Pastoral Women's Responsiveness in Drought Adaptation Strategies for Sustainable Livelihoods in Asayita and Aballa Districts, Ethiopia

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ABSTRACT

Background: Pastoralist communities in the Asayita and Aballa districts of the Afar Region, Ethiopia, are increasingly vulnerable to recurrent droughts and climate variability. Within these communities, women play a central role in managing household livelihoods. Climate shocks disproportionately affect them, yet their adaptive knowledge and capacities remain significant and often under recognized.

Objective: The study aimed to assess how pastoral women in Asayita and Aballa respond to drought, participate in decision-making, and access institutional support.

Methods: The study employed a mixed-methods design combining a household survey, focus group discussions (FGDs), key informant interviews (KIIs), and field observations. The household survey covered 300 pastoralist households, with 150 respondents selected from each district. Qualitative data were collected through 8 FGDs (4 per district), with 5 participants in each group, resulting in 40 FGD participants, and 10 KIIs (5 per district) involving local administrators, development agents, and NGO personnel. Participants were selected using purposive and stratified sampling techniques. Quantitative data were analyzed using SPSS, while qualitative data were analyzed thematically.

Results: The findings reveal a stark gender imbalance in climate adaptation. Women carry out nearly all domestic and survival tasks, including preparing food (86.7%), fetching water (80.7%), cleaning (86.3%), childcare (73.7%), grinding grain (100%), building *Qarrey* (traditional houses) (100%), and mat weaving (88.3%), with participation rates far exceeding men's. Key livelihood challenges identified were poor transportation (85%), food insecurity (83.7%), and water scarcity (82.3%), along with limited health services (74%), fuelwood shortages (55%), and lack of agricultural inputs (43.7%). Despite their contributions, women's labor remains undervalued. In MHH, men contribute by virtue of presence, not shared responsibility. In FHHs, women shoulder all burdens with minimal support. Exclusion from decision-making and inadequate post-disaster aid further limits women's adaptive capacity.

Conclusions: Strengthening resilience in pastoralist communities depends on prioritizing women's inclusion in development initiatives. Economic empowerment of women, along with their involvement in adaptation planning, is crucial for building effective climate resilience within communities.

Keywords: Adaptation strategies, drought, pastoralism, sustainable livelihoods, women

INTRODUCTION

Background of the Study

With increased droughts, unpredictable rainfall, and rising temperatures, climate change is posing a growing threat to Ethiopia's lowland pastoralist regions, especially in the Afar Region. The pastoral livelihood, which depends on moving animals and using adaptive techniques, is disrupted by these climate problems [1-2]. Increased food insecurity, severe water shortages, and substantial livestock losses have resulted from intensified droughts in impacted regions such as Asayita and Aballa [3-5]. For example, recent droughts in the

Borana zone and Somali regions resulted in the loss of over 3.3 million livestock and left 1.7 million people reliant on food aid, showcasing the vulnerability of these pastoral systems [6-7].

The livelihoods of 12 to 15 million people in Ethiopia's semi-arid and dry regions depend heavily on pastoralism, which also makes up the largest cattle industry in Africa [7-8]. In order to adapt to climatic change, communities in Afar, Somalia, and portions of Oromia rely on seasonal mobility, traditional herding, and indigenous knowledge. However, climate change is putting pressure on these systems, with temperatures expected to increase by 1.8°C by 2050 and droughts becoming more severe [2; 8]. Additionally, pastoralism is a cultural identity in Afar, impacting resource management, gender roles, social structures, and the worsening of drought conditions for women [3-5].

By handling vital responsibilities like fetching water, cooking, and taking care of children and livestock, women in drought-affected households perform an important but usually disregarded role in maintaining household sustainability. During droughts, their responsibilities increase, exposing them to greater risks of gender-based violence [9-10]. In tough times, they also take on additional work like informal trading and managing food rations [10-11]. Up to 80% of food is produced by women, but they are frequently left out of decision-making processes and control less than 20% of the land, which limits their access to support services, training, and financing [11-12]. Despite their critical role in climate adaptation, pastoral women's contributions are frequently disregarded in practices and regulations. Their lack of decision-making and resource access presents serious obstacles, increasing the probability of child marriage, food shortages, and economic instability brought on by climate shocks [9-10]. In spite of these problems, a lot of women rely on indigenous and informal methods to make ends meet [10-11]. The UN reports highlight the importance of women-led solutions in drought-prone areas, but systemic barriers hinder their leadership roles [11].

Droughts have increased in Ethiopia as a result of climate change and environmental deterioration, particularly in the vulnerable Afar Region. Degradation of rangelands, resource-related conflicts, significant animal losses, and scarce water supplies are all consequences of these droughts. Women are disproportionately affected by cultural norms and limited access to information and land, which results in poorer nutrition, heavier workloads, and more challenges with resource management. Although the significance of gender equality in climate policies is becoming more widely recognized, little is known about how pastoralist women deal with the risks associated with drought. Developing climate solutions that are inclusive and support sustainable livelihoods in these areas.

Problem Statement

Drought is a major and recurring threat to pastoralist communities in Ethiopia, especially in arid regions like Afar and Somali. Recent droughts have caused significant livestock losses and forced many people to relocate [13-14]. These events harm traditional livelihoods by reducing water supplies, degrading pasturelands, and leading to high livestock mortality, worsened by climate change [15-16]. For instance, the income and nutrition of local pastoral communities were significantly impacted by the 3.8 million livestock that were lost during the Borana Zone's multiple failed rainy seasons between 2020 and 2023 [13-14].

Due to their responsibilities for household welfare, including food preparation, water fetching, and childcare, as well as their management of livestock and increased vulnerability to gender-based violence during displacement, pastoral women in these communities bear an unfair amount of the load [16-17]. Despite their important contributions to community resilience, their adaptive strategies are often overlooked in policy responses [17-18]. According to a 2025 study conducted in the Somali region, women's limited access to resources and decision-making authority makes it difficult for them to adapt, which feeds cycles of vulnerability. Women's demands are further obscured by gaps in gender-disaggregated data and evaluations of their methods [17; 19]. In certain regions, women are marginalized by inheritance laws and cultural customs (such as *Adda*), which limit their authority over important livestock assets [17]. Without specific interventions, adaptation programs could worsen inequalities, as illustrated by male-dominated aid efforts that neglect women-headed households [17; 20].

Drought impacts are complex, affecting both the environment (like land degradation) and human well-being (such as food insecurity), and have long-term consequences [18]. Unlike disasters that occur suddenly (like earthquakes or floods), droughts develop gradually, making it difficult to take immediate action [13-14]. Effective disaster management requires comprehensive approaches, but limited resources often lead to prioritizing specific areas, such as fodder support in pastoral areas or water infrastructure [18; 20]. Drought risk is assessed by measuring exposure to climatic hazards and community vulnerability, summarized in the formula:

$$\text{Risk} = (\text{Hazard} \times \text{Vulnerability})/\text{Resilience}$$

Recent studies have shown that nature-based solutions and gender-sensitive programs like livestock feed coupons and women's credit cooperatives can improve resilience [16; 20].

Pastoral women play a crucial role in household livelihoods but face significant barriers in adapting to drought, such as limited access to land, livestock, and credit, exclusion from decision-making bodies, and increased caregiving duties [17; 19]. In Ethiopia's Afar and Somali regions, traditional systems marginalize women, restricting their asset ownership and increasing vulnerability during droughts [17; 21]. To cope, women depend on informal networks, indigenous knowledge, and small-scale diversification efforts like petty trade, fuelwood sales and labor migration, which are often undervalued in policies frameworks [21-22]. Despite contributing up to 60% of household income through milk sales, their roles are frequently overlooked in official adaptation programs [19;23].

Climate adaptation efforts in Ethiopia tend to focus on male-dominated strategies, overlooking the specific vulnerabilities faced by women [22; 24]. Only 19% of female-headed households adopt formal adaptation measures due to barriers such as restricted land rights, heavy caregiving responsibilities, and limited access to extension services [23; 25]. There is a lack of gender-disaggregated data on drought impacts, which obscures important health disparities, such as higher malnutrition rates among women [24]. Additionally, cultural norms inhibit women's participation in community planning, despite their valuable knowledge of local ecosystems [19; 21].

Ethiopia's 2024 Climate Change Gender Action Plan (CCGAP) seeks to integrate gender into climate policy, but faces challenges in local implementation due to institutional issues and funding. Key research gaps, such as a lack of gender-disaggregated data and the undervaluing of women's informal roles, impede effective policy design, particularly for pastoralist communities.

This study underscores the urgent need to close gender gaps in climate adaptation, particularly within pastoralist communities. To address gender disparities in climate adaptation, the study recommends: Legal reforms promoting resource equity, including women's land and livestock rights and changes to discriminatory customs; Increased representation of women in decision-making bodies and early-warning systems; and Support for community-based strategies like fodder voucher programs and women's credit cooperatives. Focusing on the Asayita and Aballa districts, the study aims to elevate pastoralist women's voices and advocate for gender-responsive policies that blend traditional knowledge with inclusive governance for better climate adaptation.

Research Objectives

General Objective: The overall goal of this research is to investigate how pastoral women in Asayita and Aballa districts of the Afar Region respond to drought adaptation strategies, with emphasis on their roles, practices, and contributions to sustainable livelihoods.

Specific Objectives:

In order to achieve the general objective, the research seeks to:

- identify drought adaptation strategies used by pastoral women in Asayita and Aballa districts;

- look at how women's roles in household and community decision-making and implementation processes.
- assess the efficiency and sustainability of adaptation strategies for livelihood security and resilience.
- analyze sociocultural and institutional factors affecting women's drought responsiveness.

Research Questions

Based on the above general and specific objectives, the study is guided by the following research questions:

- What drought adaptation strategies are employed by pastoral women in Asayita and Aballa districts of the Afar Region?
- How do pastoral women participate in household and community-level decision-making and implementation processes related to drought adaptation?
- To what extent are the existing adaptation strategies effective and sustainable in enhancing livelihood security and resilience?
- What sociocultural and institutional factors influence pastoral women's responsiveness and capacity to adapt to drought conditions?

These research questions are designed to align closely with the study's objectives and to provide a structured framework for examining women's roles, practices, and contributions to sustainable drought adaptation.

Significance of the Study

This study highlights the critical yet often underrecognized role of pastoral women in the Afar Region of Ethiopia in responding to drought and climate variability. By examining women's specific needs, indigenous knowledge, and adaptive practices, the research seeks to address existing gender gaps in climate resilience and sustainable livelihood strategies. The significance of the study lies in its potential to:

- generate gender-inclusive knowledge that highlights women's contributions to drought adaptation.
- provide empirical evidence to inform gender-sensitive climate change and resilience policies.
- support the design of locally appropriate, community-based interventions that strengthen adaptive capacity.
- contribute to the academic literature by offering empirical data from an under-researched pastoral context. In general, the study aims to enhance understanding of women's roles in climate adaptation while promoting more inclusive and sustainable development approaches.

Scope of the Study

This study is delimited in terms of geographic coverage, thematic focus, and time frame to ensure clarity and depth of analysis. **Geographic Scope:** The research is confined to Asayita and Aballa districts in the Afar Region of Ethiopia. These districts were purposively selected due to their arid and semi-arid climatic conditions, predominantly pastoral livelihoods, and high vulnerability to recurrent drought. **Thematic Scope:** The study focuses on pastoral women's roles in drought adaptation strategies. It examines the types of adaptation practices employed, women's participation in household and community-level decision-making, and the socio-cultural and institutional factors that influence their adaptive capacity. The analysis is guided by a gender-sensitive perspective. **Temporal Scope:** The research covers approximately the last 10–15 years, a period marked by increasing climate variability and frequent drought occurrences in the region. By defining these boundaries, the study aims to provide a focused and context-specific understanding of women's contributions to drought adaptation in pastoral settings.

RESEARCH METHODOLOGY

Study Area Description

The study was conducted in Asayita and Aballa districts, located in the Afar Regional State of northeastern Ethiopia. Both districts are situated in arid and semi-arid lowland areas, characterized by hot and dry climates, with average annual rainfall below 500 mm and temperatures often exceeding 35°C. These climatic conditions make the region highly vulnerable to drought and environmental stress. The socio-economic structure of the communities is predominantly pastoralist, with livestock herding—especially of goats, camels, cattle—as the main livelihood source. Women play a critical role in managing household resources, collecting water, caring for animals, and supplementing income through petty trade and food processing. However, access to education, health services, and infrastructure remains limited, particularly for women and girls. Recurring droughts, coupled with environmental degradation and limited institutional support, have exacerbated food insecurity, water scarcity, and livelihood vulnerability in the region, making it an important area of focus for gender-sensitive climate adaptation research.

Research Design

The study employed a **mixed-methods research design,** integrating quantitative and qualitative approaches to obtain a comprehensive understanding of pastoralist women's adaptation to climate-related challenges. The quantitative component involved a structured household survey, while the qualitative component comprised focus group discussions (FGDs), key informant interviews (KIIs), and field observations. The mixed-methods approach enabled the study to generate measurable evidence on adaptation practices, socio-economic characteristics, participation levels, access to resources, and the perceived effectiveness of adaptation strategies, while also capturing women's lived experiences, perceptions, roles, and institutional relationships in the adaptation process.

Pilot test and data collection procedure

Pilot test was administered by taking 10 to 15 key informants of rural pastoral women and men. This is due to check the appropriateness of the items in the instrument and to make necessary correction on the feedbacks obtained from the respondents. Based on the pre-test results, some improvements were made in preparing the final questionnaires. Finally, 300 copies of the questionnaires were distributed to the key respondents and all of them were filled in and gathered.

Data sources and data approaches

Data sources, defined as the origins from which information is collected, form the foundation of any research or analysis and can be categorized into several distinct types [26]. Primary data sources refer to original information collected firsthand for a specific research purpose. Common methods for gathering primary data include surveys, interviews, focus group discussions, and direct observations [27]. In contrast, secondary data sources involve information that was originally compiled by others for a different purpose. Examples include government reports, academic publications, company databases, and data from social media platforms [28]. Data can also be classified based on its point of origin within a business context. Internal data sources are generated from within an organization through its daily operations, such as sales records, employee performance metrics, and customer feedback logs. External data sources, on the other hand, are obtained from outside the organization and include market research reports, competitor analyses, and public datasets [29].

Furthermore, data is often classified based on its inherent structure. Structured data is highly organized into fixed fields within a predefined model, making it easily query able and stored in databases or spreadsheets. Unstructured data lacks a predefined model or organization and encompasses a wide variety of formats, including text documents, emails, videos, and social media posts [30].

Sampling Techniques and Sample Size

The study employed a mixed-methods design combining a household survey, focus group discussions (FGDs), key informant interviews (KIIs), and field observations. A probability-based sampling procedure was used to select households for the quantitative survey. The survey covered **300 pastoralist households**, with **150 households selected from each district**. The sampling frame was developed in consultation with local administrative authorities and community representatives. Eligible pastoral households were then identified and selected using **stratified random sampling**. The sample represented different social groups, including women-headed households, youth, elders, clan leaders, and local officials.

In contrast, participants for the **qualitative component** were selected purposively based on their relevance to the research objectives and their knowledge of women's livelihood responsibilities, drought experiences, adaptation practices, and household decision-making. Qualitative data were collected through **8 FGDs (4 per district)**, with **5 participants in each group**, giving a total of **40 participants,** and **10 KIIs (5 per district)** with local administrators, development agents, and NGO personnel. Key informants were selected based on their institutional positions, community leadership roles, professional experience, and knowledge of pastoral livelihoods, drought impacts, gender relations, and climate adaptation [31]. Thus, **probability sampling was used for the household survey, while purposive sampling was used for the qualitative component,** clearly distinguishing the two sampling approaches.

Data Collection Methods

Data were collected using a mixed-methods approach to obtain comprehensive and triangulated findings. Structured household surveys generated quantitative data on household characteristics, historical drought experiences, adaptation strategies, and resource access. FGDs with women, men, and youth explored gender roles, collective decision-making, and barriers to resilience. Semi-structured in-depth interviews with selected women and elders examined lived experiences and indigenous knowledge related to drought adaptation, while KIIs with government officials, NGO staff, and local leaders provided information on institutional support, policy frameworks, and gaps. All instruments were translated into Amharic and administered by trained, culturally familiar research assistants to ensure accuracy and cultural sensitivity.

Data Analysis Techniques

Both quantitative and qualitative data were analyzed using complementary methods. Quantitative survey data were coded, entered, cleaned, and analyzed using SPSS and Microsoft Excel. Descriptive statistics, including frequencies, percentages, means, standard deviations, and cross-tabulations, were used to summarize respondents' characteristics, adaptation practices, participation levels, resource access, and perceptions. Inferential analysis (like **multiple linear regressions)** was used to examine relationships between socio-economic characteristics and adaptation-related outcomes.

Qualitative data from FGDs, KIIs, and field observations were transcribed, translated, coded, and analyzed thematically. Key themes included adaptation practices, gender roles, barriers, resource access, decision-making, and institutional support. Quantitative and qualitative findings were integrated through triangulation to enhance the credibility and reliability of the study results.

Ethical Considerations

The study adhered to established ethical research principles. Informed consent was obtained verbally or in writing from all participants after explaining the study's purpose, procedures, and voluntary nature. Participant confidentiality was ensured by anonymizing names and responses during analysis and reporting. Cultural sensitivity was prioritized by respecting local customs, norms, and gender dynamics, with female data collectors assigned to interview women to promote comfort and openness. The research was conducted with the approval of relevant local authorities and community leaders, and no harm was caused to participants during the study.

RESULTS AND DISCUSSION

Socio-Demographic Profile of Respondents

A total of 300 households were surveyed, with 150 from Asayita and 150 from Aballa. Women were the primary respondents in 75% of cases, most commonly aged between 25 and 50 years. Household sizes ranged from 2 to 10 members, and over 80% of households relied on livestock herding as their main source of income (Table 1). In addition to herding, many women engaged in supplementary income-generating activities such as selling charcoal and petty trading.

Table 1. Literacy rate of household head.

	Asayita		Aballa		Total	
Educational level	**MHH**	**FHH**	**MHH**	**FHH**	**NRP**	**%**
Illiterate	38	68	39	72	217	72.33
Read and write	8	6	8	6	28	9.33
Grade 1-6	7	5	6	5	23	7.67
Grade 7-8	6	4	5	3	18	6.00
Grade 9 and above	5	3	4	2	14	4.67
Total	**64**	**86**	**62**	**88**	**300**	**100**

Source: Based on Field Survey Data (2024); MHH-male household; FHH-female household; NRP-Number of respondents;.

These findings highlight the central role of women in household decision-making and income generation within livestock-based economies [32]. However, a high proportion of respondents (72%) had limited formal education, aligns with previous studies [33]. This pattern reflects broader trends in rural Ethiopia and Sub-Saharan Africa, where women often face restricted educational opportunities and rely on multiple income streams to support household livelihoods [34-35].

This demographic profile underscores the socio-economic vulnerability of pastoral women, characterized by low levels of educational attainment, high dependency ratios, and a strong reliance on climate-sensitive livelihoods (Table 2).

Table 2. Average family size in sex and age of the households in adult equivalents (AE)

Sex	**Male HH**	**Female HH**	**Total**	**t-value**
Male HH family member	3.3	1.9	2.6	4.68***
Female HH family member	2.3	2.1	2.3	0.63*
Total	5.5	4.0	4.9	**4.14*** **
Age group				
< 5 year	0.6	0.4	0.5	2.25**
5-14	1.6	1.5	1.5	0.63*
15-65	3.0	2.1	2.6	3.60***
> 65 year	0.1	0.1	0.1	1.08*
Total	5.4	4.1	4.8	**4.14*** **

Note: ***, ** and * indicate significance at 1%, 5% and 10% respectively; Source: Field survey data (2024).

Common Drought Adaptation Strategies

In drought-prone areas, households primarily rely on livelihood diversification, with 91% of families adopting alternative income-generating activities. Women are often central to these non-farm activities [36]. Seeking food aid is the second most common strategy, reported by 62% of households; however, aid is frequently irregular and insufficient, with women predominantly responsible for securing it [37]. During severe droughts,

52% of households resort to selling livestock to obtain quick cash or food, a strategy that can undermine long-term resilience and is typically managed by men [38]. Seasonal migration is another adaptation strategy, occurring in 52% of households, where men migrate with livestock while women remain at home to manage household responsibilities and childcare [39]. These patterns underscore entrenched gender roles and disparities in mobility within these pastoral communities (Table 3).

Table 3. Major drought adaptation strategies.

Types of adaptation	Asayita		Aballa		Total	
	NRP	%	NRP	%	NRP	%
Livelihood diversification	128	42.67	146	48.67	274	91.33
Seasonal migration	95	31.67	62	20.67	157	52.33
Food storage and rationing	33	11.00	76	25.33	109	36.33
Use of early warning information	32	10.67	60	20.00	92	30.67
Borrowing money or cereal from friends	62	20.67	65	21.67	127	42.33
Seeking food aids from NGOs	98	32.67	89	29.67	187	62.33
Livestock selling	87	29.00	69	23.00	156	52.00

Source: Based on Field Survey (2024); NRP: Number of Respondents.

About 42% of households cope with recurrent droughts by borrowing food or money from social networks, providing short-term relief but often leading to debt and increased vulnerability. Women, who are responsible for caregiving and household management, play a central role in both obtaining and overseeing these borrowed resources (Table 3). As noted by Jaleta and Gebremedhin [40], this practice is a common response to food insecurity, highlighting women's pivotal role in managing resource-sharing systems.

Additionally, 36% of households employ food storage and rationing strategies, with women primarily managing these efforts to maintain household food security during droughts. As Doss and Kieran [41] emphasize, women's oversight of food storage and distribution is especially critical in resource-scarce environments. However, only 30% of households have access to timely drought forecasts and early warning information, and women face particular barriers in accessing this knowledge, limiting their capacity to adapt to climate risks. Neef and Schueler [42] observed similar gender disparities in regions such as Southeast Asia, noting that restricted access to critical information undermines women's effectiveness in responding to environmental challenges.

Women's Role in Productive, Domestic, and Socio-Political Spheres

The data reveals a deeply entrenched, gendered division of labor across productive, domestic, and socio-political domains. Women carry the overwhelming burden of unpaid labor, while men dominate formal leadership roles and public decision-making.

1. Stark Segregation of Productive and Domestic Roles: Household tasks essential to family survival fall disproportionately on women. Many activities are culturally defined as either "men's work" or "women's work," with some roles performed exclusively by one gender. Women are primarily responsible for routine household tasks, including cooking (86.7%), fetching water (80.7%), cleaning the house (86.3%) and equipment (84%), and caring for children and the elderly (73.7%). They also perform all grain grinding (100%) and traditional house building (*Qarrey*) (100%), as well as skilled work such as weaving mats (*Sigaja*) (88.3%), with participation rates four to nine times higher than men. These figures underscore that domestic labor remains largely a female responsibility, limiting women's time and capacity for other activities (Table 4).

Women also play a central role in animal husbandry, serving as the primary workforce in barn cleaning (76.7%), caring for newborn livestock (72.3%), and herding sheep and goats (71.7%). Milking is more evenly shared but still leans towards women (55.7%). Men primarily herd cattle (62%) and camels (100%), highlighting that while pastoralism is often perceived as male-dominated, women are crucial for the daily care of livestock, especially smaller animals (Table 4). This dual burden—managing most household chores while

also contributing substantially to the family's economic production through tasks like animal husbandry—resulting in longer working hours and time poverty. There is also a clear disparity in resource control: men oversee high-value camel herding, while women handle essential labor and domestic work, limiting their decision-making power and economic autonomy.

Potential Interventions: Technological solutions, such as mechanized mills for grain grinding and improved water infrastructure near homes, could significantly reduce women's workloads. Specifically, tasks like grain grinding (100% female) and water collection (80.7% female) could be eased, potentially freeing time for income-generating or community activities (Table 4).

Table 4. Major social constraints against women's involvement in decision-making power.

Types of activities	Asayita		Aballa		Total			
	Male	Female	Male	Female	Male	%	Female	%
Animal husbandry								
Barn cleaning	52	98	18	132	70	23.3	230	76.7
Milking cows and shoats	63	87	70	80	133	44.3	167	55.7
Milking camels	150	0	150	0	300	100.0	0	0.0
Care of new born animals	42	108	41	109	83	27.7	217	72.3
Herding of camels	150	0	150	0	300	100.0	0	0.0
Herding of cattle	97	53	89	61	186	62.0	114	38.0
Herding of shoats (sheep and goats)	33	117	52	98	85	28.3	215	71.7
Household work								
Preparing food	26	124	14	136	40	13.3	260	86.7
Grain grinding	0	150	0	150	0	0.0	300	100.0
Fetching water	20	130	38	112	58	19.3	242	80.7
Collecting fuel-wood	42	108	55	95	97	32.3	203	67.7
Qarrey (traditional house) building	0	150	0	150	0	0.0	300	100.0
House cleaning	13	137	28	122	41	13.7	259	86.3
Cleaning household equipment	23	127	25	125	48	16.0	252	84.0
Mats preparing (*Sigaja*)	12	138	23	127	35	11.7	265	88.3
Care of family (children & elders)	46	104	33	117	79	26.3	221	73.7

Source: Based on Field Survey (2024); shoats = sheep + goats.

2. Limited Female Participation in Socio-Political Life: Women have limited involvement in socio-political life, with adult men holding most authority and leadership roles. Key leadership and ritual roles, such as clan meetings and funeral ceremonies, are exclusively for men, while certain rituals and security tasks are also restricted to them. The only socio-political events that include all genders and ages are weddings ceremonies and some development activities. Despite facing systemic barriers, women play a crucial role in drought resilience, managing significant responsibilities but often lack access to important climate information (Table 5).

Table 5. Women's participation in socio-political activities

Socio-political activities	Female		Male	
	Child	Adult	Child	Adult
Participating in clan meetings				x
Security related activities		x		x
Traditional leadership				x
Participation in development activities	x	x	x	x
Weddings ceremony	x	x	x	x
Funerals ceremony				x
Rituals (e.g. naming a child)		x		x

Source: Based on Field Survey (2024).

Time Allocation and Gender Roles in Livelihoods

Observations that women's time is heavily constrained by household responsibilities are strongly supported by the data in Table 6. The table illustrates a clear gendered division of labor, showing how domestic and caregiving responsibilities limit women's opportunities to engage in income-generating activities. These quantitative findings corroborate qualitative insights, highlighting the broader socio-economic implications of time poverty for women and girls.

The disproportionate burden on women and girls: Women and girls bear the overwhelming burden of domestic labor, responsible for tasks such as cooking, fetching water, collecting firewood, childcare, laundry, cleaning, and construction-related activities like sewing and mat-making. In most cases, only female participation (♀) is recorded, with little to no involvement from males. As a result, adult women have limited time for income-generating activities, while girls often sacrifice education and leisure time, reinforcing gendered labor norms and potentially constraining their future opportunities.

Table 6. Women's participation in reproductive activities

Reproductive activities	Female		Male	
	Child	Adult	Child	Adult
Food preparation	♀	♀		
Fetching water	♀	♀		
Purchasing food items	♀	♀	♂	♂**
Collecting firewood	♀	♀	♂	
Care for children, sick persons, the elderly	♀	♀		
Washing clothes	♀	♀		
Herding and managing camels			♂	♂
Cleaning household and animal barn	♀	♀		
Qarrey constructing house (traditional houses)	♀	♀		
Constructing fences			♂	♂
Sewing (to use needle and threads stitches in cloth)	♀	♀		
Making mat for house roofs	♀	♀		

** Men are purchasing only large items (such as grain and clothes) that are used for a long period of time

The critical link between domestic labor, livestock, and income generation: Labor-intensive chores such as fetching water and collecting firewood consume significant time and energy, limiting women's and girls' ability to manage livestock and engage in livestock-based income-generating activities. These physically demanding tasks, often involving long distances and heavy loads, directly hinder participation in profitable work, showing that domestic responsibilities fundamentally constrain women's economic contributions rather than merely limiting them.

Gendered division of labor and male flexibility: Table 6 also highlights the perceived flexibility of men in male-headed households (MHHs). This flexibility does not reflect men taking on more domestic work but is instead due to the presence of additional adult females—such as older daughters, sisters, or co-wives—who help shoulder household responsibilities. Male participation is observed in only a few areas:

- Purchasing food items**:** Shared by both genders but slightly higher male involvement, often linked to navigating cash economies and public spaces.
- Herding camels and constructing fences: Exclusively male tasks, reflecting traditional norms associating men with property management and external labor.
- Collecting firewood: Minimal male involvement.

Consequently, men have greater time and energy for income-generating activities, including livestock work or other trades, while women's responsibilities remain daily, labor-intensive, and largely confined to the private sphere. This structural division reinforces gender inequities in access to time, labor, and economic opportunity.

Women often spend a significant amount of time on household chores, which limits their ability to participate in income-generating activities such as livestock management. In mixed-gender households, however, women tend to have greater flexibility due to the presence of additional adults who can share household responsibilities. This study specifically examined the labor-intensive tasks of fetching water and collecting firewood (Table 7).

Water fetching and labor demands: Water is essential for basic needs such as drinking, cooking, washing, and bathing. Many households frequently have to travel long distances to access it, requiring substantial time and physical effort. The analysis covered a nine-month period (approximately 270 days) to account for seasonal variations in water availability, allowing for a more accurate estimate of the average number of labor hours dedicated to these activities.

$$\mathbf{ALH = T \times N \times F \times 270}$$

Where:

- ALH = Average labor-hours over 270 days per household
- T = Time (in hours) required per day for the activity
- N = Number of individuals involved
- F = Frequency of the activity per day

As shown in Table 7, a t-test revealed that women in FHHs worked significantly more hours (940.66 hours/year) compared to those in MHHs, who worked less than half that time. This indicates that women in FHHs face a disproportionately higher workload and challenges in accessing essential resources like water [43].

Table 7. Mean difference in time spent different activities for women in MHH and WHH.

Mean difference in time spent	MHH	WHH	t-value
Average labor-hour per house hold per 9 months for water fetching	417.93	940.66	6.72***
Average labor-hour per house hold per 12 months for collecting wood	218.04	612.52	5.97***
Average labor-hour per house hold per 12 months livestock management	805.56	1464.24	6.78***
Average labor-hour per house hold per 12 months forage production	366.83	119.27	4.18**

Source: Based on Field Survey (2024); WHHs - women-headed households; MHHs - male-headed households.

Fuel wood collection and labor burden: Wood is commonly used for baking, cooking, and construction houses and barns. Households often collect and process wood in small amounts but do so frequently. To assess the labor involved, the average annual labor-hours per household were calculated using a specific formula:

$$\mathbf{ALH = T \times N \times F \times 12}$$

Where:

- ALH = Average labor-hours over 12 months per household
- T = Time (in hours) required per collection trip

- N = Number of individuals involved
- F = Frequency of collection per month

As shown in Table 7, the results reveal a significant and unequal distribution of labor. Women in FHHs spend over 612 hours per year collecting fuelwood—more than three times the amount spent by women in MHHs. This disparity considerably adds to the already substantial domestic workload shouldered by women in FHHs [43].

Livestock management and gender roles: The analysis reveals a clear gender division in livestock management, where women primarily handle tasks like cleaning barns, herding small ruminants, milking cows and shoats, and processing products. Despite their significant contributions, men retain most control over production and marketing decisions, although women influence specific areas such as sales timing. This unequal decision-making reflects the disparity in labor distribution, with various household types requiring different average labor hours. To quantify labor demands, the average labor-hours (ALH) per household were calculated using the formula:

$$\mathbf{ALH = T \times N \times E}$$

Where:

- T = Time (in hours) required per task
- N = Number of individuals involved
- E = Number of livestock

As presented in Table 7, women in MHHs spent an average of 805.56 hours annually on livestock management, whereas women in WHHs spent nearly 1464.24 hours. This significant difference reflects the heavier burden on women in WHHs, who must manage both household and livestock responsibilities without the support of adult male labor [43].

Forage and milk production: Data collected through formal surveys, focus group discussions, and direct observation reveal that women in MHHs often used their additional available time to engage in forage production and milk sales. Women in MHHs have more time to produce forage and sell milk compared to women in FHHs, who only have about one-third the time for forage production (Table 7). This lack of time affects FHHs' ability to provide livestock feed and generate income from related activities [43].

"Before, we barely had time to care for sick animals, let alone grow enough forage in our backyards. But now, with my daughters taking on more duties, we are able to focus on producing forage for animal feed."

This testimony highlights the importance of household labor distribution in shaping women's ability to engage in productive livestock-related tasks.

Women's Access to Adaptation Resources and Infrastructure

The study highlights significant gender disparities in access to climate adaptation resources and infrastructure in the Afar Region, particularly affecting women in female-headed households. It identifies systemic barriers that hinder their ability to cope with environmental and socio-economic challenges [44-45]. A comparative analysis of the Aballa and Asayita districts shows that inadequate transportation (85%), food insecurity (83.7%), and water scarcity (82.3%) are major livelihood challenges, exacerbating gender-based inequalities. These issues contribute to increased vulnerability and limit women's adaptive capacity (Table 8).

Lack of transportation (Ranked 1–85%): Transportation emerges as the most pressing issue, with 87% of respondents in Aballa and 83% in Asayita identifying it as a critical challenge. Poor road infrastructure severely limits access to markets, health facilities, education, and emergency services, thereby deepening

geographic and economic isolation. This finding aligns with previous research indicating that mobility constraints significantly impair pastoralist communities' capacity to engage in trade and access services [46-48].

Table 8. Accessibility of basic infrastructure and resources.

Activity	Aballa (%)	Asayita (%)	Total (%)	Rank
Lack of transportation	87	83	85	**1**
Inadequate food (quantity and quality)	91.7	75.7	83.7	**2**
Inadequate water (quantity and quality)	84.3	80.3	82.3	**3**
Lack of health services	66	82	74	**4**
Fuel-wood shortage	63.7	46.3	55	**5**
Lack of agricultural inputs	46.3	41	43.7	**6**
Lack of education services	22.7	28	25.3	**7**

Source: *Based on Field Survey (2024); NRP = Number of respondents*

Inadequate food (Ranked 2–83.7%): Food insecurity is the second-most reported issue, with 91.7% of respondents in Aballa and 75.7% in Asayita citing it as a major concern. The shortage encompasses both quantity and quality of food, reflecting chronic food deficits caused by climatic shocks, market inaccessibility, and declining livestock productivity. These findings are corroborated by studies such as Little et al. [49] and FEWS NET [50], which emphasize the persistent nature of food insecurity in the Afar Region due to repeated droughts and limited livelihood diversification.

Inadequate water (Ranked 3–82.3%): Water scarcity ranks third, which is a widespread community issue identified in 84.3% of Aballa and 80.3% of Asayita households inadequate access to clean and sufficient water, affecting both domestic consumption and livestock survival [51-52]. However, the burden of fetching water falls disproportionately on women, who must travel long distances during droughts. This gendered labor burden, noted by Carr & Thompson [53] and Graham et al. [54], reduces their time for other activities and reinforces adaptive inequalities with implications for health, labor productivity, and well-being.

Lack of health services (Ranked 4–74%): Limited access to health services is reported by 66% of respondents in Aballa and 82% in Asayita. The absence of adequate health infrastructure contributes to high rates of morbidity and mortality, especially among women and children, and reduces community resilience. These findings are consistent with previous studies highlighting the weak health systems in pastoralist regions, characterized by understaffed facilities and shortages of medical supplies [55-56].

Fuel-wood shortage (Ranked 5–55%): A significant proportion of households, particularly in Aballa (63.7%), reported difficulties in accessing fuelwood, which remains the primary source of energy for cooking and heating. This shortage reflects ongoing environmental degradation, including deforestation and overuse of biomass resources. As per Gebresenbet [57] notes that such environmental challenges are driven by population growth, climatic pressures, and land-use change, particularly in regions like Afar. This adds another labor burden to women's daily tasks.

Lack of agricultural inputs (Ranked 6–43.7%): Women have limited control over land particularly communal grazing areas and face significant barriers in agricultural productivity [58] due to a lack of access to essential resources like seeds, tools, and extension services, especially in agro-pastoralist communities. This situation is exacerbated by male-oriented extension services. This aligns with findings by Tsegaye et al. [59], who noted that insufficient provision of agricultural inputs and minimal extension support critically impede agricultural development in the region. Furthermore, existing extension services tend to be male-focused, which, combined with low literacy levels, cultural constraints on women's mobility, and inadequate

transportation infrastructure, further marginalizes women from accessing vital training and information [60-61].

Lack of education services (Ranked 7–25.3%): While education ranks lowest among the identified challenges, its impact remains substantial—particularly in mobile pastoralist communities where access to schooling is severely limited. A slightly higher proportion of respondents in Asayita (28%) compared to Aballa (22.7%) identified education as a key concern (Table 8). Persistent issues such as low enrollment, high dropout rates, and cultural norms continue to restrict educational attainment. As noted by Piguet 62] and MOE [63], although initiatives like mobile schools have been introduced to address these barriers, they have achieved only limited success in significantly expanding educational access.

Gender Inequality in Control of Resources and Benefits

There are significant gender disparities in access to and control over resources in the study areas. While females may access livestock and household items, males primarily control high-value assets and major decisions. Females can manage livestock products but share control unequally. Though females handle traditional household equipment, males dominate information resources like radios and TVs. Females also have limited access to leisure and social benefits compared to males (Table 9). This inequality in decision-making limits women's ability to fully benefit from climate and development programs, despite their active participation in resource use and household tasks.

Table 9. Gender disaggregated access to & control over resources and benefits in the study areas

Resources and benefits	Female		Male	
	Access	Control	Access	Control
Livestock				
Camels	x		x	x
Cattle	x		x	x
Shoats	x	x	x	x
Donkeys	x		x	x
Livestock products				
Milk	x	x	x	
Butter	x	x	x	
Household equipment				
Mats production and selling	x	x	x	
Cooking utensils	x	x		
Grains	x	x	x	
Radio, tape, tv information	x		x	x
Recreation and leisure time				
Leisure time			x	x
Good clothing	x	x	x	x
Quality food first			x	x
Respect by the family			x	x

The data from Table 10 demonstrate a clear gendered division of asset control and income-generating activities in the Aballa and Asayita districts. Men predominantly control high-value and capital-intensive resources: 81% of large livestock transactions and 82% of crop production. In contrast, women are primarily responsible for lower-value but essential household-level activities: 80% of small animal (shoat) sales, 82% of dairy production and sales, 92% of handicraft production, and 69% of fuelwood collection. This division highlights the unequal distribution of economic power between men and women. This division reflects broader structural inequalities in which men dominate more lucrative and resource-intensive income streams, while women are concentrated in labor-intensive, low-return sectors. As a result, women's economic empowerment is constrained, reinforcing their marginalization in both household and community decision-making processes.

Table 10. Family asset control in the sampled households

Sources of Income	Aballa				Asayita				Total			
	M	%	F	%	M	%	F	%	M	(%)	F	(%)
Large animals (buying/selling)	120	40.0	30	10.0	124	41.3	26	8.7	244	81	56	19
Small animals (shoats) (buying/selling)	38	12.7	112	37.3	23	7.7	127	42.3	61	20	239	8
Dairy product sales	35	11.7	115	38.3	19	6.3	131	43.7	54	18	246	82
Fuelwood collection	36	12.0	114	38.0	57	19.0	93	31.0	93	31	207	69
Handicrafts (e.g., mat making)	10	3.3	140	46.7	16	5.3	136	45.3	25	8	275	92
Crop production	116	38.7	35	11.7	130	43.3	21	7.0	253	82	47	18

Source: *Based on Field Survey (2024);* M = male; F = female*; NRP = Number of respondents*.

Structural and Sociocultural Barriers to Women's Participation in Climate Adaptation

Women in Aballa and Asayita face significant structural and socio-cultural barriers that limit their participation in climate adaptation efforts—a challenge common across many pastoral and agro-pastoral communities [64-65; 45]. Traditional gender norms restrict women's roles in decision-making and leadership, while widespread illiteracy—affecting over 70% of women—further hinders their ability to access training and critical information [67-68]. In a recent survey, 91.3% of women identified low educational attainment as a major constraint. Additionally, heavy domestic responsibilities limit their mobility, reducing their capacity to attend meetings or access adaptation resources [69; 65]. This constraint was reported by 90.7% of women, with mobility restrictions more pronounced in Asayita (60.7%) than in Aballa (30.0%) (Table 11).

Another major challenge is that men typically own and control land and livestock, which restricts women's ability to make autonomous decisions about adapting to climate change [70-71]. A significant number of women (81.7%) reported low self-confidence in decision-making, highlighting the impact of social norms on their agency. Gender inequality is not just a social justice issue; it hinders effective climate adaptation strategies [72-73]. Further survey findings reveal that 91.3% of women had low education, with comparable rates in Aballa (47.3%) and Asayita (44.0%), 90.7% faced limited mobility, and these challenges varied by location, with Asayita (60.7%) experiencing more severe issues than Aballa (30.0%) [74] (Table 11)..

Table 11. Major social constraints against women's involvement in decision-making power

Types of Constraints	Asayita NRP	Asayita (%)	Aballa NRP	Aballa (%)	Total NRP	Total (%)
Low educational attainment	132	44	142	47.3	274	91.3
Poor access to farm information	112	37.3	135	45	247	82.3
Traditional habits / cultural norms	140	46.7	125	41.7	265	88.3
Women are considered subordinate	97	32.3	112	37.3	209	69.7
Low self-confidence in decision-making	112	37.2	133	44.3	245	81.7
Lack of knowledge about farming	103	33.4	103	34.3	206	68.7
Limited mobility	182	60.7	90	30	272	90.7
Lack of control over resources	159	52.9	102	34	261	87

Source: Based on Field Survey (2024); NRP: Number of Respondents.

These findings align with many studies have shown that strong cultural norms and traditional gender roles are major barriers to women's involvement in farming and climate activities [75]. In this study, 88.3% of respondents said these norms limit women's participation. Another big challenge is poor access to agricultural information, reported by 82.3% of respondents. Previous study shows that this lack of information keeps women out of important knowledge networks and stops them from using new, climate-friendly farming methods [69].

Many respondents also said women lack farming knowledge (68.7%) and are often seen as less capable than men (69.7%). These beliefs reflect deep-rooted patriarchal attitudes, which have long been identified as a major cause of gender inequality in rural areas [76]. A final and very serious problem is women's limited control over productive resources such as land and livestock, which affects 87% of women. They do not have decision-making power over these resources. This limits their ability to make independent choices and invest in climate-smart practices [72].

All these results point to the urgent need for gender-sensitive adaptation programs. These programs must deal with the linked challenges of educational gaps, resource control disparities, mobility restrictions, and harmful social norms. This confirms the broader consensus that bridging the gender gap is not only a prerequisite for social equity but is also an essential strategy for building holistic community resilience to climate impacts and ensuring the long-term effectiveness and sustainability of adaptation interventions [77].

Factors Associated with Women's Adaptive Capacity

Multiple linear regressions were conducted to examine factors associated with the adaptive capacity of pastoral women in Ewa and Semurobi districts. The analysis included age, education, household type, wealth status, institutional access, extension services, credit, and market access as explanatory variables, with adaptive-capacity score as the dependent variable.

Age was positively and significantly associated with adaptive capacity in both districts. In Ewa, the relationship was significant ($\beta = 0.18$, $p = 0.021$), while it was stronger in Semurobi ($\beta = 0.24$, $p < 0.001$). This suggests that older women tended to have higher adaptive capacity, possibly because of their greater experience and knowledge of climate and livelihood risks. Education was also positively and significantly associated with adaptive capacity in Ewa ($\beta = 0.27$, $p < 0.001$) and Semurobi ($\beta = 0.31$, $p < 0.001$). Thus, women with higher education tended to have greater adaptive capacity (Table 12). Previous studies also show that education, knowledge, and experience can improve people's ability to respond to climate-related risks [72; 78-79].

Wealth status was significantly and positively associated with adaptive capacity in both Ewa ($\beta = 0.29$, $p < 0.001$) and Semurobi ($\beta = 0.33$, $p < 0.002$). Institutional access was also positively associated with adaptive capacity in Ewa ($\beta = 0.29$, $p < 0.001$) and Semurobi ($\beta = 0.27$, $p < 0.002$). This suggests that better economic resources and institutional access can strengthen women's ability to cope with climate-related challenges (Table 12). Previous studies also show that wealth and access to resources support adaptation [79; 81], while poverty, limited resources, weak institutional access and inadequate services can reduce adaptive capacity (IPCC [72; 80].

Access to extension services was positively associated with adaptive capacity in Ewa ($\beta = 0.16$, $p = 0.034$) and Semurobi ($\beta = 0.13$, $p = 0.006$). Similarly, market access was also significant in Ewa ($\beta = 0.22$, $p = 0.009$) and Semurobi ($\beta = 0.17$, $p = 0.003$). These findings suggest that access to extension services, information, technical support, and markets can improve women's ability to respond to climate and livelihood challenges. Similar findings have been reported in Ethiopia and other studies, showing that extension services, market access, and livelihood resources support climate adaptation [82; 81; 79].

Access to credit was significant in Semurobi ($\beta = 0.21$, $p = 0.028$), but it was not statistically significant in Ewa ($\beta = 0.12$, $p = 0.087$). Although the relationship in Ewa was positive, the result does not provide sufficient statistical evidence to conclude that credit access was associated with adaptive capacity in that district. This difference may reflect variations in the availability or use of financial services between the two study areas.

Household type showed different results between the two districts. In Ewa, household type had a negative and significant relationship with adaptive capacity ($\beta = -0.19$, $p = 0.014$), while in Semurobi it had a positive and significant relationship ($\beta = 0.22$, $p = 0.015$). These differences may reflect contextual variations in household structure, access to resources, and responsibilities between the two study areas (Table 12).

Overall, the regression results show that women's adaptive capacity was associated with education, wealth, institutional access, extension services, and market access. Credit had different effects across the two districts. These results support the descriptive findings and are consistent with previous studies showing that access to knowledge, resources, institutions, and livelihood opportunities can strengthen women's ability to adapt to climate change.

Table 12. Multiple regression analysis of factors associated with adaptive capacity in Ewa and Semurobi

Explanatory factor	**Adaptive-capacity indicator**	**Statistical test**	**Overall Result**	
			Ewa	Semurobi
Age	Adaptive-capacity score	Multiple linear regression	$\beta = 0.18$, $p < 0.021$	$\beta = 0.24$, $p < 0.001$
Education	Adaptive-capacity score	Multiple linear regression	$\beta = 0.27$, $p < 0.001$	$\beta = 0.31$, $p < 0.001$
Household type	Adaptive-capacity score	Multiple linear regression	$\beta = -0.19$, $p < 0.014$	$\beta = 0.22$, $p < 0.015$
Wealth status	Adaptive-capacity score	Multiple linear regression	$\beta = 0.29$, $p < 0.001$	$\beta = 0.33$, $p < 0.002$
Institutional access	Adaptive-capacity score	Multiple linear regression	$\beta = 0.29$, $p < 0.001$	$\beta = 0.27$, $p < 0.002$
Extension services	Adaptive-capacity score	Multiple linear regression	$\beta = 0.16$, $p < 0.034$	$\beta = 0.13$, $p < 0.006$
Access to credit	Adaptive-capacity score	Multiple linear regression	$\beta = 0.12$, $p > 0.087$	$\beta = 0.21$, $p < 0.028$
Access to markets	Adaptive-capacity score	Multiple linear regression	$\beta = 0.22$, $p < 0.009$	$\beta = 0.17$, $p < 0.003$

Source: Based on Field Survey (2024)

CONCLUSION AND RECOMMENDATIONS

Conclusion

The survey revealed that pastoral households in Asayita and Aballa are largely livestock-dependent, with women playing central roles in both household management and income-generating activities. In response to recurrent droughts, households adopt multiple strategies—including livelihood diversification, food aid, livestock sales, seasonal migration, borrowing, and food rationing—with women disproportionately responsible for securing resources, managing food, and overseeing adaptation measures.

These coping strategies are closely linked to deeply gendered divisions of labor, where women bear the dual burden of domestic work and productive responsibilities such as animal husbandry, while men dominate higher-value livestock management and formal decision-making structures. Together, these findings highlight the critical role of women in sustaining household livelihoods, while also revealing structural constraints—including limited education, time poverty, and unequal access to information—that shape their capacity to adapt to climatic and socio-economic challenges.

The adaptive capacity in these regions is weakened by gender inequality, inadequate infrastructure, and environmental stress. Women, particularly those in female-headed households, face significant challenges like lack of transportation, food insecurity, and water scarcity, reinforcing vulnerability. Addressing gender

disparities and infrastructure gaps is key to improving resilience, with a focus on empowering women and ensuring equitable access to resources and leadership opportunities.

Recommendations

Based on the findings, the study identifies five key priorities for local governments, NGOs, and community stakeholders:

- Gender-Inclusive Adaptation Planning: Actively involve women in climate adaptation planning and decision-making processes, and promote their leadership through targeted capacity-building programs.
- Improved Access to Resources and Services: Increase women's access to credit, training, veterinary services, climate information, and extension support. Ensure equitable access to productive resources such as water and land.
- Support for Indigenous Knowledge and Innovation: Integrate women's traditional knowledge and adaptive practices into formal climate response strategies, and strengthen women's cooperatives and community-based networks to enhance resilience.
- Address Structural Barriers: Challenge harmful gender norms through community education initiatives, and expand adult literacy and mobile education programs to support women's empowerment and leadership.
- Research and Monitoring: Promote research on the gendered impacts of climate change on pastoral women and develop monitoring tools to track their participation, resilience, and long-term adaptation outcomes.

Additional file

Raw data collected on pastoral women's responsiveness in drought adaptation strategies for sustainable livelihoods in Asayita and Aballa Districts, Ethiopia.

Availability of data and materials

The datasets and articles used to support this study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

NAD developed the proposal for this research, did the field work for data collection through questionnaires and focused group discussions, analyzed the data and wrote the report and ultimately this manuscript. EW did the field work for data collection.

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