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The Impact of Climate Change on Gender Roles in Semi-arid Agropastoral Communities: The Case of Kondoa District, Tanzania

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Abstract

Globally, the effects of climate change disproportionately affect agropastoral communities, with women being categorized as more vulnerable than men. However, information on how climate change affects the gender roles of agropastoral communities is limited in Tanzania. This study aims to assess the effects of climate change on gender roles among agropastoral communities in Kondoa District. The study employed a cross-sectional design. The data was gathered through household surveys, focus group discussions, and interviews with key informants. The SPSS (version 25) was employed to analyse quantitative data, while content analysis was used to analyse qualitative data. The study results showed that men and women were differently affected by climate change. The results also revealed that women were overburdened since they performed a variety of tasks, including walking long distances to collect firewood and water, handling all household chores, and milking and caring for young and sick livestock. Grazing was the primary activity that men handled, who also had to travel long distances to look for pastures and search for jobs away from home. Based on the results, gender roles in agropastoral communities are impacted by climate change in different ways. Therefore, the relevant organs addressing climate-related issues in local communities should consider gender-specific needs and vulnerabilities to improve mitigation and adaptation strategies.

Keywords: *climate change, gender, semi-arid, agropastoralists, Tanzania*

1. Introduction

Climate change is a global problem that has a detrimental impact on people's livelihoods and the environment (IPCC, 2022; Liru, 2020). Extreme climatic events—such as floods, drought, temperature rise, and hurricanes—have negatively affected community livelihoods, particularly those dependent on global climate-sensitive sectors (Liru & Heinecken, 2021; Mung'ong'o et al., 2019). According to Nkuba et al. (2019) and Mung'ong'o (2022), agropastoral communities are reportedly among the most vulnerable groups to the effects of climate change worldwide since they depend on sectors that are susceptible to such changes.

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Various studies have found that the effects of climate change vary according to socioeconomic status, geography, and gender (Adeleke et al., 2018; Nnadi, Liwenga et al., 2019; Onah et al., 2023). According to Nagasha et al. (2019), climate change effects have negatively impacted gender roles and affected the coping mechanisms of agropastoral communities in different ways. Gender roles are activities that are assigned to men and women based on their perceived differences (ILO, 2020). Nagasha et al. (2019) assert that these differences are often influenced by various global elements, including the environment, education, social and economic status, and religion.

Agropastoral communities in many sub-Saharan African (SSA) countries experience more significant impacts from climate-related hazards, such as drought, floods, temperature increases, and hurricanes (Ayub et al., 2023; Mung'ong'o et al., 2019; Sewando et al., 2016). For instance, severe droughts have been reported to have caused 20–60% of livestock herds to disappear in various SSA nations over the past two to three decades, as well as decreased cereal crop yields (FAO et al., 2018; Swai & Njau, 2020). Thus, these climatic adversities have impacted community livelihoods and changed people's gender roles, especially in agropastoral communities (Nagasha et al., 2019).

In the context of Tanzania, climate change has led to longer dry spells and more severe and frequent droughts, especially in semi-arid regions, which has decreased water supplies and destroyed pastures (URT, 2021). It has been reported that agropastoral communities are among the most vulnerable groups to climate change (Mongi & Msongaleli, 2024; Mung'ong'o et al., 2019). Different studies have also reported that climate change effects have disproportional challenges on the lives of agropastoral men and women (Kabote, 2018; Mtupile & Liwenga, 2017). However, climatic vulnerability differs from case to case, depending on factors such as location, socioeconomic issues, etc; hence necessitating site-specific and contextual research (Onah et al., 2023). Also, studies indicate that women are among the most vulnerable groups to climate change effects due to limited access to livelihood resources, limited decision-making authority, and adaption options (M.C Edward, 2020; Kabote, 2018; Mtupile & Liwenga, 2017). According to Swai et al. (2012), agropastoral men and women in Kondoa District have been disproportionately impacted by climate change, especially drought. However, information about how climate change has affected their gender roles is limited.

Although different studies have been carried out in Tanzania to assess the effects of climate change to agropastoral communities (Joseph, 2022; Sewando et al., 2016), however, gender disaggregation in this regard has received insufficient attention. Moreover, even studies that have focused on gender vulnerability to climate change (Kabote, 2018; Mtupile & Liwenga, 2017), and have identified the unequal impact of climate change on agropastoral communities in terms of gender, these studies have a paucity of information regarding the specific effects of climate change on gender roles within

agropastoral communities, particularly in semiarid areas. To fill this gap, it is essential to analyse gender roles to determine which ones are primarily impacted by climate change and its effects.

2. Literature Review, Theories Underpinning the Study and Conceptual Framework

Climate change significantly impacts several groups of people globally, and affects mostly communities that rely on climate-sensitive sectors, especially the rural poor in Africa (Kusse et al., 2023). For instance, Galwab et al. (2024), Nagasha et al. (2019) and Omollo et al. (2017) found that climate change has distinct impacts on the roles of men and women, especially within agropastoral communities. Unequal distribution of resources, restricted mobility, numerous domestic tasks, and limited decision-making authority: all impact gendered vulnerability to climate change (Kabote, 2018; Mtupile & Liwenga, 2017; Myeya, 2021). Although studies have been conducted in other countries—e.g., by Nagasha et al., (2019), Omolo and Mafongoya (2019) and Ayubu et al., (2023)—there is a dearth of information in Tanzania, particularly regarding the effects of climate change on gender roles within agropastoral communities; and specifically in semiarid regions. Such information is essential because gender roles may be affected differently by climate change depending on the economic status, location, environmental conditions and the culture of a particular society in a given country, which may in turn require case-specific solutions to address the impacts of climate change.

In the context of Tanzania, different studies by Kabote (2018), Mtupile and Liwenga (2017) and Swai et al (2012), reported that men and women within agropastoral communities are affected differently by climate change. However, these studies focused on the broad impacts of climate change, and have paid little attention to the specific analysis of how gender roles within agropastoral communities are impacted by the effects of climate change. Therefore, there remains a paucity of information on the effects of climate change on gender roles among agropastoral communities.

The study makes use of the feminist political ecology theory (FPE) to find out how climate change affects gender roles since the theory focuses on how gender, power and ecology are related. According to Rocheleau et al. (1996), the theory suggests that unequal power dynamics across genders—in terms of accessing and controlling resources—can impact variations in vulnerability. The theory asserts that, due to power dynamics in decision-making and resource access, the gender division of labour is impacted differently by climate change. Since men and women have diverse roles in agropastoral communities, the theory recognizes that they face various challenges from environmental changes, especially climate change. According to Rossi and Lambrou (2008), gender distribution of labour is well acknowledged as a substantial factor that influences the varying levels of vulnerability to risks of climate change. For instance, the effects of climate change, particularly drought, affect the availability of resources like water, pastures and

fuelwood, which impacts men's and women's roles in different ways (Nagasha et al., 2019). Thus, the gender roles of agropastoral communities are affected differently due to unequal distribution of labour, and disparities in resource access and decision-making power (Ayub et al., 2023; Nagasha et al., 2019).

The conceptual framework (Figure 1) shows that the effects of climate change, such as drought and temperature variations, disproportionately affect the roles of men and women, particularly in agropastoral communities (Nagasha et al., 2019; Omolo & Mafongoya, 2019). These effects have posed greater challenges, especially to the livelihoods of agropastoral males and females in various ways (Kabote, 2018; Mtupile & Liwenga, 2017). Men's and women's roles are differently affected because they are differently exposed, sensitive to, and have different adaptive capacities to climate change effects (Balikoowa, 2019; Basiru et al., 2022; Onah et al., 2023).

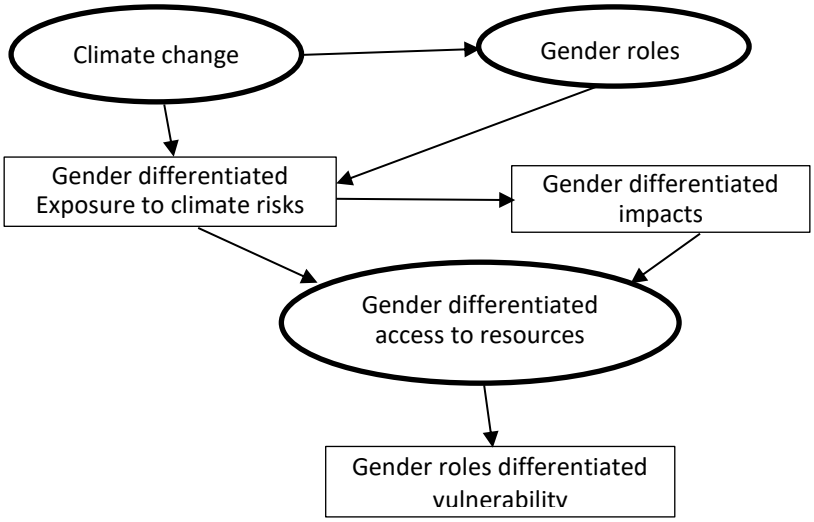

Figure 1: Conceptual framework showing the impact of climate change
Source: Modified from Kakota et al. (2011)

Gendered vulnerability to climate change is also due to limited access to resources (Edward, 2020; Kabote, 2018; Nagasha et al., 2019). According to Nagasha et al. (2019) and Ayub et al. (2023), climate change has increased the vulnerability of women, particularly those from agropastoral communities, by altering their roles and limiting their access to productive resources. The study by Rossi and Lambrou (2008) noted that gender distribution of labour is widely recognised as a significant element that determines the different levels of vulnerability to risk. Hence, men's and women's roles in agropastoral communities have been differently affected due to climate change effects, particularly droughts (Ayub et al., 2023; Galwab et al., 2024).

3. Methodology

3.1 Description of the Study Area

This study was conducted in five villages in Kondoa District: Mtiryangwi, Mauno, Atta, Chubi and Ihari. Kondoa District is situated in the northern part of Dodoma Region. It is located between latitudes 4°12" and 5°38" south of the Equator, and longitudes 35°6" and 36°2" east of the Greenwich (Kondoa District Profile, 2020) (Figure 1).

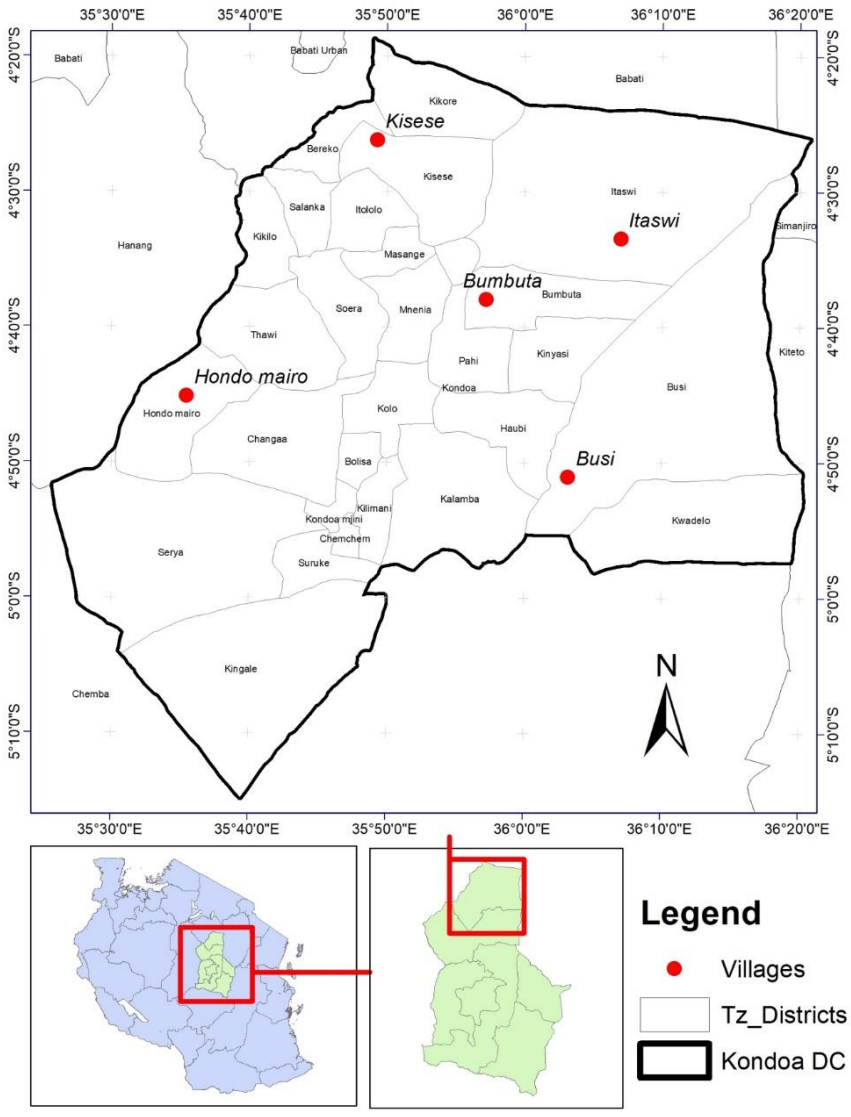

Figure 2: A Map of Kondoa District
Source: Author 2023

According to the 2022 Tanzania National Population Census, the district had a population of about 244,854 people; consisting of 124,379 males, and 120,475 females (URT, 2022). The main economic activities in the district include agriculture and livestock raising (Kondoa District Profile, 2020). Moreover, the crops that are cultivated in the district include maize, leguminous crops, paddy, bananas, fruits, vegetables, sun flower, and beans (Kondoa District Profile, 2020). The district has a semi-arid ecological zone and dry savannah type of climate, which is characterized by a long dry season, and unimodal and erratic rainfalls between November/December and April. It receives an average of 500–1,000mm of rainfall per annum in the lowlands, and between 800–1,500mm per annum in the highlands; with an average temperature of about 21^0C (Kondoa District Profile, 2020; Swai, 2017).

Kondoa District was purposely selected based on a range of criteria. Unlike other districts in Dodoma Region, it experiences frequent soil erosion that causes land degradation due to climate change, hence affecting agriculture productivity (Kondoa District Profile, 2020). Also, the district hosts many agropastoralists (48,579) compared to the other districts of Dodoma Region. The five villages were purposely selected based on the severity of the impacts of climate change, and the presence of a large number of agropastoralists in the district (Kondoa District Profile, 2020; Ward Reports, 2022). According to the village household registry for 2023, which was acquired during the pre-visit at the research site, there were 798 households engaged in agropastoral activities in Mauno Village, and 1441 similar households in Mtiryangwi Village. Also, there were 511, 761, and 752 households in Ihari, Chubi, and Atta villages, respectively, engaged in agropastoral activities. Thus, a total of 4263 households participated in agropastoral activities in the five villages (Ward Reports, 2022).

3.2 Research Design, Sampling Procedure and Sample Size

A mixed research approach was adopted, involving the collection of both quantitative and qualitative data for cross-validation. Also, the study adopted a cross-sectional design. The reasons for choosing a cross-sectional design is that it involved the gathering of information from a representative population at a single point in time, through structured questionnaires and interviews (Creswell, 2014). Moreover, the study employed a multistage sampling procedure for several reasons. First, Kondoa District was purposely selected because it is one of the semiarid areas with a large number of agropastoralists and notable gender inequalities. Secondly, five wards were purposefully selected due to the fact that they were predominantly inhabited by agropastoralists. Thirdly, for each ward, one village was randomly chosen. Furthermore, purposive sampling was also used to choose key informants and participants in focus group discussions (FDGs). Probability sampling techniques—which included stratified and simple random sampling—were

employed in choosing a representative sample. To start with, members of agropastoral groups were classified as men and women using stratified sampling techniques; and then simple random sampling was adopted in choosing men and women who were engaged in agropastoral activities.

The sample size of the study was 366 households, obtained through the Yamane (1967) sample size calculation formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where: n = the sample size
N = the total number of households (for all five villages)
e = the level of precision (an error of five percent).

$$n = \frac{4263}{1 + 4263(0.05)^2} = 366$$

The obtained sample size was used to calculate the proportional number of households in each village as indicated in Table 1, using the following formula:

$$nv = \left(\frac{nt}{N}\right) n$$

Where:
nv = proportional sample size of households per village
nt = total number of households per village
N = total number of households in all villages
n = sample size

Since the study was focused on gender, the representative samples in each village were divided into two strata (of men and women), and random sampling were employed to select equal number of representative men and women who were engaged in agropastoral activities.

Table 1: Population and Sample Size by Villages for Men and Women

Village	Population	Sample by Village	Gender	
			Male	*Female*
Mauno	798	69	34	35
Mtriryangwi	1,441	124	62	62
Ihari	511	44	22	22
Chubi	761	65	33	32
Atta	752	64	32	32
Total	**4263**	**366**	**183**	**183**

Source: Fieldwork survey, 2023

3.3 Data Collection

The quantitative data for the study was collected through a household survey of 366 households using a structured questionnaire. To meet the study objectives, information like normal household gender roles, and how the roles were affected by climate change—and particularly drought—was captured. The qualitative data was collected through interviews with key informants and focus group discussions (FGDs). Furthermore, also collected through these methods was information on how men and women were affected by climate change, and household division of labour between men and women within households. In-depth interviews were conducted to 20 key informants, and 70 FGD participants.

The key informants included the District Agricultural, Livestock and Fisheries Officer (DALFO), District Environmental and Solid Waste Management Officer (DESWMO), ward executive officers (WEOs), ward extension officers (WEXOs), village executive officers (VEOs) and village chairpersons. In all five villages, two (FGDs)—comprising of 7 men and 7 women—were conducted. The chosen individuals were thought to have direct stakes in agropastoral activities; and were aware of climate change and related effects.

3.4 Data Analysis

The quantitative data was entered and coded using the IBM SPSS (version 25) software. Further, it was analysed using descriptive methods such as frequencies, percentages and inferential statistics (specifically the Chi-square test). Besides, the significance of the results of specific variables was indicated by p-values. Also, cross-tabulation was used to disaggregate the data by gender, based on men and women. A content analysis method was employed to analyse the qualitative data as the method helps to highlight the setting in which documents are created to describe a phenomenon (Bryman, 2016). Moreover, the data was condensed into the smallest feasible meaningful informational units and themes, and then summarized to include crucial information relevant to the study's objectives.

4. Results and Discussion

4.1 Household Division of Labour to Agropastoralists Based on Gender

The results in Table 2 demonstrate a statistically significant difference ($\chi^2 = 55.33$; p=0.001) in the participation of men (72.7%) and women (33.9%) in grazing activities. The greater number of men in grazing was due the traditional nature of many rural communities, where men are mostly responsible in the management of livestock. Moreover, the little involvement of women in grazing activities was attributed to their involvement especially in all household chores. These results align with those of studies by Abbasi et al. (2019), Nagasha et al. (2019) and Mamkwe (2020): who all noted that, in most cases, men were in charge of grazing livestock.

Table 2: Households Division of Labour to Agropastoralists Based on Gender

Role	Gender		χ^2	p-value
	Male	Female		
Farming				
No	9(4.9%)	4(2.2%)	1.99	0.158
Yes	174(95.1%)	179(97.8%)		
Grazing				
No	50(27.3%)	121(66.1%)	55.33	0.001
Yes	133(72.7%)	62(33.9%)		
Fetching water				
No	108 (59.0%)	36(19.7%)	59.35	0.0001
Yes	75(41.0%)	147(80.3%)		
Firewood collection				
No	151(82.5%)	53(28.96%)	106.36	0.001
Yes	32(17.5%)	130(71.04%)		
Household chores				
No	138(75.4%)	13(7.1%)	176.15	0.0001
Yes	45(24.6%)	170(92.9%)		
Fodders collecting				
No	181(98.9%)	178(97.3%)	1.31	0.252
Yes	2(1.1%)	5(2.7%)		
Pasture management				
No	176(96.2%)	172(94.0%)	0.95	0.334
Yes	7(3.8%)	11(6.0%)		
Milking				
No	124(67.8%)	61(33.3%)	43.38	0.001
Yes	59(32.2%)	122(66.7%)		
Caring small & sick livestock				
No	97(53.0%)	53(29.0%)	21.87	0.0001
Yes	86(47.0%)	130(71.0%)		

Source: Field Survey 2023 (Significant at 95% confidence interval)

Similar results were observed through FGDs in Chubi Village, where it was noted that grazing was primarily done by men. However, they reported that, although a few number of women were engaged in grazing activities, they normally did so on a fallow land close to their homes. For instance, during one FGD, a woman participant at Chubi Village said:

> "*Before my husband passed away, he was in charge of grazing our cattle and marketing its products. Currently, the children and I do the grazing; and when the children go to school, I ask my neighbours to help me.*"

Also, a man from Atta Village noted*:*

> *"In our community, grazing is mainly done by men because the pastures are found far away from home due to prolonged drought in our village. However, few women participate in grazing activities on nearby fallow grounds, as pastures are found far away from home."*

The differences between men and women respondents in respect to water fetching have been noted from the results at (χ^2 = 59.35; p=0.0001). These results show that a majority of women (80.3%), compared to men (41.0%), participated in fetching water. The results regarding fetching water were linked to the cultural norms in many African countries, where such household tasks are largely assigned to women. Studies by Mdemu (2021) and Galwab et al. (2024) also reported that women and girls were in charge of fetching water for domestic use in most farming communities. However, during FGDs, participants in all five studied villages disclosed that although women were the ones responsible for fetching water for domestic use, men sometimes assisted their wives in the task when the latter were sick or pregnant.

Furthermore, as far as firewood collection was concerned, the results showed a statistically significant difference between men and women (χ^2 =106.36; p= 0.001). The results in Table 2 indicate that women (71.04%) were involved in the collection of firewood, compared to men (17.5%). As indicated earlier, the results are likely due to the fact that the gender division roles of particular societies may influence their engagement in certain activities, firewood collection being one of these activities. One of the main reasons is that since women, especially those living in rural regions, are responsible for cooking, and firewood is their main source of energy, then they are responsible for hewing firewood. The results align with Galwab et al. (2024), Venance and Pauline (2021), and Mdemu (2021): all of whom found that women were primarily in charge of gathering fuelwood, particularly in rural areas.

Similarly, the Village Executive Officer (VEO) of Mauno Village reported that gathering firewood and fetching water was typically done by women and girl-children in many villages of the district. This was corroborated by one male discussant from Mtiryangwi Village, who was heard saying:

> *"Ever since I got married, I have stopped doing some activities in my house, and firewood collection is one of those activities. My wives and children are the ones who collect firewood for domestic use. I'm the head of my family. I can decide what to do because I have three wives; and all are happy, and agree with me in my decisions."*

The results in Table 2 also show significant disparity (χ^2 =176.15; p= 0.0001) between men and women in terms of their participation in household chores. The results indicate that more women (92.9%), compared to men (24.6%), engage in domestic activities. Women in the studied area perform various domestic tasks, including the preparation of family meals, washing and cleaning dishes, and bathing younger family members. These results are likely due to traditional norms of most African countries that often assign domestic tasks to women. These results also concur with those of other studies, such as Mdemu (2021) and Venance and Pauline (2021), who likewise found that domestic activities were primarily done by women in most rural areas.

Moreover, gender disparities were seen during milking cows in the study area at (χ^2 =43.38; p= 0.001). The findings in Table 2 indicate that more women (66.7%), compared to men (32.2%), were involved in milking cows. Likewise, studies by Mamkwe (2020), and Omolo and Mafongoya (2019), showed that in pastoral and agropastoral communities, milking and processing milk are primarily done by women. The FGD participants similarly observed that, in their agropastoral communities, milking is normally done early in the morning (4 am up to 5 am) before the cattle are taken for grazing; or in the evening (6 pm up to 9 pm), when the livestock return home from grazing. As such, women are compelled to wake up very early in the morning, and sleep late to complete milking activities.

Furthermore, a significant difference (χ^2 =21.87; p= 0.0001) was noted between men and women as regards the caring of small and sick livestock. The results in Table 2 show that more women respondents (71.0%), compared to men (47.0%), reported that the caring of small and sick livestock was a chore traditionally assigned to women, as it was often performed along with other domestic tasks. These findings are similar to those of Ayub et al. (2023), who reported that women cared for calves, sick livestock, or goats left at home because they could not travel long distances in search of scarce pastures and water during droughts. During an FGD at Chubi, the participants also reported that while women were heavily engaged in diverse household chores, they also took care of small and sick livestock that could not travel long distances for pasture.

4.2 How Climate Change Affects the Gender Roles of Agropastoralists

4.2.1 Spending Many Hours Searching for Pasture

The study findings in Table 3 show a statistically significant disparity (χ^2 = 77.00, p= 0.001) between men and women, especially in how climate change affected them regarding time spent in the search for pastures. The results revealed that a significant proportion of men (85.3%), compared to women (41.0%), spent a lot of time (10–15 hours) searching for suitable grazing areas, especially during times of prolonged drought in the study area.

The larger number of men searching for pasture was attributed to the cultural norm that men are the primary owners and managers of livestock, and are responsible for grazing mostly in rural areas. The WEOs also reported that climate change—and particularly the onset of droughts—affected the availability of pasture and water, impelling men to walk long distances and spend a lot of time searching for pastures and water for livestock.

4.2.2 Spending Many Hours Fetching Water

The Tanzania National Water Policy (NAWAPO) (2002) proposed a prescribed timeframe of 30 minutes, or a distance of 400 meters, to access water. This time/distance incorporates walking to a water source, waiting/queueing,

collecting water, and walking back. The results in Table 3 show that there is a statistically significant difference (χ^2 = 55.88; p= 0.001), based on gender, in the effects of climate change on fetching domestic water.

Table 3: Effects of Climate Change on the Gender Roles of Agropastoralists

Role	Gender		χ2	p-values
	Male	*Female*		
Spending hours for pasture search				
No	27(14.7%)	108(59.0%)	77.00	**0.001**
Yes	156(85.3%)	75(41.0%)		
Spending hours in water fetching				
No	150(82.0%)	81(44.3%)	55.88	**0.001**
Yes	33(18.0%)	102(55.7%)		
Increase of Normal personal roles				
No	98(53.5%)	35(19.1%)	46.88	**0.001**
Yes	85(46.5%)	148(80.9%)		
Search for jobs away from home				
No	52(28.4%)	98(53.5%)	23.90	**0.001**
Yes	131(71.6%)	85(46.5%)		
Long distance for firewood collection				
No	158(86.3%)	72(39.3%)	86.54	**0.002**
Yes	25(13.7%)	111(60.7%)		
Spending hours for fodder collecting				
No	161(88.0%)	157(85.8%)	0.38	0.536
Yes	22(12.0%)	26(14.2%)		
Shared gender roles				
No	15(8.0%)	13(7.0%)	0.16	**0.694**
Yes	168(92.0%)	170(93.0%)		
Shifting of responsibilities				
No	5(2.7%)	2(1.1%)	1.31	0.252
Yes	178(97.3%)	181(98.9%)		

Source: Field survey 2023 (Significant at 95% confidence interval)

In all five studied villages, a majority of the women (55.7%), compared to men (18.0%), said they spent many hours (2 to 6 hours) during the dry season to fetch for water; and sometimes walked long distances (2 to 5km) in search of water. This was also confirmed by the VEO of Ihari Village, who reported that, during the dry season, women are likewise forced to use traditional wells that are found far away (up to 5 km) from their homes to get water for domestic use, because village water pipes do not supply enough water. As such, there is an inadequate water supply during the dry season due to prolonged droughts as a result of climate change effects; hence, forcing women to queue for water for long periods because the village's taps produce little water. These results are in

line with the findings by Mamkwe (2020), Nzengya and Maguta (2021), and Schwerhoff and Konte (2020): all of whom found that women were disproportionately affected by climate change-related water scarcity because they bear the burden of traveling long distances, and spending many hours to collect water.

4.2.3 Increase of Normal Personal Routine/ Roles

Table 3 indicates a statistically significant disparity (χ^2 = 46.88; p= 0.001) regarding routine tasks based on gender due to climate change. The results show that the majority of women (80.9%), compared to men (46.5%), reported that their normal routine roles had increased due to impacts of climate change. For instance, due to negative impacts, men were forced to migrate in search of pastures, which caused families to separate and/or divorce for extended periods. This also compelled women to take on extra responsibilities by handling tasks that had previously been done by their husbands. Furthermore, climate change may potentially result in the use of new farming methods, so placing additional responsibilities on individuals; and mainly women. Likewise, studies by Galwab et al. (2024), Eneji et al. (2020) and Goodrich et al. (2017) found that women experience an increased gender burden as a result of additional workload imposed on their original schedules due to the effects of climate change.

4.2.4 Searching for Jobs Away from Home

The findings show a statistically significant difference (χ^2 = 23.90; p= 0.001) between men and women when it comes to searching for jobs away from home. Table 3 shows that the majority of men (71.6%), compared to women (46.5%), were working away from their homes looking for alternative sources of income to support their families. This might have also been associated with the lower education level among women, compared to men, which restricted their ability to seek for alternative work opportunities. Hakansson (2022) also noted that the decrease in agricultural yields caused by the adverse impacts of climate change forced men to migrate to different regions in search of employment opportunities, and ensure their survival. Similarly, the impact of climate change has resulted in the reduction in agricultural and livestock production, compelling men to relocate to other areas in search of alternative jobs to support their families (Nzengya & Maguta, 2021).

During FGDs with men at Chubi Village, it was reported that prolonged droughts, which in turn affected agricultural production, forced men to go to other areas to pursue alternative activities for survival. They added that the relocation of men to other areas did not only disturb men, but also altered gender roles, particularly for women who had to perform their husbands' activities, as well. This situation overburdened women because they found it hard to perform men's tasks, such as grazing.

4.2.5 Walking Long Distances Collecting Firewood

When it came to walking long distances to collect firewood, Table 3 indicates that there was a statistically significant difference (χ^2 = 86.54; p= 0.002) in the effects of climate change between men and women respondents. The study results indicate that the majority of women (60.7%), compared to men (13.7%), said they usually went far away from their homes to collect firewood. It was reported that women walked between 4 and 8 hours searching for firewood. During one FGD, a woman from Mauno Village said:

> *"In our village, deforestation is high due to prolonged drought; we are forced to walk long distances of up to 10 kilometres to collect firewood. This is necessary because firewood remains a primary source of energy in our community."*

5. Conclusion and Recommendations

The findings of the study indicate that climate change has impacted and changed the gender roles of agropastoral communities in the study area. However, women have been more affected by climate change effects, particularly drought, than men. In addition, unlike men who were more involved in grazing, women were overburdened because they were more involved in household tasks—e.g., gathering firewood, fetching water, milking cows, and caring for small and sick livestock. Men were affected in a different manner as they had to spend a lot of time searching for pastures and seeking for jobs away from home. To address this overburdening of one gender due to the ill-effects of climate change, the government and other stakeholders—including non-governmental organizations (NGOs)—need to implement community-wide education and awareness initiatives to address climate change challenges, and encourage equitable participation of men and women in household chores. Additionally, policies related to climate change should take into account the specific needs and vulnerabilities of women and men in marginalized groups, such as agropastoralists.

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