
| RESEARCH ARTICLE

Assessing the Impact of Climate Change on the Livelihoods of Communities in Burhakaba District

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| ABSTRACT

The purpose of this study was to assess the impact of climate change on the livelihoods of communities in Burhakaba District, Somalia, an area particularly vulnerable to climatic variations and significantly affected by them. The specific objectives of the study were to understand the effects of climate change on community livelihoods and the role of local authorities in responding to climate-induced crises and to examine the general perceptions of climate change adaptation and its mitigation strategies. The study employed a quantitative research design and collected data through an administered questionnaire survey involving 80 respondents selected via purposive sampling. The data was analysed using SPSS. The findings indicate that 76.25% of participants strongly agreed that climate change adversely affects their livelihoods, with severe water shortages, declining agricultural yields, and an increased frequency of droughts identified as critical challenges. Furthermore, the results underscore the urgent need for educational initiatives focused on adaptation strategies and enhanced public awareness programs to empower affected communities and mitigate the socio-economic impacts of climate change. This research provides valuable localized insights into the social, economic, and environmental consequences of climate change in Burhakaba, addressing significant gaps in the existing literature.

| KEYWORDS

Climate Change, Livelihoods, Adaption Strategies, Droughts, and Somalia

| ARTICLE INFORMATION

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1. Introduction

Climate change is a global phenomenon with varying impacts across different regions, presenting a particularly severe challenge to community livelihoods (Thakur & Bajagain, 2019). People most acutely feel these impacts on food supply and security, water availability, infrastructure, agricultural income, and broader societal structures (Xu et al., 2024). Climate change affects people across continents; its consequences are most felt by people in rural and marginalised communities that rely heavily on agriculture and livestock for their livelihoods (Roy et al., 2024). Apart from the political crisis, today's world views climate change challenges, socio-economic aspects, health and safety, and food insecurity as serious threats that adversely affect essential lives, including agricultural productivity and water scarcity (Noah, 2024).

Countries in the Horn of Africa have experienced significant climate change impacts, including the frequency of droughts, which has led to food insecurity, water scarcity, massive displacement, and vulnerability to pandemics and diseases (IGAD Climate Prediction and Application Centre, 2022). The negative impact of climate change has particularly challenged communities in this region, as a significant portion of the population are pastoralists who depend on rainfall for their livelihoods (Seife, 2020). The

climate change effects have resulted in forced migration, mass displacement, and significant disruptions to the livelihoods of affected populations (Musau, 2021).

Somalia is among the most vulnerable countries to climate change, as its people rely on rainfall for essential food crops, livestock, and water resources (Amir, 2024). Communities in Burhakaba district and nearby areas have experienced climate-induced crises, including failed crops, loss of livestock, chronic food insecurity, and significant displacement of nomadic populations due to the profound impact of climate change (Khorsandi, 2022).

For decades, Burhakaba district and its surrounding villages have suffered from ongoing conflicts and political instability, compounded by the severe impacts of climate change. This has resulted in widespread internal displacement, with many people fleeing to major Somali towns like Mogadishu or to neighbouring countries in search of better living conditions. The displacement of these communities highlights the urgent need to fully understand the extent of climate change's impact on their livelihoods, as their survival is deeply tied to seasonal rainfall, agricultural production, and livestock.

This study aims to investigate the specific impacts of climate change on the livelihoods of communities in the Burhakaba district. The findings will provide critical data that can assist the Southwest State, local authorities, the federal government, and non-governmental organizations in better understanding the challenges faced by these communities. Additionally, the research will help develop more effective strategies for resilience-building and mitigating climate-induced disasters.

The objectives of this study are to (1) examine the effects of climate change on the livelihoods of Burhakaba's residents; (2) investigate the role of local authorities in addressing these impacts; and (3) assess community perceptions of strategies to mitigate the negative effects of climate change. Through these efforts, the study aims to raise awareness about the local impacts of climate change among policymakers, humanitarian organizations, and the public, while empowering communities to better understand the risks they face and take adaptive measures.

Ultimately, this research seeks to make a meaningful contribution to understanding the local impacts of climate change, informing the development of targeted responses to mitigate these challenges and enhance community resilience.

Previous studies have largely focused on the general regional impacts of climate change in Somalia, with limited attention given to its effects on livelihoods in Burhakaba district. There is also a lack of research on how these communities adapt to climate change, including their coping strategies, resource management practices, and overall resilience. This study aims to address these gaps by providing localised insights into the social, economic, and environmental consequences of climate change in the region.

2. Related Literature Review

This section reviews existing research on the impacts of climate change on the livelihoods of communities in the Burhakaba District. Specifically, it explores the effects on agriculture, food security, water access, socioeconomic vulnerabilities, women's livelihoods, and local adaptation strategies. While research specific to Burhakaba is limited, broader studies on climate change in Somalia provide helpful information regarding its effects on these communities.

Rural communities in developing countries have experienced significant impacts of climate change, as studies across Nigeria, Indonesia, Tanzania, and Zimbabwe revealed that it led to declining crop yields, reduced soil fertility, and decreased forest resources (Abaje et al., 2016). These climate change challenges have also forced communities from developing countries to face food insecurity, reduced incomes, and increased poverty, which has led to a humanitarian crisis (Muganyizi et al., 2021).

Samatar (2024) says that pastoralists are the most at risk and that there are big direct and indirect effects, such as the loss of pastures and water resources. A study by Wanjara (2023) found that climate change has negative impacts on the health and socio-economic livelihoods of pastoralists in the north-eastern region of Kenya.

2.1 Impacts of Climate Change on Livelihoods

Communities from the low-income countries have had adverse climate change impacts on their livelihoods, particularly affecting water sources for domestic use, crop production, livestock keeping, human health, and human migration (George & Kangalawe, 2024).

Climate change threatens the livelihoods of communities in Burhakaba and nearby areas, where the population depends on rainfed agriculture and livestock farming (Food Security & Nutrition Analysis, 2016). These climate stressors have led to the displacement of many families, disrupting their access to food and livelihoods (Said & Bashir, 2023).

Agriculture, the backbone of the local economy, is experiencing lower crop yields; this situation is one of the key drivers of hunger in Somalia, which compounds food insecurity and exacerbates water scarcity (Jalango et al., 2021). Studies indicate that communities in Somalia are consistently vulnerable to food and water shortages due to their reliance on traditional farming and pastoralism, which are becoming increasingly unreliable as a result of climate change (Omar et al., 2022).

2.2 Impacts of Climate Change on Agriculture and Food Security

Agriculture and food insecurity are global challenges, as climate change poses significant threats to reduced crop yields, increased pest proliferation, and decreased soil productivity (Ndruru & Masjud, 2024). Recent reports highlight that over 36 million people in the Horn of Africa, including Somalia, are suffering from hunger due to recurrent droughts and famine (Tiba, 2023). Local farmers have seen shifts in crop yields and a severe water shortage, which directly impact their farming practices and livestock management (Mbiafeu et al., 2024). In Somalia, climate change has significantly reduced yields of essential crops such as sorghum, maize, and beans, leading to increased food insecurity (Warsame et al., 2022). Over the past three decades, Somalia has experienced a significant escalation of climate change impacts, manifesting in heightened resource-related conflicts, intensified drought cycles, diminished domestic food security, substantial livestock losses, and declining local agricultural productivity (Ibrahim et al., 2025).

2.3 Climate Change Impact on Water Resources and Access

Water access has long been a critical challenge in Burhakaba and nearby villages, as the district relies on water from the dam or small water catchments (Warta Dowlada), smaller lakes, and shallow wells; however, climate change and shifting rainfall patterns have rapidly depleted these vital resources (Mohamed Nur, personal communication, February 3, 2025). Most of the communities in the Bay region have been suffering from water scarcity, which has also resulted in poor crop yields and a reduction of local essential foods for both people and livestock (Mukhtar, 2022). During dry seasons, 1 cubic meter of domestic water use in the Burhakaba district costs 100,000 Somali shillings, which is equivalent to 3.75 USD, and people cannot afford it due to the fragile economy (Abdibasi Abdi, personal communication, February 3, 2025). The failure of rainfalls, exacerbated by ongoing political instability, has made these communities even more vulnerable, as the majority are pastoralists and nomadic populations (Mohamed et al., 2024).

2.4 Impact of Climate Change on Women's Livelihoods

The frequency of droughts in Somalia has significantly impacted agricultural income and food security in rural areas, particularly for women-headed households that are vulnerable to climate change-induced challenges (Gaheir, 2019). Droughts and climate change shocks have hurt the main source of income for pastoralist and agro-pastoralist women by lowering the number of animals they keep and the amount of food they grow (Pape & Wollburg, 2019).

Climate-induced disasters, including droughts and food shortages, have further marginalised women, especially in displaced communities, where they face higher risks of gender-based violence and limited access to resources (Mohamed & Ojwang, 2020). These challenges call attention to gender-sensitive policies that consider women's unique vulnerabilities in the context of climate change (OHirsi, 2024).

One example is that getting water from wells, lakes, and other water-available sources, which is usually a job for women, is especially challenging because many people have to walk a long way to get it, which puts them at risk of being raped, abused physically or emotionally, and other things. Climate change deeply impacts agriculture, food security, water access, and women's roles in society, exacerbating existing vulnerabilities. Further studies need to be done in this area to specifically understand the key factors contributing to how climate change affects women in rural places and come up with beneficial ways to adapt.

3. Method and Material

This study adopted a quantitative research design to examine the impact of climate change on the livelihoods of communities within the Burhakaba District. The target population consisted of community members, academic experts, and representatives from civil society organisations directly affected by climate change. A structured survey questionnaire served as the primary instrument for data collection. The questionnaire incorporated a Likert scale to quantify and assess community vulnerability to climate change, a phenomenon highly sensitive to climate variability. Given the security challenges, geographical inaccessibility, and budgetary limitations inherent in conducting research within the Burhakaba District, a purposive sampling technique was employed. This method facilitated the selection of participants deemed most knowledgeable and relevant to the study's objectives. A sample size of 80 respondents was determined, aiming to achieve a representative and diverse participant pool. The survey questionnaires' data were analysed using SPSS. Ethical considerations were paramount throughout the research process. Prior to participation, all respondents were provided with detailed information regarding the study's purpose and procedures. Informed consent was obtained from each participant. Strict confidentiality was maintained, ensuring the anonymity of individual

responses. Participation was voluntary, and respondents were explicitly informed of their right to withdraw from the study at any time without consequence.

4. Results and Discussions

This section presents the findings from the study respondents, focusing on the demographic characteristics of the participants. It will also discuss the results related to the impact of climate change on local community livelihoods, assess the role of local authorities in addressing climate change's significant impact, and explore broader community perceptions regarding climate change effects.

4.1 Demographic Characteristics

A total of 80 respondents were employed in this study. The respondents' profile revealed a diverse representation, including age, gender, marital status, education, occupation, and income levels.

4.1.1 Age distribution:

	Frequency	Percent	Valid Percent	Cumulative Percent
25-30	43	53.8	53.8	53.8
31-35	15	18.7	18.7	72.5
36-40	2	2.5	2.5	75.0
Under 25	20	25.0	25.0	100.0
Total	80	100.0	100.0	

The majority, 53.8%, were between 25 and 30 years old. Participants under 25 constituted 25%, while those aged between 31 and 35 made up 18.7%. A smaller proportion, between 36 and 40 years old, made up 2.5%.

4.1.2 Gender representation:

	Frequency	Percent	Valid Percent	Cumulative Percent
Female	23	28.7	28.7	28.7
Male	57	71.3	71.3	100.0
Total	80	100.0	100.0	

Regarding the gender, 71.3% of the study participants were male, and 28.7% were female.

4.1.3 Marital status:

	Frequency	Percent	Valid Percent	Cumulative Percent
Divorced	1	1.2	1.2	1.2
Married	42	52.5	52.5	53.7
Single	37	46.3	46.3	100.0
Total	80	100.0	100.0	

52.5% were married, 46.3% were single, and 1.2% divorced.

4.1.4 Household size:

	Frequency	Percent	Valid Percent	Cumulative Percent
1-3	28	35.0	35.0	35.0
10 and above	12	15.0	15.0	50.0
4-6	25	31.2	31.2	81.2
7-9	15	18.8	18.8	100.0
Total	80	100.0	100.0	

35% had 1-3 members, 31.2% had 4-6 members, 18.8% had 7-9 members, and 15% reported 10 or more members.

4.1.5 Education level:

	Frequency	Percent	Valid Percent	Cumulative Percent
Bachelor's Degree	55	68.7	68.7	68.7
Diploma	7	8.8	8.8	77.5
Master's Degree	13	16.2	16.2	93.7
No Formal Education	2	2.5	2.5	96.2
Primary/Secondary Education	3	3.8	3.8	100.0
Total	80	100.0	100.0	

Most of the participants held bachelor's degrees, made up 68.7% holding bachelor's degrees and 16.2% held master's degrees. Additionally, 8.8% had diplomas, 3.8% had completed primary or secondary education, and 2.5% had engaged in non-formal education.

4.1.6 Occupations:

	Frequency	Percent	Valid Percent	Cumulative Percent
Farmer	6	7.5	7.5	7.5
Government Worker	8	10.0	10.0	17.5
Humanitarian worker	21	26.2	26.2	43.7
Other (please specify)	20	25.0	25.0	68.7
Teacher	18	22.5	22.5	91.2
Trader	7	8.8	8.8	100.0
Total	80	100.0	100.0	

occupational characteristics of the respondents 21 were humanitarian workers, making up 26.2%; 20 were self-employed individuals or in other types of employment, making up 25%; 18 were teachers, making up 22.5%; 8 worked in government positions, making up 10%; 7 were traders, which corresponds to 8.8%; and the remaining 6 were farmers, equating to 7.5%.

4.1.7 Income levels:

	Frequency	Percent	Valid Percent	Cumulative Percent
101-200 USD	14	17.5	17.5	17.5
201-300 USD	13	16.3	16.3	33.8
51-100 USD	11	13.8	13.8	47.5
Less than 50 USD	9	11.3	11.3	58.8
More than 300 USD	33	41.2	41.2	100.0
Total	80	100.0	100.0	

41.1% earned over 300 USD monthly, while 17.5% earned between 101 and 200 USD, and 16.3% earned between 201 and 300 USD. 13.8% earned between 51 and 100 USD, and the remaining 11.3% reported incomes of less than 50 USD.

The demographic diversity ensures a broad perspective on climate change impacts across different socio-economic groups in the Burhakaba communities.

4.2 Impact of Climate Change on Livelihoods

The first objective of the study was the impact of climate change on local livelihoods. To address this, participants answered five questions concerning (1) water shortages, (2) agricultural productivity, (3) livestock farming, (4) the frequency and severity of droughts and floods, and (5) climate-driven displacement.

The results indicate that a significant majority of respondents (76.25%) strongly agreed that climate change negatively affects their livelihoods. Participants identified several interconnected issues, including severe water shortages, declining agricultural yields, increased frequency and intensity of droughts and floods, and higher livestock mortality rates. Additionally, these environmental challenges have led to climate-induced displacement, with many individuals from Burhakaba and its surrounding areas reporting migration to urban centres in search of more stable living conditions.

On the other hand, a smaller segment of the respondents (7.5%) expressed a lack of awareness regarding the effects of climate change on their livelihoods. Another 16.25% remained neutral, not affirming or denying climate change's influence, which may suggest limited access to information or uncertainty about linking observed changes to climatic factors. Overall, these findings emphasise the widespread impact of climate change on rural livelihoods, particularly among pastoralists, and highlight the urgent need for local adaptation strategies.

4.3 Perceived Role of Local Authorities

The second objective examined the perceived role of local authorities in addressing climate-related challenges within the Burhakaba community. Respondents answered four questions, yielding mixed yet insightful results. More than half (52.5%) strongly disagreed with the idea that local authorities had made minimal contributions to climate action. This perspective may stem from factors such as economic constraints, inaccessibility due to security issues, and the absence of emergency response plans. This finding suggests a degree of positive perception regarding local engagement and responsiveness. Conversely, 32.5% of participants agreed with the statement, reflecting their scepticism about the effectiveness or visibility of local interventions. The remaining 15% adopted a neutral stance, possibly due to limited awareness of local government initiatives.

These differing viewpoints illustrate a complex understanding within the community. While some acknowledge and appreciate local efforts to address climate-related issues, others remain doubtful or uninformed. This division may highlight disparities in outreach and communication strategies among local authorities.

4.4 Community Awareness and Perception

The third objective focused on broader community perceptions of climate change and its impacts. Participants responded to five structured questions to assess their awareness and experiences with climate variability. The analysis revealed that 58% of respondents strongly agreed that climate change significantly affects their livelihoods, aligning closely with findings from the first objective. This consensus underscores the community's widespread recognition of environmental degradation and its socio-economic ramifications. However, 27% disagreed, indicating that a substantial portion of the population either does not perceive climate change as a threat or attributes their challenges to other factors. The remaining 15% showed neutrality, which could reflect uncertainty, a lack of knowledge, or adherence to traditional beliefs.

These findings highlight varying levels of climate awareness within the community. While the majority acknowledges the impacts of climate change, there remains a critical need for enhanced public education and community-based climate literacy programmes. Such initiatives are essential to ensure that all community members are informed and prepared to respond effectively to ongoing climatic changes.

5. Conclusion

The purpose of the study was to assess the impact of climate change on the livelihoods of communities in Burhakaba District, Somalia. This area is one of the most vulnerable to climatic variations, and this study examined it to understand the effects of climate-induced crises on community livelihoods, the role of local authorities in responding to climate-induced crises, and general perceptions of the community on climate change adaptation and mitigation strategies.

The findings revealed a significant and pervasive negative impact of climate change on the livelihoods of the communities in Burhakaba District, Somalia. The majority of the study respondents (76.25%) strongly agreed that problems caused by climate change make it challenging for them to support themselves, mainly due to serious water shortages, lower crop production, frequent droughts and floods, and higher death rates among livestock. As a result of climate challenges and heavy reliance on

rain, these communities have also driven massive internal displacement to migrate to urban centers within Somalia and neighbouring countries. 52.5% of the study respondents have positively indicated that local authorities make a significant contribution in responding during climate-induced crises, while 32.5% of the respondents disagreed due to factors related to economic constraints, security challenges, and a lack of emergency response plans. The result further shows the difficulties faced by local governance in addressing these issues. Regarding community awareness and perception, it was revealed that 58% of the respondents strongly recognized climate change significantly impacting their livelihoods, underlining an extensive recognition of environmental degradation. However, 27% of the respondents disagreed, signifying a need for an increase in public education for climate change impact.

5.1 Limitations of the Study

This study was to assess the impact of climate change on the livelihoods of communities in the Burhakaba district, Somalia. The study offers specific insights, however, it has some drawbacks, such as using a targeted sampling method with 80 respondents, which was needed because of security and access issues in the Burhakaba district and has also restricted the results. Language barriers, cultural norms, and a lack of education about climate change may lead to biased responses in the questionnaire surveys.

5.2 Future Research

This study recommends conducting future research based on these findings by using mixed-methods approaches to gain a deeper understanding of the lived experiences of the community regarding climate change challenges and adaptation strategies in the Burhakaba District. This will lead to the effective implementation of interventions. This study recommends examining gender-disaggregated data, specifically focusing on women's climate change vulnerabilities, to facilitate the development of policies. Moreover, future studies should focus on socio-political factors, security and inaccessibility, and economic challenges by understanding how to respond to climate-induced crises in the areas of conflict affected. Conducting this future study will help identify the humanitarian organizations that can deliver aid to build resilience and mitigate climate change impacts in these challenging environments.

In light of the study's findings, it recommends policymakers should prioritize the following actions:

- Development of adaptive infrastructure (e.g., irrigation systems, drought-resistant crops).
- Policymakers should also implement community-based education programmes to enhance climate awareness.
- Strengthening local governance to ensure equitable distribution of resources.

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