, both groups recognize the urgency of collective action and institutional support to translate these strategies into practice.

3.6 Community Level Training Opportunities

The study reveals that the following NGOs (both local and international) namely Action Aid and SoS, HUNDEE Oromo grass root program, CIFA, ILRI and DORCAS, HELVETAS, AFD, Gayo Pastoralists Development Initiative; and Welthungerhilfe (WHH) had provided training to men and women pastoralists in at least one village or kebele in target areas with focus on water and pasture management.

Table 3: List of NGOs who provided training for the pastoralists

Name of Village	Training Type	Training Provided By	Participants
Arero/ Halona	Water and grass management and early warning	Action Aid and SOS	Men and women.
Gomole/Arboro	Water and pasture management	HUNDEE Oromo Grass Root Program	Men and women
Moyale/Bokola	Water and pasture management	CIFA, ILRI and DORCAS	Men and women
Dhas/Gayo	Water and pasture management	CIFA, HELVETAS, AFD, Gayo Pastoralists Development and WHH (at different times)	Men and women

3.7 Groups/associations/networks active in the community

The study reveals that there are groups/associations that are active in each kebele. Hallona and Arboro have very active Aloe Vera Soup Producing Association. In addition, Hallona has poultry association. Hallona and Gayo kebeles have women association and saving and credit association. Saving and credit associations are highly active in Hallona, Bokola and Gayo. Aloe vera soup producing association is comprised of mostly women members whereas saving and credit associations have men and female members.

Table 4: Groups/associations/networks in the community

Location: Woreda/Kebele	Groups/ Associations Name	Functional Status of Association	Composition of Members	Decision-Making power
Arero/ Halona	Poultry Association, Women Association, Saving and Credit Association, Aloe vera Soup Association-established by SoS.	Aloe vera Soup Association is highly active, Saving and Credit is regularly active, Poultry and women associations are not very active.	Men and women for poultry, women and, Saving and credit Associations. Mostly women for Aloe vera Soup Association.	Men and women in Poultry, saving and credit and Aloe vera Soup Association. Mostly women in Women Association.
Gomole/Arboro	Gemechu Gudina Soap Producers' Group (Aloe Vera Women's Group)	Regularly active.	Men and women.	Men and women.
Moyale/Bokola	Ibsa, Bakalcha, Kayo and Dansa Associations	Ibsa and Kayo Associations are highly active, whereas. Bakalcha and Dansa are not very active.	Men and women in Ibsa, Kayo and Dansa Associations. Mostly women in Bakalcha Association.	Men and women in Ibsa and Kayo Associations. Mostly Women in Bakalcha Association.
Dhas/Gayo	Cooperative association, Women association, Saving and Credit Association.	Cooperative and Saving and Credit associations are highly active whereas women association is regularly active.	Men and women in Cooperative & Saving & Credit associations. Mostly women in Women association.	Men and women in Cooperative & Saving and Credit associations. Mostly women in women association.

3.8 Women-centered Associations in Selected Sites of Borana

With the objective of identifying associations/groups that are most important for women in study sites in Borana, the research team has conducted in-depth discussion with participants of the study in respective locations. Accordingly, the study reveals that Aloe vera soap producing associations are very important for women in Hallona and Arboro and Lattu association is very important for women in Gayo. Aloe vera soap associations are founded by SOS Sahel Ethiopia. The association has cooperative feature with voluntarily organized women being the dominant members. The following table presents summary of those women-centred associations with their characteristics.

Table 5: Women-centred associations with their characteristics

Location: Woreda. Kebele	Institute/group Name	Type of Institute/group	Gender composition in institute/group	Received Support from outside the community.	Type of membership
Arero: Halona	Aloe vera Association	Cooperative	Men and Women	SOS Ethiopia	Voluntary choice
Gomole: Arboro	Gemechu Gudina Soap Producers' group	Cooperative	Mostly Women	SOS Ethiopia	Voluntary choice
Moyale: Bokola	-				
Dhas: Gayo	Lattu association	Women and men	Women and men		Required to join

4. Summary

As of 2023, the Borana Zone has a population of 1,431,922, comparable to Hawaii's population, with nearly an equal gender distribution (49.6% female) (ESS, 2023). This demographic balance suggests that both men and women have significant roles within the community, although social norms may influence their participation in different spheres of life.

Borana's livelihood system is primarily pastoralist, with 89% of the population residing in rural areas and depending on livestock for sustenance (Megersa & Markemann, 2015). However, due to the failure of rain of three years or six consecutive rainy seasons, some community members have begun diversifying into crop farming. Here it is important to note that rain-fed crop farming in Borana was started long before. The failure of rain of three consecutive years or six consecutive rainy seasons is not the sole push factor for starting crop farming, but it had pushed the pastoralists to go into crop farming. This shift reflects the community's adaptability to climate-induced economic challenges through risk aversion.

Among the valuable assets in Borana, livestock holds the highest significance, followed by grazing land, farmland, and urban housing. The dependence on livestock makes the community vulnerable to climate changes, particularly droughts, which can lead to severe losses of livelihood resources. Borana residents engage in crop cultivation, growing maize for household consumption, while teff and wheat are primarily produced for commercial purposes. Additionally, haricot beans serve a dual purpose, supporting both home consumption and income generation. These agricultural activities highlight a mix of subsistence and market-oriented farming that helps sustain livelihoods in the region.

Efforts toward value addition are evident in Aloe Vera farming, which is used for soap production. This emerging economic activity provides an opportunity for local industries and contributes to alternative income streams, particularly for women involved in soap-making cooperatives.

Borana zone has access to essential services, including security forces, healthcare facilities, and agricultural extension programs. Additionally, water purification chemicals, nutrition programs for mothers and children, emergency response services, and primary education are available across all kebeles. However, disparities exist in access to mobile networks, secondary education, and vocational training, with these services being limited to only a few kebeles. Despite these available services, distance remains a major challenge. Many services are located 25-50 km from residential areas, requiring 30 minutes to 1.5 hours of travel by motorbike or public transport. This distance poses a barrier to timely access, particularly for urgent healthcare and education.

Water sources in Borana vary from village to village. The most common sources include ponds and open shallow wells, but some kebeles rely on hand pumps, pipes, water taps, and water pans. Additional sources, such as boreholes, micro dams, motorized pumps, and brick wells, play a crucial role in water supply, showing a blend of traditional and modern water-harvesting methods. Access to water fluctuates seasonally. During the wet season, residents take between 10 minutes and 2 hours to fetch water. However, in the dry season, this time extends significantly, with some villagers spending between 2 and 12 hours to reach water sources. This seasonal variation places a heavy burden on women and children, who are primarily responsible for water collection.

The uses of water in Borana extend beyond household consumption to include small scale crop agriculture, livestock watering, hygiene, cooking, and drinking. Different sources are utilized for specific purposes—ponds, hand pumps, and wells support livestock and household needs, while boreholes and pipes provide drinking and washing water. In crop agriculture, rainwater remains the most relied-upon source for crop production, supplemented by pond water, wells, and motorized pumps. Micro dams enable irrigation, while boreholes and roto tanks support aloe vera production for soap making. The practice of using rainwater for maize fermentation (t*ella* production) in three kebeles reflects the traditional knowledge embedded in water utilization. Various service providers rely on specific water sources. NGOs and government agencies primarily use hand pumps, pipe water, and roto tanks for their activities, while private investors depend on pond water for agricultural ventures. This selective water source utilization underscores the need for an integrated approach to water resource management.

Water management and decision-making responsibilities differ by source. Communal ponds and wells are traditionally managed by men, whereas hand pumps and pipes are overseen by mixed-gender committees. Boreholes are solely managed by women, while the government regulates roto tanks. Focus group discussions (FGDs) reveal divergent views on water management. Some participants believe both men and women have equal decision-making power over water sources, while others argue that only men should control ponds and wells due to the physical labour involved. Several justifications are provided for male water management, including cultural beliefs, the need for full-day oversight of livestock watering, and concerns over women's responsibilities at home. Some argue that women’s domestic roles and childcare obligations prevent them from actively managing water resources.

Despite being theoretically accessible to all, some water sources are fenced off and locked to prevent overuse. Restrictions apply when individuals violate management rules, when distances to water sources are too far, or when physical limitations prevent access (especially

for children, pregnant women, and the elderly). Drinking water treatment is practiced using both traditional and modern methods, although field observations indicate that some children still drink untreated water directly from wells, that may expose them to health risks. To improve water access, community members suggest protecting existing ponds, constructing new water sources, and investing in renewable water solutions.

The Borana Zone has suffered from recurrent droughts, experiencing six consecutive failed rainy seasons. The most recent drought has had devastating effects, including tree defoliation, food and water shortages, and the loss of millions of livestock. These consequences have placed immense pressure on community resilience and food security. Additionally, climate change has led to shifts in water sources. Prolonged droughts have dried up ponds, while floods have damaged wells, water pipes, and generators. These environmental changes exacerbate water scarcity and disrupt daily life, requiring immediate mitigation measures. The consequences of water scarcity are severe, leading to human and livestock deaths, deforestation, and malnutrition, particularly among vulnerable groups such as women, children, and the elderly. The situation has also resulted in soil degradation and a decline in safe drinking water access.

Borana communities are also affected by flood-related damages, which have displaced people, killed small ruminants and poultry, and triggered soil erosion and disease outbreaks among livestock. These damages further worsen the already precarious economic conditions. The lack of water access significantly impacts pastoralist productivity, restricting their ability to engage in income-generating activities. Women are particularly affected, as they spend excessive time collecting water, limiting their involvement in economic opportunities.

Traditional norms and practices influence daily life in Borana. Meal-sharing customs dictate that children eat first in order of age, followed by the father, and lastly, the mother. This hierarchy reflects broader cultural beliefs regarding gender and family roles. The division of labour is highly gendered. Women handle household chores, water collection, small livestock care, and food preparation, while men manage large livestock, land clearing, and ploughing. This rigid role distribution limits women's access to income-generating activities and decision-making power. Inheritance practices in Borana favour the firstborn son (*Angafa*), who inherits all his father’s resources. Women, on the other hand, only receive gifts upon marriage. This system reinforces gender inequality in asset ownership.

Food scarcity peaks during dry seasons, affecting children, pregnant women, and the elderly the most. In response, men engage in brokering, mineral searching, and charcoal production, while women rely on petty trade, selling charcoal, beverages, tea, and coffee. Women also depend on food reserves saved during the wet season. Several climate mitigation strategies have been proposed, including improving early warning systems, fencing water ponds, constructing micro dams, adopting drought-tolerant crops, and diversifying livestock species. These interventions aim to enhance climate resilience.

Borana pastoralists receive climate-related information through both traditional and modern means, including community elders, animal behaviour, and astrology, alongside digital sources such as mobile phones, radio, and television.

Training programs on water and pasture management have been conducted in all kebeles, supported by NGOs and development organizations. These programs aim to build resilience

and improve adaptation capacities. The presence of community groups and associations, such as aloe vera soap-making cooperatives and savings groups, plays a crucial role in economic empowerment, especially for women.

Finally, institutions supporting women, such as the Aloe Vera soap-making associations, provide critical economic opportunities. These cooperatives, founded by organizations like SOS Sahel Ethiopia, serve as a vital support system for women's financial independence and skill development.

5. Conclusion and Recommendation

5.1 Conclusion

To conclude, the Borana population resides in rural pastoralist areas, and their livelihood depends on livestock. However, in some parts people are diversifying their livelihood to agriculture and start farming. Here it is important to note that rain-fed crop farming in Borana was started long before. The failure of rain of three consecutive years or six consecutive rainy seasons is not the sole push factor for starting crop farming, but it had pushed the pastoralists to go into crop farming. Crops like corn/maize (home consumption), teff and wheat (commercial reason), and they also produce beans in some parts of Borana for both home consumption and commercial reasons.

There are also value-addition practices like Aloe Vera production. There are services like security/militias, health and agricultural extension, water purification medicine, nutrition for mothers and children and emergency services, primary schools in all kebeles, mobile network services in three kebeles, secondary school in two kebeles, private sector service provision like veterinary clinics and mobile selling in two kebeles, on job training and vocational programs in one village. The services are 25-50KM away from the resident area, and it takes 30 minutes to 1:30 hours by motorbike or public transport.

The Borana Zone has received little to no rain for the past three years, which means six consecutive rainy seasons and drought caused the disappearance of leaves from trees, a scarcity of basic needs, such as food and water, the loss of livestock and human life, limited access to safe drinking water and malnutrition among women, children, and elderly and school dropouts.

The study reveals that gender norms and practices worsen situation of women, children, and elderlies by increasing their vulnerability and risks during disaster time. In Borana community, people own assets through inheritance and marriage. The Borana culture/customary laws provide the first-born son to inherit all his father's resources after the death of his father. A woman life depends on the gifts she is receiving from her parents, relatives, and her husband's family after marriage only.) Valuable resources or assets like livestock, ponds, water wells, grazing land, and farmland (since recent time) are owned/controlled by the community leader (mostly men). And women have limited control over communal resources.

Women are involved more in caring practices rather than productive (income generating) activities like their male counterparts. Women do cooking, cleaning house, fetching water (for drinking), feeding and watering small ruminants, caring for baby, collection of firewood, pestle grinding, manual grinding on grinding stone, milk container smoking, preparing/making bed, constructing traditional living house from local materials while men/boys do the

following tasks opening kraal, herding large animals, watering livestock, moving with livestock to other locations , cleaning kraal (removing dung), closing kraal, collecting mineral salt, bush clearing for farmland and ploughing.

Fetching water for household purposes is solely women and girls' role (hygiene, drinking water for humans and weak animals and cooking) however women (particularly in polygamous marriage) have very limited control/decision making over assets like donkey and motorbike that are most important for accessing water and this contributes to limited water access to women. Water ponds and open shallow wells serve as the main sources of water in Borana however women's involvement in these water source management and decision making is very limited compared with male counterparts due to their work burden and stereotypes. As a result, men may not understand the extent of importance of the pond to women and may not treat and protect the pond like women. It was also learnt during a validation workshop that the Borana community settle following pasture and distance of water source may be far from resident areas.

There are conditions that women can't access water, such as when the distance for collecting water is too far, and everyone in the area are affected by scarcity of water because of prolonged drought (case of the mother killed by truck because of extreme water scarcity), when she is pregnant, she can't fetch water from water wells, but men are denied access when they break the rules and regulation of the water management. It is also difficult for children to fetch water from water wells unless there is someone who can help them. Although key informants and FGD participants said there is a culture of treating water for drinking (both traditional and modern), the study team has witnessed when children were drinking untreated water (directly) from well.

Duration of travel time to access water sources varies from village to village. In the dry season, male and female pastoralists travel minimum 2 hours and maximum 12 hours (round trip) to access water. And they could move to another area where water source is available when the dry spells. Therefore, there were incidents that boys' and girls' dropout from school due to mobility for searching of water and alternative income source during the past prolonged drought.

In Borana, children in age order eat first (little children, middle age children, and adolescents), followed by husbands, and wives eat last. According to female key informants from three kebeles, household members eat separately with children eating first then followed by fathers and mothers respectively. Mother/wife eats last. If food is not available/scarce, mother/wife may not find any food to eat.

Coping mechanisms differ between men and women in drought time (when food is scarce). Male pastoralists tend to participate in labour-intensive activities such as brokering, searching for minerals like gold, moving along with their livestock to other areas, and charcoal making and selling. On the other hand, female pastoralists engage in petty trading such as selling charcoal, beverages, tea, coffee, and firewood. In addition, women save food during times of relative abundance like the period of wet season to be used during the dry season when food is scarce.

In Borana water sources are used for households, agricultural goods production and processing and service providers. It was observed when private sectors collect water from

water ponds using water trucks and they transfer the water from water pond to the water truck using small water pumps that function by diesel. Diesel might affect the water quality of the pond.

The occurrence of floods caused the loss of water ponds, forced people to relocate, affected small ruminants and chickens, disrupted the functioning of generators, damaged water pipes, triggered soil erosion, and resulted in the displacement of households. Furthermore, the flood-induced conditions also contributed to the outbreak of livestock diseases, leading to the loss of cows, camels, and goats.

It was learnt through in-depth interview that there is gender disparity in accessing climate information between men and women. currently women mainly access climate information from traditional source (*Uuchuu* and *Ayantu*) and development agents while men access information from SMS, community gatherings, elders, radio and social media but still affected by the prolonged drought.

The study reveals that the following NGOs (both local and international) namely Action Aid and SoS, HUNDEE Oromo grass root program, CIFA, ILRI and DORCAS, HELVETAS, AFD, Gayo Pastoralists Development Initiative; and WHH had provided training to men and women pastoralists in at least one village or kebele in target areas with focus on water and pasture management.

The study reveals that there are groups/associations that are active in each kebele. Hallona and Arboro have very active Aloe Vera Soup Producing Association. In addition, Hallona has poultry association. Hallona and Gayo kebeles have women association and saving and credit association. Saving and credit associations are highly active in Hallona, Bokola and Gayo. Aloe vera soup producing association is comprised of mostly women members whereas saving and credit associations have men and female members. With the objective of identifying associations/groups that are most important for women in study sites in Borana, the research team has conducted in-depth discussion with participants of the study in respective locations. Accordingly, the study reveals that Aloe vera soap producing associations are very important for women in Hallona and Arboro and Lattu association is very important for women in Gayo. Aloe vera soap associations are founded by SOS Sahel Ethiopia. The association has cooperative feature with voluntarily organized women being the dominant members.

There are climate mitigation strategies that are suggested by all male and female participants, such as proper utilization/use of early warning information; fencing of the existing ponds; New/additional large ponds development for water harvesting and storage;, introduction of fodder/grass baling machine/technology; introduction of early maturing and drought tolerant crop varieties; build permanent water sources, diversification of livestock species; bush clearing for farming; better water infrastructure like micro dam construction for irrigation activities; maintenance of malfunctioning generators as power source for water pump; improving land terracing; diversification of livelihood for risk aversion; encouraging settlement along the roadside, development of private water harvesting and storage, improve pasture management by encouraging communal enclosure as reserve grazing land for future use, stakeholder to work hard together.

5.2 Recommendation

The gender analysis in Borana pastoralist communities underscores a deeply entrenched disparity in access to, control over, and management of water and other productive resources, compounded by climate shocks and recurrent droughts. Women and girls bear the heaviest burden of water collection-often walking several hours each day-yet they remain excluded from decision-making and governance processes that directly affect their lives and livelihoods. Traditional gender norms and the concentration of asset ownership among men further limit women's adaptive capacity, constraining their ability to participate in productive activities or benefit equitably from climate-resilient investments. These dynamics, if unaddressed, will continue to undermine household and community resilience, and exacerbate vulnerability during periods of crisis. To address these structural challenges and promote inclusive climate adaptation in Borana, the following recommendations are proposed:

1. **Develop and Implement a Comprehensive Gender Strategy**

A project-level gender strategy should be developed for the Livestock Water Source Monitoring and Risk Management (LWSM) project, with potential for replication in other pastoralist development programs. This strategy should adopt a gender-transformative approach, seeking not only to meet women's practical needs but also to shift power relations by challenging restrictive norms, increasing women's leadership, and promoting shared decision-making in resource governance. The strategy should clearly outline:

- Priority areas for gender integration across project activities.
- Context-specific interventions to address women's unequal access to productive assets).
- Approaches for engaging men and community leaders as allies in gender equity and climate adaptation.

2. **Foster Inclusive Water Governance and Community Leadership**

Women's exclusion from water management committees and resource governance structures must be systematically addressed. LWSM and partner initiatives should:

- Establish or strengthen quotas for women's representation in water committees, pastoral associations, and local governance forums.
- Build the capacity of women leaders to influence decision-making through targeted leadership training and mentorship.
- Support women's active involvement in the planning, maintenance, and monitoring of water infrastructure to ensure that designs reflect their needs.

3. **Expand Gender-Responsive Water and Climate-Resilient Infrastructure**

Water infrastructure investments should be designed to reduce women's and girls' time and labour burdens while improving equitable access. This includes:

- Developing strategically located and safely accessible water points to shorten travel times.
- Introducing water storage and harvesting systems at household and community levels.
- Constructing or rehabilitating water ponds and boreholes with input from women users.
- Integrating renewable energy-powered pumping systems to replace costly diesel pumps that degrade water quality.

4. Strengthen Climate Information Services for Women

Given the gender gap in climate information access, targeted efforts are required to ensure that women receive timely, actionable forecasts and advisories. This can be achieved by:

- Leveraging women's groups and savings associations as dissemination hubs for climate information.
- Expanding the use of accessible communication channels such as local radio in Borana language, mobile messaging, and community meetings.
- Training female extension agents and local women leaders to interpret and share early warning information within their networks.

5. Support and Scale Women's Economic and Resilience-Building Groups

The success of Aloe Vera soap production associations, savings and credit cooperatives, and poultry associations demonstrates the potential of collective action for women's empowerment. These groups should be strengthened and replicated through:

- Technical and business skills training.
- Linkages to markets, microfinance institutions, and value chains.
- Seed funding or revolving credit facilities to support diversification of livelihoods, including climate-smart agriculture and small-scale enterprises.

6. Policy Engagement and Advocacy

The findings of this study provide a strong evidence base for influencing policy at local, zonal, and national levels. Key actions include:

- Developing a series of thematic policy briefs highlighting critical gender gaps and recommended actions.
- Engaging government bodies, customary leaders, and development partners to adopt gender-transformative policies on water governance, asset ownership, and climate adaptation.
- Advocating for dedicated budget allocations for women-targeted climate resilience interventions in pastoralist areas.

7. Capacity Building for Gender-Inclusive Adaptation

Practical, context-specific capacity development programs should be delivered to:

- Women, on rights awareness, leadership, financial literacy, and climate-smart practices.
- Water management committees, on inclusive governance and equitable benefit sharing.
- Men and boys, on shared domestic and productive responsibilities to reduce women's work burden.

By pursuing these recommendations, the LWSM project and its partners can help dismantle systemic gender barriers, enhance women's agency in climate adaptation, and build more resilient pastoralist livelihoods in Borana. The integration of gender-responsive and transformative measures is not only a matter of equity-it is essential for the sustainability and effectiveness of water resource management and climate resilience efforts in the region.

Table 6: Summary of high-risk areas that contribute to the vulnerabilities of women, children and elderlies.

Gender norm	High vulnerability and risk areas
In Borana culture, young girls take over their mother's responsibility.	Women's illiteracy level is high than their men counterparts.
A woman is responsible to ensure water is available in the household and do all household related tasks**.**	Less time for income generating activities.
Women in polygamous marriage, widow and separated women have full responsibility (productive and reproductive) unless there is young child (girl or son) who share their work burden.	Less time for income generating activities.
Women eat last in the family.	There is a high risk of women not eating when food is scarce and their vulnerability to malnutrition is high
Inheritances are distributed among families during birth or marriage. The Borana customary laws provide the first-born son to inherit all his father's resources. A woman gets gifts from her relatives and her husband's family only when she gets married.	There is a high risk in the case of separation/, divorce since their bargaining capacity is very low.
Resources or assets like livestock, water ponds, water wells, farmland (since recent time) are owned/controlled by the community. And women have limited control over communal resources.	Their vulnerability to falling to poverty is very high.
Women are involved more in caring practices rather than productive activities than their male counterparts.	High risk of having low-income level and decision making over productive resources.
Fetching water for household purpose is solely women and girl's role (hygiene, drinking water for human and weak animals and cooking).	Water shortage at household level when the source of water is far. There is high risk of school dropout of young girls to assist their mothers on household chores when there is prolonged drought.
Women involvement in water management and decision making is very limited compared with male counterpart due to their work burden and stereotypes.	Mismanagement of important water sources for women.

There are conditions that women can't access water, such as when the distance for collecting water is too far, and everyone in the area are affected by scarcity of water because of prolonged drought (case of the mother died b/s of water scarcity), when she is pregnant, she can't fetch from water wells, but men deny access when they break the rules and regulation of the customary water management. It is also difficult for children to fetch water from water wells unless there is someone who can help them.	Women and children suffer from thirst, malnutrition, and loss of life.
Women are limited to one water source (pond) in some areas of Borana because of distance (ARBOORO)	Water shortage for household purposes, as a result hygiene and drinking water for weak animals are compromised.
Although key informants and FGD participants said there is a culture of treating water for drinking (traditional and modern), the study team witnessed when children drink untreated water (directly) from well.	Risk for waterborne diseases.
Time to fetch water varies from village to village. In the dry season, women travel 2 hours and maximum 12 hours (round trip) to fetch water.	Risk of violence, starvation, exhaustion, less productive, household food insecurity.
During the dry season, food is scarce in the family because of drought because women rely on the food that they save during the wet season. However, when the drought takes long time, men and women have different coping mechanisms.	Both men and women pastoralists give less attention for the family during drought time and when male pastoralists participate in labour-intensive activities such as brokering, searching for minerals like traditional gold mining, moving to other areas with livestock, and charcoal preparation whereas female pastoralists engage in petty trades such as selling charcoal, beverages, tea, coffee, and firewood. Therefore, most children, pregnant women and elder are affected by malnutrition.
There was an instance as witnessed by the study team when private sectors use pond water (Haro Bakke) for investment reasons.	There is a high risk of shortage of water for households when private sectors use pond water for investment reasons.

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7. Annexes

I- Definition of Key Gender Concepts

The concept gender, gender relation, gender analysis, Gender (or sexual) division of labor, production, reproduction, access to and control over resources, status and roles, condition and position are fundamental in this research since this research tries to explore how gender norms and practices influence water access, control, and utilization in Borana, and men, women, boys' and girls' vulnerability and coping strategies.

Gender: Sex is a fact of human biology; gender is not. The experience of being male or female differs dramatically from culture to culture. The concept of gender is used by sociologists to describe all the socially given attributes, roles, activities, and responsibilities connected to being a male or a female in each society. Our gender identity determines how we are perceived, and how we are expected to think and act as women and men, because of the way society is organised. (Oxfam GB, 2010)

Gender relations: These are the social relationships between men as a sex and women as a sex. Gender relations are simultaneously relations of cooperation, connection, and mutual support, and of conflict, separation, and competition, of difference and inequality. Gender relations are concerned with how power is distributed between the sexes. They create and reproduce systemic differences in men's and women's positions in each society. They define the way in which responsibilities and claims are allocated and the way in which each is given a value. Gender relations vary according to time and place, and between different groups of people. They also vary according to other social relations such as class, race, ethnicity, disability, and so on. (Oxfam GB, 2010)

Gender analysis: Such an analysis explores and highlights the relationships of women and men in society, and the inequalities in those relationships, by asking: Who does what? Who has what? Who decides? How? Who gains? Who loses? When we pose these questions, we also ask: Which men? Which women? Gender analysis breaks down the divide between the private sphere (involving personal relationships) and the public sphere (which deals with relationships in wider society). It looks at how power relations within the household interrelate with those at the international, state, market, and community level. (Oxfam GB, 2010)

Gender and development work is based on gender analysis. This involves promoting equality between men and women; key to this is placing the issues that women say are of particular concern to them on the main agenda of those institutions which shape women's and men's lives (the state, non-government organizations, and so on). (Oxfam GB, 2010)

Gender (or sexual) division of labour in all societies, men and women are assigned tasks, activities and responsibilities according to their sex. The gender division of labour varies from one society and culture to another, and within each culture, it also changes with external circumstances and over time. Because in most societies, gender power relations are skewed in favor of men, different values are ascribed to men's tasks and women's tasks. In all types of work done by men and women, a distinction can be made between productive work (production) and reproductive work (reproduction). (Oxfam GB, 2010)

Production: This includes the production of goods and services for income or subsistence. It is this work which is mainly recognized and valued as work by individuals and societies, and which is most included in national economic statistics. Both women and men perform productive work, but not all of this is valued or rewarded in the same way. (Oxfam GB, 2010)

Reproduction: This encompasses the care and maintenance of the household and its members, such as cooking, washing, cleaning, nursing, bearing children and looking after them, building and maintaining shelter. This work is necessary, yet it is rarely considered of the same value as productive work. It is normally unpaid and is not counted in conventional economic statistics. It is mostly done by women. (Oxfam GB, 2010)

Access to, and control over, resources: When considering the way in which resources are allocated between women and men (the 'gendered' allocation of resources), it is important to look at the difference between access to resources and control over them. (Oxfam GB, 2010)

> **Access:** This is defined as the opportunity to make use of a resource.
>
> **Control:** This is the power to decide how a resource is used, and who has access to it. Women often have access but no control.

Status and role: There are several sets of concepts which aim to distinguish between the visible aspects of gender relations between women and men (for example, as seen in the different activities they participate in), and the invisible power relations which determine these activities. As a result of their low status in the community, the activities which women perform tend to be valued less than men's; and in turn, women's low status is perpetuated through the low value placed on their activities. (Oxfam GB, 2010)

Condition and position (Oxfam GB, 2010)

Condition: This term describes the immediate, material circumstances in which men and women live, related to their present workloads and responsibilities. Providing clean water or stoves for cooking, for example, may improve the condition of women by reducing their workload.

Position: This concept describes the place of women in society relative to that of men. Changing women's position requires addressing their strategic gender interests (see below for a full definition of this term), including equal access to decision-making and resources, getting rid of discrimination in employment, land ownership, and so on. To change women's position, we must address the way gender determines power, status, and control over resources.

Practical and strategic gender interests/ needs (Oxfam GB, 2010)

The dual concept of women's - or men's - practical and strategic gender interests (first coined by Maxine Molyneux in 1985) was developed into a tool for planners by Caroline Moser, which looks at 'needs' rather than interests.

Practical gender interests/ needs: If these were met, the lives of women (or men) would be improved without changing the existing gender division of labour or challenging women's subordinate position in society. Meeting practical interests/needs is a response to an

immediate perceived necessity; interventions which do this are typically concerned with inadequacies in living conditions such as water provision, health care, and employment.

Strategic gender interests/ needs: If these were met, the existing relationship of unequal power between men and women would be transformed. These interests/ needs relate to gender divisions of labour, power, and control. Those identified by women may include issues such as legal rights, domestic violence, equal wages, and women's control over their bodies. However, many of these issues are perceived as part of a natural order, which cannot be challenged. Women may only be able to articulate their strategic interests/ needs once they have exchanged knowledge with someone who knows that it is possible to change the 'natural order'. This may be an external facilitator, or a community member who has experienced another environment or culture (for example, a returning migrant worker). Men also have strategic interests/ needs: they may aim to transform their own roles (to be able to take part in child-care or to resist conscription into a fighting force), or, on the other hand, they may resist women's demands for more control over their own lives. Some have argued that practical and strategic interests and needs cannot be so neatly separated. Sara Longwe points out that every practical development intervention influence power relation (the 'strategic' area of life), whether this is intended or not.

II- CGIAR Gender framework

Enhancing critical consciousness involves the “process of changing the way people see and experience their worlds that can raise awareness of inequalities, stimulate indignation about injustice and generate the impetus to act together to change society” (Cornwall, 2016, p. 344). Agency is exercised at the individual and group levels via cooperative relations and collective action (Elias et al., 2021) and can be expressed in positive and negative ways. It can include forms of negotiation, bargaining, manipulation, resistance, and subversion (Kabeer, 1999), and encompasses “the meaning, motivation, and purpose that individuals bring to their actions” or their sense of agency (Kabeer, 2005, pp. 14–15). There are several subdimensions of agency (Mosedale et al., 2005) that can be considered when measuring gender transformative change.

Source: Modified from Mosedale, S. & CARE Impact Measurement and Learning Team. 2005. *Strategic impact inquiry on women's empowerment.* Report of Year 1 (July 2004–June 2005 / FY 05). Geneva, Switzerland, CARE (Cooperative for Assistance and Relief Everywhere). https://www.care.org/wp-content/uploads/2020/06/SII-Womens-Empowerment-Global-Research-Framework-with-annexes-2006.pdf

Figure 7**:**Dimension of Agency

Challenging unequal power relations Power is something that each person has, but may be able to exercise to different degrees, whereas power relations are between two or more people who may have equal or varying degrees of power. Unequal gender relations are the expression of inequitable power relations and are considered the underlying cause of the disempowerment of women and girls (van Eerdewijk et al., 2017). Table 7 provides definitions of different expressions of power. It is within these gender relations that women face systemic disadvantages in exercising choice and expressing their voice (van Eerdewijk et al., 2017).

Gender relations are embedded in patriarchal societies, where women and girls routinely experience discrimination, marginalization, and subordination. Within the institutional arenas of the family, community, market, and state (van Eerdewijk et al., 2017), the choices and voices of women and girls are constrained by unequal power relations. While power can be oppressive (i.e., power over another), it can also be a means of transforming one's own life and those of others (VeneKlasen and Miller, 2002). Challenging unequal power relations involves developing strategies to move away from inequitable power over relationships among individuals and groups towards building more positive expressions of power, including power within, power to, and power within ways that help to catalyse systemic change (Pansardi, 2012; Rowlands, 1997; Allen, 1999; Gammage, Kabeer and van der Meulen Rodgers, 2016; Cornwall, 2016; Galiè and Farnworth, 2019)

Table 7: Expression of Power

Expression	Definition
Power over	Power over involves using power to repress, force, coerce, discriminate against, corrupt or abuse others. This interpretation of power leads to an understanding of relationships as "win–lose" – one side has power and associated benefits, and the other does not. Power over perpetuates inequality, injustice, and poverty when individuals or groups of people deny access to key resources like land and health care to others. Patriarchy is a deeply embedded institutional form of power over that systemically discriminates against women and girls.
Power Within	Power within has to do with a person's sense of self-worth and self-knowledge; it concerns the power of an individual and is not relational. Power within involves a person's capacity to imagine and have hope and affirms the common human search for dignity and fulfilment. This expression of power is considered a starting point for engaging in other positive forms of power.
Power to	Power to acknowledges the unique potential of every person to shape their lives and world. It involves activating a person's capacity to act (their power within) in the real world.
Power with	Power with involves finding common ground among shared and different interests and building collective strength. Based on mutual support, solidarity and collaboration, power with can exponentially multiply individual talents and knowledge in a synergetic manner. This expression of power can construct bridges across different interests to promote equitable power relations and strengthen gender equality.

Different women, men, girls, and boys maintain important relationships with many people across different institutional arenas that can be considered when measuring gender transformative change (van Eerdewijk et al., 2017), such as:

- spouses or domestic partners (family)
- parents, siblings, in-laws, and grandparents (family)
- aunts, uncles, cousins, and other relatives (family)
- friends and peers (community)
- community, religious and local government leaders, and representatives (community)
- businesspeople, traders, wholesalers, bank officials and insurance agents (market)
- teachers, health services workers (e.g., doctors, nurses), extension agents, police officers and judges (state)
- state officials, such as government bureaucrats or politicians (state)

Making social institutions more gender equitable social institutions consist of both formal and informal rules and norms (Carter, 2014) that are made and remade through people's practices (Berry, 1989), and that change over time. These rules and norms structure how social relations play out in the institutional arenas of the family, community, market, and state. Formal institutions comprise the written constitutions, policies and laws, and rights and regulations that are imposed by governmental and other authorities. Informal institutions comprise: "unwritten" social norms, customs, values, traditions, and sanctions. Social institutions dictate how agricultural inputs or land get distributed or accessed/owned by women, often in ways that constrain their abilities to communicate and act upon their practical needs and strategic life goals.

In this context, both formal and informal institutions frequently interact with each other. For instance, formal policies combined with discriminatory social norms can create barriers to women's involvement in leadership positions within farmers' associations and can limit women's power to participate in key agricultural and other decisions within their households. By developing their personal and collective agency, women can strengthen their decision making and collective power-and their leadership capacities-to challenge informal and formal institutions to become more equitable (DeMerritt-Verrone and Kellum, 2021), thereby catalysing transformative change processes (van Eerdewijk et al., 2017). There are several subdimensions of social institutions (Mosedale et al., 2005), which reflect the above-mentioned references to formal and informal institutions:

- marriage or kinship rules and roles
- notions of citizenship
- transparency of information and access to services
- enforceability of rights and access to justice
- market accessibility
- political representation
- allocation of state resources
- density of civil society representation

Spheres of influence: In building a framework for measuring gender transformative change, it is important to determine where a change in agency, power relations and social institutions has occurred. Gender influences social and power relations at different levels, putting women and men in complex relationships within social institutions, which determines their status, power, and the expression of their voice (Cole et al., 2014). As such, gender transformative change should be measured across different levels (micro, meso and macro) or spheres of influence (individual sphere, household sphere, community sphere, etc.). Socioecological models can be used to situate where gender transformative change can occur (for example, see HC3, 2016a).

These models are most often used to depict elements of the complex interactions between individual, household, community, organizational and macro environmental factors that lead to variation in a specific outcome. Overlapping spheres are used to depict how factors at one level can influence factors at another level. Programmes can then be designed to promote the positive factors and intervene to address the negative factors that influence agricultural, economic, health or other outcomes. These Guidelines use a modified version of a model proposed by Cole et al. (2014), which is like the socioecological model proposed by UNFPA, UNICEF and UN Women (2020) to identify gender transformative interventions.

Through this socioecological model we highlight where gender transformative change could be measured depending on the focus of a particular gender transformative programme intervention. We describe each sphere of influence in Table 2 and provide some examples of the types of gender transformative changes that could be measured within each sphere. Given that the spheres interact with each other, changes in one sphere influence and are reflected in other spheres. These can also be measured, provided a programme is able to clearly trace and attribute cause–effect relationships between interventions in one sphere and outcomes in another.

Table 8: Spheres of influence where gender transformative change can be measured.

SPHERE	FOCUS AND EXAMPLES OF GENDER TRANSFORMATIVE CHANGES FOR MEASUREMENT
Individual (microlevel)	Focus is on individual women and men, girls, and boys. Changes in power within are reflected in strengthened individual agency and capacities-confidence, self-esteem, aspirations, awareness of discriminatory social institutions and unequal power relations at different levels, agricultural knowledge, skills, and capabilities. Evidence of power to act-it is evidenced in action taken upon improved knowledge and capacities, evidence of women and men taking on new roles. Changes in power within and power to act are reflected in women's and men's attitudes/beliefs on roles and responsibilities in agriculture, food preparation, and ensuring good health and nutrition
Household (mesolevel)	Focus is on households, families and intra-household relationships. Changes in power to act, power with and power over are reflected and measurable in changes in the involvement of household members in making agricultural and other decisions. Changes in social and gender norms are demonstrated through changes in gender roles and expectations in and outside of agriculture
Community (mesolevel)	Focus is on co-inhabitants of (and those providing services within) a bounded geographical space; community decision-making structures and actors active in the community, such as, local agricultural input and other service providers, buyers, cooperatives and farmer associations, women's groups, savings groups, etc. Gender transformative change can be measured in: Changes in social and gender norms at community level. Changes in power relations between local people and community decision making spaces and service providers. Changes in power to act by women's groups to ensure their gender issues are understood and addressed by community decision-makers, farmer associations, savings groups, and other bodies acting on behalf of or representing women and men. Changes in decision-making powers, leadership positions, and bylaws in cooperatives, farmer associations, and other organizations that promote gender equality. Changes in power with evidence that women join women's organizations, savings groups and other organizations representing their gender and other interests
Organizational (mesolevel)	Focus is on national and international agricultural research and development organizations (e.g., national agricultural research and extension services), civil society, humanitarian, and other organizations (including national-level associations and cooperatives), and private sector bodies (e.g., buyers and aggregators, processing mills, seed and feed companies, exporters). Gender transformative change can be measured in: Changes within organizations regarding their workplace and organizational culture and formal policies along with their attitudes about national agricultural development and gender relations, including recognizing women as farmers and economic change agents, and men as allies for change for gender equitable power relations, and as advocates for gender equality. Changes in power over-changes in how public and private sector provide services to, or develop technologies for, farmers and other value chain actors that consider existing gender needs and norms, and unequal power relations that constrain their uptake of services and technologies. Changes in power with-changes in the number of women's movements and NGOs advocating for gender equality in agriculture.

Macroenvironmental (macrolevel)	(macrolevel) Focus is on governments, resource partners (e.g., donors), and development banks. Gender transformative change can be assessed against: Changes from power over to power to act-changes in agricultural development policies or related laws and approaches for implementing agricultural development programs from gender blind to those that aim to help people and their representative organizations to purposefully challenge underlying causes of gender inequality and envision gender transformative outcomes. Changes in the formal and informal organizational cultures of governments, development banks and resource partners that facilitate actors in other spheres to spark transformative change processes leading to women's empowerment and gender equal outcomes in their own work. Changes in the norms, attitudes and beliefs of policy and decision makers that influence the creation of gender equal policies, laws, strategies, etc.

Table 9: Number of populations per Woreda in Borana Zone

Woreda	**Total Population (T_TL)**	**Male (M_TL)**	**Female (F_TL)**
Yabelo	25872	12553	13318
Arero	67911	34118	33793
Moyalele (OR)	42796	22059	20737
Dire	104511	52443	52068
Teltale	99761	51063	48698
Miyo	71882	35438	36444
Dilo	15778	7824	7954
Dhas	25048	12261	12788
Gomole	29507	15333	14174
Guchi	21577	11075	10502
Dubluk	29375	15300	14075
Elwaya	29567	15116	14451
Yabelo town	34551	18386	16165
Wachile	27961	12934	15026

Source: Central Statistical Agency of Ethiopia (CSA), 2007 Population and Housing Census – Population Projections for 2014–2017; Borana Zonal Administration Office Estimates (2023).