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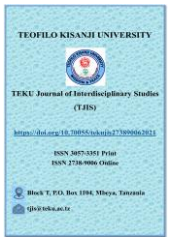

Research Paper

Assessing the Influence of Climate Change Stressors on Family Conflicts and Social Cohesion in Iramba District, Tanzania

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ABSTRACT

The study investigates the influence of climate change stress on family conflicts in vulnerable communities in Iramba District, Tanzania. The research uses a case study approach, with random and purposive sampling, to collect quantitative data using questionnaires and qualitative data using focus groups. The sample size is 168. Quantitative data were analyzed using SPSS version 21. The qualitative data were analysed thematically. The study found significant correlations between climate stressors such as rainfall patterns, temperature changes in the region over time, resource scarcity, economic instability, increases in disease and pests, and family conflicts. The research uncovered a range of community-initiated approaches aimed at mitigating these tensions. These strategies included diversifying family livelihoods, enhancing education on climate change, managing resources collaboratively, and fostering social networks. The results underscore the necessity of employing varied intervention methods to tackle the stresses induced by climate change and domestic disputes. It advocates for creating cohesive programs that intertwine climate adaptation with social support, bolstering community resilience and establishing effective conflict resolution frameworks.

Keywords: *Climate Change; Family Conflict; Vulnerable Communities; Traditional Approaches; Climate Adaptation; Community Resilience*

1. Introduction

Climate Change (CC) is causing global challenges and affecting families worldwide by increasing competition for resources such as food, water, and shelter due to more frequent and severe weather events (Joseph 2022). This deficiency of resources leads to tensions and conflicts within families as they struggle with uncertainties and stress brought by CC (Brochmann and Gleditsch, 2012, Gleditsch et al. 2006). Environmental shifts caused by rising sea levels and droughts further disrupt community cohesion (Kingu 2020) and family structures (Gleditsch et al. 2006, Koubi 2019). Therefore, the ramifications of climate change are not solely confined to the amplification of resource scarcity; they additionally aggravate social instability, thereby destabilizing community resilience as well as family dynamics.

In Africa, where agriculture and pastoralism are important sectors, CC has devastating impacts (Joseph, 2022; Kotir, 2010). Furthermore, as Kingu (2020) highlights, a significant proportion of Africa's population depends on agriculture and livestock farming (pastoralism), which is considered the continent's main economic engine (Kabote et al., 2017; Kingu, 2020).

CC poses a significant threat to ecosystems and communities in East Africa, particularly in Tanzania (Kingu, 2020, Joseph 2022). Tanzania, continues to experience heavy impacts of CC, with rising temperatures eventually leading to flooding after the great drought periods. All of this environmental degradation reduces crop yields, reduce water resources, and increase health risks (Mayaya et al., 2015; Chang'a, 2017). Increased temperatures destroy the habitats of many plant and animal species. Hence, long periods of extreme drought, sometimes suddenly followed by flooding, are a characteristic of erratic precipitation that has set off unfortunate chain events consisting of agricultural failure, famine, and human migrations (Chang'a et al 2017).

The Iramba district in Tanzania has seen a wave of the adverse impacts of climate change more than ever. It is mainly due to the heavy reliance on agriculture and pastoralism (Kabote, 2018); that negative climate change has caused irreparable damage to the area.

This threatening climate change problem has caused worldwide environmental distress related to the surging number of family conflicts, such as a high divorce rate that has hiked up to 3.3 percent (Kabote, 2018; Nombo et al., 2015). Some researchers have identified changing weather patterns as being one of the reasons that families break up (Chang'a et al., 2017), thereby being consistent with the rise in the divorce statistics (Huang and Ma 2024); the scarcity of food and water, especially due to environmental stress has only been some of the major factors (Nombo et al., 2015). Studies have already shown an unveiled link between environmental stress and the social fabric of a community (Jones and Boyd, 2011; Joseph 2022). These stresses underline the continued need for more investigation to find out how much the environment-induced stressors are a source of the emergence of family conflicts in the Iramba district.

Additionally, the unique social systems and mother-child relations offer valuable insights into the growth of these environmental pressures (Kabote, 2018). The historical and socio-economic contexts also play a vital role in shaping network responses to these demanding situations in Iramba (Kabote, 2018). The district's environmental characteristics, which include soil quality, water sources, and geographical capabilities, in addition, differentiate it from adjacent areas, for this reason, justifying a concentrated examination of Iramba as an awesome case. This study's objectives are to investigate the impact of climate alternate stressors on familial conflicts and social concord within the Iramba District, Tanzania, and, at the same time, to find out some possible ways for increasing the capacity of the model and how to resist weather trade.

Based on this context, the study identifies two main objectives

i. To explore the climate change stressors that cause family conflicts in the study area
ii. To explore community-driven coping strategies and adaptive mechanisms to mitigate family conflicts in light of climate change stressors.

This study explores climate change stressors in Iramba District, highlighting their impact on family discord and social tensions. It urges collaboration among policymakers, stakeholders, NGOs, and communities to develop innovative solutions. Additionally, it investigates Indigenous coping strategies vital for resilience and social cohesion amidst these challenges.

2. Methodology

2.1 Description of the Study Area

The study took place in the Iramba District of central Tanzania, between latitudes 4° and 4.3° South and longitudes 34° and 35° East (Figure 1) (IDCR, 2015). The district's altitude ranges from 1,000 to 1,500 meters above sea level, creating specific climatic conditions. Iramba receives annual rainfall of 600 mm to 800 mm, which is often inconsistent, leading to drought and low precipitation (IDCR, 2015). This rainfall variability negatively affects agriculture and water availability, causing food production issues and family conflicts (Kabote et al., 2017; IDCR, 2015). The semi-arid climate and reliance on agriculture make the area vulnerable to climate change, contributing to socio-economic problems and increasing family tensions, including higher divorce rates (Nombo et al., 2015). Iramba district was selected for its significant social and environmental challenges related to climate stress and family discord, highlighting the need for immediate action.

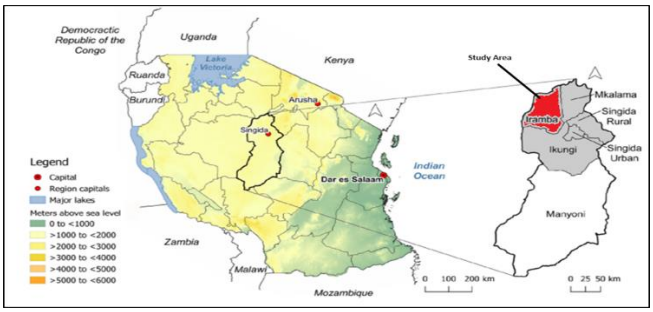

Figure 1. The map of Tanzania showing the Iramba district located in Singida region, Tanzania

2.2 Research Design

The study used a dual sampling strategy, combining random and purposive techniques. Random sampling was used for household surveys, ensuring equal probability of selection and enhancing generalizability. Ward Executive Officers provided a comprehensive list of all households in the district. Purposive sampling was used for field visits, targeting individuals over 35 years old with at least three decades of experience observing climate change. These individuals, with their profound, lived experiences of climate impacts, played a significant role in enriching the qualitative data. Their contributions, particularly those who could provide longitudinal perspectives on the evolving challenges faced by their communities, were of immense value to the study. The irregular precipitation patterns intensify water resource scarcity and agricultural practices, directly affecting the economic survival of those whose livelihoods are linked to agrarian and pastoral activities.

2.3 Data Collection

This research was specifically tailored to the local context, focusing on four wards in the district: Ndongo, Shelui, Kimampanda, and Matekente. It employed a mixed-methods approach, combining primary and secondary data sources. The primary data, gathered through structured questionnaires, household surveys, and focus group discussions, was complemented by secondary data from scholarly articles, meteorological data archives, and authoritative online databases, with meteorological data sourced from the Tanzanian Meteorological Agency.

The sample size was determined using Yamane's (1967) formula for sample size calculation, with an additional 15% buffer to account for non-responses, resulting in a final sample of 114 respondents (Table 1).

$$n = N/ [1+N (e)^2]$$

where *n* represents the sample size, *N* denotes the sampling frame, and *e* represents the prediction error at 10%.

Table 1: The number of respondents filled the questionnaires through simple random sampling

S/N	Wards	Number of Households	Estimation	Number
1	Ndongo	4162	115/15389 x 4162	31
2	Shelui	4588	115/15389 x 4588	34
3	Kimampanda	2604	115/15389 x 2604	19
4	Matekente	4035	115/15389 x 4035	30
Total				**114**

Source: Field Data 2023

The questionnaires were pre-tested in various wards of the Iramba District before actual data collection (Kothari, 2011; Maxwell, 2012). Both Single Focus Group Discussions (SFGDs) and Mini Focus Group Discussions (MFGDs) were used to gather in-depth insights from participants. Following best practices from Rabiee (2004) and Barbour (2010), the FGDs encouraged open dialogue while allowing exploration of nuanced perspectives. Participants were purposively selected based on their extensive experience with climate change impacts and stratified by age and gender to ensure diverse viewpoints. This methodology facilitated a comprehensive investigation of experiences and coping mechanisms, ensuring that all aspects of climate change in Iramba District were considered and a wide array of perspectives were captured.

Single Focus Group Discussions (SFGDs) were held in district wards, engaging 48 participants (24 male, 24 female) to share experiences of climate-induced stressors and family tensions. These sessions, guided by skilled facilitators, followed a semi-structured format, allowing for an equal expression of views in an inclusive environment that fostered diverse perspectives within an 8-10-minute timeframe.

Simultaneously with SFGDs, Mini Focus Group Discussions (MFGDs) were held in Iramba town. Six experts on climate change and community dynamics discussed the practical implications of climate change's impact on local communities, including family conflicts, adaptation strategies, and governance roles. The conversations underscored the importance of societal frameworks, community support, and local governance in aiding families to cope with climate change stressors, making the findings highly relevant to our understanding of community dynamics.

2.4 Ethical Considerations

Ethical considerations during data collection included informed consent, confidentiality, and voluntary participation. Participants were fully informed about the study's purpose and procedures and consented without coercion. Data was securely stored to maintain confidentiality and anonymity, with findings reported in aggregate form. Participation was not just voluntary, but also a testament to the respect for individual autonomy, allowing individuals to withdraw at any time without negative consequences. The research respected local needs and cultural differences, using appropriate language for better communication. Special care was taken to protect vulnerable groups, with permission obtained from ward leaders and family heads for participation. These actions were aimed to safeguard participants' rights and well-being while upholding research integrity.

2.5 Models of Analysis

In this study, two models were employed. The *chi-square test of association* was employed in both objectives, thus i) the relationship between Climate Change Stress identified and family conflicts in the study area and ii) community-driven coping strategies and adaptive mechanisms to mitigate family conflicts. On the other hand, the *logistic regression model*, a powerful tool, was employed exclusively in objective two of this study, adding depth to our research.

2.5.1 Chi-square tests model

Chi-square tests were used to test whether possible responses of categorical variables were associated with this study. The Chi-Square Test statistic model was

$$X^2 = \sum \frac{(Q_i - E_i)^2}{E_i} \quad (1)$$

where:

χ^2: the chi-square test statistic
$\sum$: summation of values
O_i: the observed frequency
E_i: the expected frequency
$(Q_i - E_i)^2$: the squared difference between the observed and expected frequencies

Rules of Decision: The null hypothesis was rejected when the p-value, as a crucial indicator, was less than 0.05. This p-value, derived from the Chi-Square statistic, was compared with the critical value from a Chi-Square distribution table at an appropriate number of degrees of freedom and the chi-square level. If the calculated value exceeded the critical value, the null hypothesis was rejected. Therefore, the calculated value of the chi-square statistic and its running p-value were used to determine if the observed relationships were sufficient to confirm their validity.

2.5.2 Logistic Regression model

This logistic regression equation explores how community adaptation strategies can reduce family conflicts related to climate change stress. Logistic regression helps analyze binary or categorical outcomes, offering insights into these complex dynamics. Therefore, the model equation used is hereunder.

$$\text{Logit(p)} = \left(\frac{\text{P}}{1-\text{P}}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \cdots \beta_k X_k \quad (2)$$

Where:

logit(p): The logarithmic odds of successfully resolving familial disputes.

1-p: the chance that the coping mechanism does not work.
β_0: the intercept, serving as the baseline value when all other predictors are set to zero.
X_1: the management of collective resources.
X_2: mechanisms for resolving conflicts.
X_3: diversification of livelihoods.
X_4: development of social networks.
X_5: education focused on climate change awareness.
X_6: construction of wells and dams.
β_k: coefficients that quantify the impact of each respective X_k.
X_k: The independent variables

2.6 Data Analysis

The quantitative data were analysed using Statistical Package for the Social Sciences (SPSS) software version 21 and Crosstabs (Chi-

square). The qualitative data were analysed substantively and thematically using a dual analysis methodology. Thematic analysis identified recurring patterns and themes, while substantive analysis explored the meanings and implications of these themes. The quantitative data collected using questionnaires were coded and then processed using Statistical Package for the Social Sciences (SPSS) version 21, as Field (2009) suggested. Therefore, applying these mixed methods resulted in a comprehensive examination of the data, allowing both a statistical test of the relationships and an expanded exploration of the contextual implications underlying the observed results.

3. Results

3.1 Respondents' Socioeconomic Characteristics

The results for respondents' socioeconomic characteristics Are as shown in Table 2. Women made up 51.8% of respondents, slightly outnumbering men (48.2%). This suggests that many households are female-headed, possibly indicating gender-specific challenges in managing CC impacts. The majority of respondents (53.5%) were aged 51-70, a group likely to experience the pressures of climate change more acutely, potentially leading to increased family stress. Marital status data revealed that while 53.5% were married, 32.5% were separated or divorced, suggesting a significant link between CC stress and family breakdowns. Education levels were relatively high, with 71.9% having secondary education or higher, potentially equipping individuals with better tools to manage climate-related challenges.

Table 2: Socioeconomic characteristics of respondents in Iramba district, Tanzania

S/N	*Item*	*Number of Respondents*	*Proportion*
		Frequency of people	*(%)*
	Gender of respondents		
1	Male	55	48.2
	Female	59	51.8
	Age		
	34 -50 years	34	29.8
2	51- 70 years	61	53.5
	70 Above years	19	16.5
	Marital Status		
	Single	11	9.6
	Married	61	53.5
3	Widow	05	4.4
	Separated	18	15.8
	Divorced	19	16.7
	Education level		
	Primary Education	33	28.1
4	Secondary Education	35	30.7
	Above Secondary Education	47	41.2
	Economic Activities*		
	Beekeeping	100*	87.7*
5	Subsistence farming	79*	69.3*
	Small Business	96*	84.2*
	Pastoralism	77*	67.5*

(*) multiple responses **Source**: Field data, 2023

Most respondents were engaged in multiple economic activities, 87.7% in beekeeping, 84.2% in small businesses, 69.3% in subsistence farming, and 67.5% in pastoralism. This diversification reflects attempts to adapt to climate variability, though reliance on climate-sensitive livelihoods like farming and pastoralism still makes households vulnerable to resource scarcity, which can increase family conflicts.

3.2 Climate Change Stress Influencing Family Conflicts

The key climate change (CC) stressors identified to contribute to the rise in family conflicts are as presented in Table 3.

Table 3: CC stressors enhancing Family conflicts* identified in Iramba district, Tanzania (N=114)

CC stress	Responses		Chi-Square Test		
	Frequencies	%	Value	df	P-Value
Alteration of rainfall patterns	92*	80.7%*	4.130[a]	1	0.042
Temperature Change	88*	77.2%*	5.103[a]	1	0.024
Decline of income	89*	78.1%*	4.852[a]	1	0.028
Shortage of pastures	91*	79.8%*	4.366[a]	1	0.037
Strong wind	93*	81.6%*	3.900[a]	1	0.048

*Multiple responses **Source:** Field Data 2023

3.2.1Alteration of rainfall patterns

The study revealed that 80.7% of respondents (N=114) regarded changes in rainfall patterns as a critical climate change stressor influencing family conflicts. A chi-square test demonstrated a significant relationship (X^2 (1, N=114) = 4.130[a], p = 0.042) between these rainfall changes and increased disputes. This correlation aligns with 50 years of rainfall data indicating frequent precipitation fluctuations in the Iramba district, often below average during vital agricultural periods (see Figure 2). The graph demonstrates over 50 years of rainfall fluctuations, with below-average levels from 1979-1983, 1988, 1990-1993, 1995-1996, 1998-2010, 2012, 2014, 2016-2017, and 2021-2022. Such volatility likely exacerbates resource scarcity, heightening familial tensions. The findings underscore the adverse effects of environmental changes on family interactions and societal stability in the region.

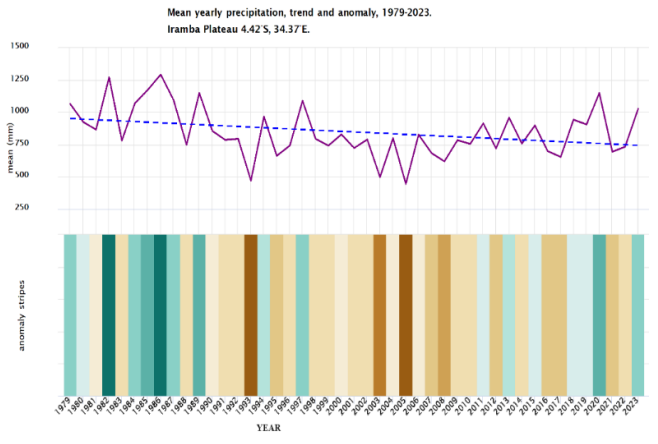

Figure 1: Mean yearly Precipitation, trend and anomaly 1979 – 2023 in Iramba District (Meteoblue, 2023)

3.2.2Temperature change overtime

The study found that 77.2% of respondents (N=114) identified long-term temperature changes, particularly drought conditions, as a significant factor contributing to family conflicts (Table 5). A chi-square test confirmed a strong association between temperature fluctuations and conflicts, with a chi-square value of 5.103[a] (p = 0.024). This statistical result, $X^2(1, N=114) = 5.103^a$, p = 0.024, underscores the critical role that rising temperatures play in exacerbating household tensions. Temperature increases, as one discussant from Ndongo Ward noted, have a direct impact on food production, limiting access to nutritious foods and causing stress within families:

> *"Temperature fluctuations greatly impact food production, limiting availability and making access to nutritious foods more difficult. This can cause stress and conflict in the family or home, as fathers sometimes fail to provide food for their wives and children" (FGD 2_JM, personal communication, November 11, 2023).*

The field results indicate that 77.2% of the respondents (see Table 5) perceive long-term temperature changes leading to drought in the area as influencing family conflicts. A chi-square test of independence was executed to explore the connection between temperature fluctuation and conflict. The outcomes revealed a significant association between temperature fluctuation and conflict, with a chi-square value of 5.103[a], signifying a strong relationship. The association's significance is further confirmed by the p-value of less than 0.024. The statistical notation for the results is presented as X^2 (1, N = 114) = 5.103[a], p = 0.024. The result indicates that an increase in temperature acts as a catalyst for family conflict and poses a threat to crops and biodiversity. One of the discussants in Ndongo Ward explains,

> "*Temperature fluctuations greatly impact food production, limiting availability and making access to nutritious foods more difficult. This can cause stress and conflict in the family or home, as fathers sometimes fail to provide food for their wives and children*" *(FGD 2_KJ, personal communication, November 11, 2023).*

The data depicted in Figure 3 presents the temperature trend over a span of more than 50 years, exhibiting anomalies that have contributed to the semiarid conditions in the district. The graph illustrates notable fluctuations in temperature over this period, particularly indicating above-average temperatures in the years 1981-1988, 1991-1996, 2002-2006, 2009-2012, 2015-2017, and in 2023. Conversely, instances of below-average temperatures were limited. Climate change's fluctuating temperatures impact agricultural productivity, leading to crop failures and stress within families. Economic strain exacerbates tensions, especially in decision-making processes, as evidenced by Table 5, Figures 3 and 4.

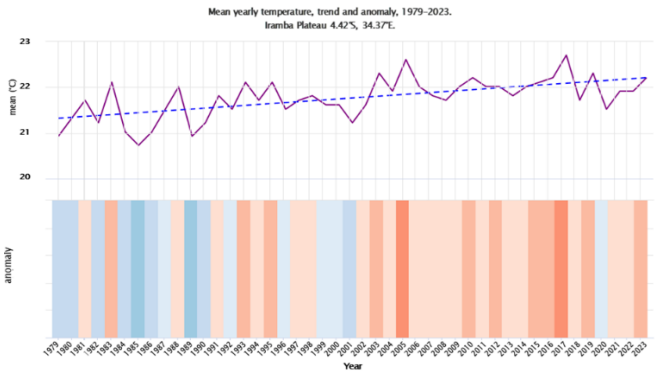

Figure 2: Mean yearly temperature, trend and anomaly, 1979-2023 (Meteoblue, 2023)

Figure 4 clearly illustrates the fluctuations of both rainfall and temperature in Iramba district over more than 50 years.

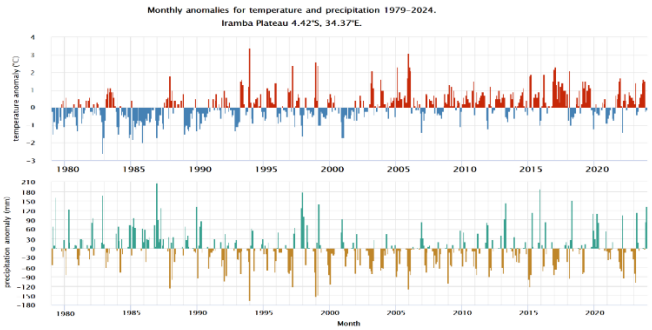

Figure 4: Anomalies for temperature and precipitation 1980 -2020 (Meteoblue, 2023)

3.2.3Shortage of pastures

As shown in Table 2, 79.8% of respondents (N=114) identified the shortage of pastures as a key driver of family conflicts in the district. The chi-square test further confirmed a significant association between the decline in pasture availability and the rise in family conflicts, with a chi-square value of 4.366 (p = 0.037). This result, X^2 (1, N=114) = 4.366, p = 0.037, indicates a clear link between environmental changes, specifically pasture scarcity, and increasing tensions within families. The discussant in Shelui Ward stated that,

> "*In our wards, the scarcity of pastures has led to conflicts among community members regarding the use and management of available pasture land. Each individual perceives their own needs as more important than others, resulting in tensions within families and strained relationships" (FGD 2_EL, personal communication, November 24, 2023).*

The above statement justifies that in resource-limited environments, conflicts arise due to competition for essential resources like pastoral land. Individuals or families often exacerbate their own needs, leading to escalating tensions within communities and familial structures. Therefore, this highlights the importance of equitable resource allocation and conflict resolution mechanisms.

3.2.4Decline and loss of income

The field findings in Table 2 indicate that 78.1% of respondents (N=114) reported a decline in income due to climate change, which has contributed to tensions and conflicts within families. A chi-

square analysis confirmed a statistically significant relationship between income decline and family conflicts, with a chi-square value of 4.852 (p = 0.028). These results, X^2 (1, N=114) = 4.852, p = 0.028, underscore the negative impact of climate change on household income, which, in turn, exacerbates familial tensions and conflicts. During the discussion in Shelui, one of the discussants stated that,

> *"The impacts of climate change have precipitated impoverishment and turmoil within our communities. The absence of a sustainable income has given rise to intrafamilial discord. The attainment of a stress-free existence is greatly impeded, as each family necessitates a viable means of subsistence. However, as climate change endures in our locality, the prevalence of discord is anticipated to escalate" (FGD 1_GM, personal communication, November 18, 2023).*

The statement highlights the intricate link between climate change, economic distress, and societal disunity. Climate fluctuations often hinder subsistence, especially in populations reliant on agriculture, natural resources, leading to fiscal instability and emotional strain. Hence, without stable income sources, households face increased pressures, causing conflict and compromising social cohesion.

3.2.5The outbreak of diseases and pests

The focus group discussions in Shelui, Ndongo, Kimampanda and Matekente wards revealed that the outbreak of diseases and pests has caused strife within households in the wards. The discussants stated that the eruption of pests and diseases creates tensions, disagreements and disharmony among family members. It was revealed that stress and uncertainty resulting from the outbreak increase any felt emotions, which in turn spiral over into quarrels and blaming within the household. Likewise, it was observed that disrupted gender roles, increased workload, and the resultant exhaustion contribute to tension and conflicts.

3.3 Community Responses and Family Conflict Adaptation Strategies

The results for adaptation strategies to mitigate family conflicts caused by CC stressors are shown in Table 4. The revealed strategies include collective resource management, traditional dispute resolution, diversifying livelihoods, workshops, and local wisdom to reduce vulnerability and end family conflicts. The study noted that these techniques range from community approaches to enriching livelihoods and sharing knowledge in workshops.

Table 4: Community Adaptation and Copying Mechanism for Family conflicts Solutions*

Coping Mechanism	Observed Frequency (O)	Percentage (%)	Chi-Square Value (χ^2)	df	P-Value	Odds Ratio (OR)	Coefficient
Collective Resource Management	97*	85.0	5.328[a]	1	0.021	2.1	0.742
Conflict Resolution Mechanism	94*	82.5	6.468[a]	1	0.011	2.5	0.916
Livelihood Diversification	95*	83.3	6.08[a]	1	0.014	2.3	0.833
Formation of Social Networks	99*	86.8	4.606[a]	1	0.032	1.9	0.642
Education About Climate Change	101*	88.6	3.913[a]	1	0.048	1.8	0.587
Wells and Dam Construction	93*	81.6	6.865[a]	1	0.009	2.7	0.993

(*) Multiple responses **Source**: Field Data, 2023

3.3.1Collective resource management

The findings of this study revealed that 85.01% (see Table 3) of the respondents (n=114) believe that a collective resource management strategy helps resolve family conflicts influenced by climate stress. Additionally, the chi-square test results indicate a statistically significant association between collective resource management and conflict resolution at ($\chi 2$ (1, N = 114) = 5.328[a], p <.021). The study's results, with a p-value below alpha 0.05, strongly suggest a correlation between cooperative efforts and successful dispute resolution in the study area. Further, the results of the odds ratio (OR) of 2.1 and the coefficient (β_k = 0.742) indicate an increase in solving family conflicts as the mechanism is adopted. This evidence positions collective resource management as one approach among many and an indispensable tool in combating the complex challenges CC presents to society and the environment.

3.3.2Support networks and solidarity

The formation of social networks as a strategy was highlighted by 86.8% (N=114) of the respondents (See Table 3). The independence of association was then examined to establish the relationship between variables of social networks and conflict resolution. The chi-square test results indicate a statistically significant association between collective resource management and conflict resolution at ($\chi 2$ (1, N = 114) = 4.606[a], p <.032). Importantly, an odds ratio (OR) of 1.9 and a coefficient (β_k =0.642) indicate a moderate positive effect when social networks are formed and implemented, underscoring their potential in conflict resolution.

During the discussion in Shelui, one of the discussants stood and stated that,

> *"I suggest that researchers, policymakers and practitioners can help by investing in community-building initiatives, promoting social unity, and facilitating information and resource sharing" (FGD 2_KL, personal communication, November 15, 2023).*

In alignment with the above statement, it is posted that the allocation of resources towards community cohesion and social solidarity is crucial for enhancing resilience against climate change and reducing intergroup hostilities. This involves strengthening communal relationships, distributing resources effectively, and promoting data dissemination to raise awareness about climatic hazards and accessible resources. Therefore, this approach promotes synergistic methodologies that address socio-demographic complexities and ecological challenges caused by climate variability.

3.3.3Traditional conflict resolution mechanisms

The study revealed that 82.5% (N=114) of the respondents pointed to forming a conflict resolution team in their areas as a strategy to mitigate family conflict caused by climate stress (see Table 3). On the other hand, the chi-square test results indicate that there is a statistically significant relationship between the variables at (X^2 (1, N = 114) = 6.468[a], p <.011). Since the p-value is smaller than the alpha level of .05. It permits the argument that traditional conflict resolution mechanisms and teams towards conflict mitigation play a significant role. The study noted that elders' wisdom and community dialogues are essential for reducing family conflict and building resilience. The process involves seven steps, from acknowledging climate impacts to rallying traditional authorities, engaging in dialogues, and employing indigenous insight. One of the discussants in Matekente stated,

> *"In our ward, traditional conflict resolution mechanism has strengthened communities and promoted harmony during environmental challenges"(FGD 1_WM, personal communication, November 15, 2023).*

The quotation emphasizes the significance of traditional conflict resolution methods in promoting communal unity amidst environmental challenges. It suggests that elders' wisdom and community dialogues can use pre-existing societal frameworks to resolve disagreements and strengthen resilience.

3.3.4Diversification of livelihoods

The study, conducted with a robust methodology, revealed a significant finding: 83.3% (N=114) of the respondents recognized livelihood diversification as a potent strategy for mitigating family conflict caused by climate stress. The chi-square test results further validated this, showing a statistically significant relationship between the variables at (X2 (1, N = 114) = 6.080[a], p <.014). The p-value, smaller than the alpha level of .05, confirms the effectiveness of livelihood diversification in mitigating family conflicts. The odds ratio (OR) =2.3 indicates that the likelihood of resolving family conflict is higher when this strategy is employed. The coefficient (β_k =0.833) underscores the positive impact of the strategy on conflict resolutions, instilling confidence in the research findings. Consistent with this finding, one of the Kimampanda discussants stated,

"*In our community, having diverse sources of income through various activities not only helps us cope with the unpredictable impact of weather patterns on traditional farming, but also reduces the strain on limited natural resources, which are often a source of conflict" (FGD 2_SM, personal communication, December 17, 2023).*

Income diversification is crucial for managing environmental and socio-political issues, alleviating resource pressure, enhancing resilience against climatic variability, and promoting social stability in resource-scarce regions, aligning with adaptive methodologies.

3.3.5Community workshops and education

The research revealed that 88.6% (N=114) of respondents stated that workshops were conducted in their district to provide climate change (CC) education and help reduce family conflicts caused by climate stress. This significant finding underscores the crucial role of educators and policymakers in implementing such initiatives. The chi-square test results showed a significant relationship between the variables at (X2 (1, N = 114) = 3.913[a], p < .048) as the p-value is less than the alpha value of 0.05. The odds ratio (OR) of 1.8 towards solving conflicts is higher when education about climate change is provided. On the other hand, the coefficient (β_k = 0.587) signifies the increase in resolving family conflicts when the mechanism is employed, further highlighting the importance of their work.

4. Discussion

The study explores the impact of climate change stressors on family conflicts and suggests community-driven strategies to reduce them. It reveals that climate change significantly contributes to conflicts through changes in rainfall, long-term temperatures, pasture shortages, income decline, and increased diseases and pests.

4.1 Climate change stress influencing family conflicts

The findings indicate that changes in rainfall patterns, a climate change stressor, are associated with an increase in family conflict, indicating a strong correlation between climate change-induced stress and family conflict. This highlights the complex relationship between environmental factors and social dynamics. According to the study, erratic rainfall patterns caused crop failure, water shortages, and insufficient food supply in households. In African traditions, the father is typically considered the head of the household. During droughts and food shortages, tensions can arise between spouses when the husband is unable to provide food for consecutive days, leading to conflict as the wife holds the husband responsible for failing to fulfil his duty to feed the family. The findings are consistent with those of Schinasi & Hamra (2017) and Sanz-Barbero et al. (2018), who found that impacts have effects on mental health and psychological well-being and are linked to conflict and violence, including between intimate partners.

Additionally, conflicts arise when a wife returns home late after fetching water from a distant location, leading to quarrels with her husband. The findings align with those of Koubi (2019), Kimaro et al. (2018), Gleditsch et al. (2006), and Brochmann and Gleditsch (2012), who found that water shortages and climate change are interconnected, leading to resource competition, disputes, and strained interactions at communal water points. Variable rainfall and water scarcity increase the risk of conflicts. The pursuit of crucial water resources merges with environmental transformation, causing societal unrest. Rainfall variability and climate change continue to impact communities, causing ecological flux and a fight for survival.

Also, the study revealed that shortage of pasture, was found to influence conflict between partners consistent with long-term temperature fluctuations. Both variables caused stress in the families. These results are consistent with the research findings of Schinasi and Hamra (2017), McLean (2007), and Vesco et al., (2021), who found that climate change is linked to conflict and violence, including between intimate partners. Kimaro et al. (2018) and Roche et al. (2020) also found that abnormal temperatures lead to conflict and make criminal proceedings more likely.

Furthermore, the study also found that a decrease in income leads to family conflicts at 78.1%, and the P-value of .028 shows a significant relationship between variables. Reduced financial resources cause parents to feel stressed and frustrated, leading to disagreements about money and how it should be used. This creates feelings of insecurity among family members and leads to arguments, conflicts, or breakdowns in communication. This result aligns with the research of Conger et al. (1994), who have also found

that financial stress increases conflicts between parents and marriages.

Moreover, the study showed that the emergence of diseases and pests has led to tension and conflicts within households. This aligns with the findings of Nordas and Gleditsch (2007), who discovered that the effects of climate change on the natural environment result in conflict. Disease outbreaks and changes in climate have significantly affected family dynamics, leading to disagreements and discord. It is crucial to promote resilient agricultural practices and provide disease-resistant crop varieties to improve communication and cooperation within families. Strategies to address these challenges and promote resilient agriculture are needed to mitigate the negative impacts of climate change on family dynamics in semi-arid areas.

These results highlight the need for interventions to mitigate negative impacts and strengthen community resilience to emerging family conflicts in the study area and other areas with similar situations.

4.2 Community Responses and Adaptation Strategies to Family Conflicts

The study emphasizes community-driven strategies for addressing family conflicts related to resource management, highlighting the importance of indigenous wisdom and community resilience. Key strategies include collective resource management, conflict resolution mechanisms, and educational initiatives on climate change impacts. The process involves seven steps: recognizing climate change effects and promoting dialogue with traditional authorities. It aligns with findings from Carmen et al. (2022) and Sanginga et al. (2007), which stress the value of local dispute resolution and collaborative efforts in resource allocation.

Concerning Indigenous knowledge, the study revealed that Indigenous wisdom and a culture of consensus are essential for resolving disputes and fortifying community defences against climate change. Protecting and integrating traditional conflict resolution methods into climate adaptation initiatives is imperative, particularly in arid regions such as the Iramba District. These findings are corroborated by research conducted by Reyes-García et al. (2022), Ullah et al. (2023), Berke et al. (2008), and Tilt and Gerkey (2016), which highlights that Indigenous communities possess a profound understanding of climate patterns and local ecosystems, thereby fostering interconnected networks based on local knowledge.

Furthermore, the results of this study align with those of Carmen et al. (2022) and Sanginga et al. (2007), which found that communities and organizations possess the authority to amend regulatory frameworks governing resource distribution and utilization. This authority creates an environment conducive to collaborative efforts by empowering local entities to resolve disputes. Additionally, it was noted that a comprehensive educational approach plays a critical role in reducing family-level conflicts and enhancing adaptation, resilience, and mitigation strategies in response to the impacts of climate change.

Additionally, the study found that livelihood diversification is increasingly recognized as a critical community-driven coping mechanism to alleviate family conflict due to the stress of climate change. This approach involves expanding and varying sources of income and economic activities to reduce dependence on a single resource, which is particularly important in areas severely affected by climate change. Local communities in Iramba have diversified their livelihoods by engaging in activities such as beekeeping and small businesses. The results of several studies, such as Cooper et al. (2008), Hailu and Hasan (2012), Gebru and Beyene (2012), Sadik et al. (2021), Achiba (2018), Bhatta and Aggarwal (2015), Teweldemedhin and Kapimbi (2012), Barrett et al. (2006), Brown et al. (2006), UNDP (2009) and Marschke and Berkes (2006) agree that diversification is a strategy to mitigate the effects of climate change at the family level. They found that diversifying livelihood activities on and increasingly off-farm is an important way for farmers to cope with adversity and effectively contribute to climate change adaptation. Furthermore, Sadik et al. (2021) and Achiba (2018) have pointed to the use of a combination of livelihood activities involving pastoralists and agro-pastoralist households to adapt to climate change and increase resilience. The collective evidence of Bhatta and Aggarwal (2015), Teweldemedhin and Kapimbi (2012), Hailu and Hasan (2012), Barrett et al. (2006), Brown et al. (2006), UNDP (2009), and Marschke and Berkes (2006) have found that diversification is a key decision for households as they use all means to respond to uncertainties arising from environmental and socioeconomic factors.

Community-driven initiatives such as workshops and educational programs used adaptive strategies to minimize family conflict. The study found that educational programs equip individuals and communities with vital knowledge and skills. Echoing this finding, Bhatta and Aggarwal (2015), highlights the prominent role of education in promoting awareness and behavior change for CC mitigation and adaptation. Hailu and Hasan (2012),states that education strengthens communities' capacities for mitigation and adaptation.

Therefore, the identifies community-driven conflict mitigation strategies that assure collective resource management, mechanisms for conflict resolution, diversification of livelihoods, education on the impact of climate change, and other measures mitigating family conflicts that support resilience.

4.3 Inconsistencies in findings

The findings presented reveal a mosaic of strategies aimed at mitigating familial conflicts induced by climate stress. Each coping mechanism holds statistical significance, underscored by chi-square tests, odds ratios, and coefficients that weave a compelling narrative of their impact. However, inconsistencies arise: the varying degrees of influence (β_k) across these strategies may point to disparities in their implementation or accessibility. Moreover, while the emphasis is placed on effectiveness, a critical gap remains in the exploration of barriers that hinder the adoption of these mechanisms and their long-term viability. Looking ahead, it becomes imperative to examine how socio-demographic factors such as gender, education, and income shape the uptake of these strategies, allowing for recommendations that are not only insightful but also tailored to specific community needs.

5. Policy Implications

The study suggests that policymakers should consider adopting comprehensive strategies to address climate change (CC) and mitigate family conflicts. Key policy implications include

promoting resilient agricultural practices, efficient water management, disaster preparedness, early warning systems, and community resilience programs. Training and social support programs can also help families cope with the challenges posed by climate change. Proactive interventions are crucial for addressing the impacts of climate change and fostering sustainable development. Integration of Traditional and Local Knowledge in Policy Framework: "The study points out how the traditional means of resolving disputes, along with local wisdom, which lay attention to agreeing to the welfare of the family and communal health, can easily be combined to contribute to conflict resolution." It is pertinent to mention that the policymakers should integrate traditional means of resolving disputes and local wisdom on a broader climate-change platform. An example is where elders. The study highlights the importance to Conduct Community participatory appraches during solving family conflicts. For example, the communities experiencing agricultural disruption may benefit from crop diversification workshops. To have maximal impact, practitioners should implement workshops that are accessible, inclusive, and designed around real issues that communities face. For instance, regions with water hazards could be trained in water harvesting methods.

6. Conclusion and Recommendation

6.1 Conclusion

The study highlights the contribution of climate change to family conflicts and how ecological changes affect relationships within households. It found that long-term temperature changes, climate-related stress on food supplies and prices, and lack of pasture land lead to financial difficulties and disputes within families. Disease outbreaks and pest infestations also add to household tensions. The study emphasizes the importance of community driven responses and adaptation strategies to reduce the negative climate impacts and strengthen community resilience, such as collective resource management, conflict resolution mechanisms, livelihood diversification, and use of social networks and information sharing.

6.2 Recommendations

This study presents several recommendations to enhance community resilience against climate change challenges. Key suggestions include designing policies for resilient crop varieties, promoting livelihood diversification, implementing local conflict resolution, and providing education on climate practices. Additionally, establishing health services to address climate-related illnesses, executing environmentally-friendly community projects for resource management, and ensuring government policy support for vulnerable communities through international cooperation are highlighted as critical measures for improvement.

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Conflicts of Interest

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Reference

Achiba, G. A. (2018). Managing livelihood risks: Income diversification and the livelihood strategies of households in pastoral settlements in Isiolo County, Kenya. *Pastoralism, 8*, 1–5. https://doi.org/10.1186/s13570-018-0120-x

Barbour, R. S. (2010). Focus groups. In I. Bourgeault, R. Dingwall, & R. de Vries (Eds.), *The SAGE handbook of qualitative methods in health research* (pp. 327–352). SAGE.

Barrett, C., Marenya, P. P., McPeak, J. G., Minten, B., Murithi, F. M., Oluoch-Kosura, W., Place, F., Randrianarisoa, J. C., Rasambainarivo, J., & Wangila, J. (2006). Welfare dynamics in rural Kenya and Madagascar. *Journal of Development Studies, 42*, 248–277. https://doi.org/10.1080/00220380500405394

Berke, P. R., Chuenpagdee, R., Juntarashote, K., & Chang, S. (2008). Human-ecological dimensions of disaster resiliency in Thailand: Social capital and aid delivery. *Journal of Environmental Planning and Management, 51*, 303–317.

Berkes, F. (2004). Rethinking community-based conservation. *Conservation Biology, 18*, 621–630.

Bhatta, G. D., Aggarwal, P. K., Poudel, S., & Belgrave, D. A. (2015). Climate-induced migration in South Asia: Migration decisions and the gender dimensions of adverse climatic events. *The Journal of Rural and Community Development, 10*(4), 1–23.

Brochmann, M., & Gleditsch, N. P. (2012). Shared rivers and conflict: A reconsideration. *Political Geography, 31*, 519–527.

Brown, R., Stephens, C., Ouma, J., Murithi, M., & Barrett, C. (2006). Livelihood strategies in the rural Kenyan highlands. *African Journal of Agricultural Resource Economics, 1*, 21–36.

Carmen, E., Fazey, I., & Ross, H. (2022). Building community resilience in a context of climate change: The role of social capital. *Ambio, 51*, 1371–1387. https://doi.org/10.1007/s13280-021-01678-9

Chang'a, L., Kijazi, A., Luhunga, P., Ng'ongolo, H., & Mtongor, H. (2017). Spatial and temporal analysis of rainfall and temperature extreme indices in Tanzania. *Atmospheric and Climate Sciences, 7*, 525–539. https://doi.org/10.4236/acs.2017.74038

Conger, R. D., Ge, X., Elder, G. H., Jr., Lorenz, F. O., & Simons, R. L. (1994). Economic stress, coercive family process, and developmental problems of adolescents. *Child Development, 65*(2), 541–561.

Cooper, P. J. M., Dimes, J., Rao, K., Shapiro, B., Shiferaw, B., & Twomlow, S. (2008). Coping better with current climatic variability in the rain-fed farming systems of sub-Saharan Africa: An essential first step in adapting to future climate change. *Agriculture, Ecosystems and Environment, 126*, 24–35. https://doi.org/10.1016/j.agee.2008.01.007

Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). SAGE Publications.

Gebru, G. W., & Beyene, F. (2012). Rural household livelihood strategies in drought-prone areas: A case of Gulomekeda District, eastern zone of Tigray National Regional State,

Ethiopia. *Journal of Development and Agricultural Economics, 4*(6), 158–168.

Gleditsch, N. P., Furlong, K., Hegre, H., Lacina, B. A., & Owen, T. (2006). Conflicts over shared rivers: Resource scarcity or fuzzy boundaries? *Political Geography, 25*, 361–382.

Hailu, R., & Hassen, A. (2012). Livelihood diversification among the agricultural land-scarce peasants in the Central Highlands of Ethiopia. *International Journal of Agricultural Science, Research and Technology, 2*(1), 1–8.

Huang, Y., & Ma, Y. (2024). Climate change and divorce behavior: Implications for family education. *Innovation and Green Development, 3*, 1–6. https://doi.org/10.1016/j.igd.2023.100115

Iramba District Council Report (IDCR). (2015). *Iramba district socio-economic profile, Kiomboi.* Iramba District Council.

Jones, L., & Boyd, E. (2011). Exploring social barriers to adaptation: Insights from Western Nepal. *Global Environmental Change, 21*, 1262–1274. https://doi.org/10.1016/j.gloenvcha.2011.06.002

Joseph, L. (2022). The liability of climate change on constraining women's rights in the Southern Highlands, Tanzania: A case of Kilolo District. *East African Journal of Environment and Natural Resources, 5*, 58–74. https://doi.org/10.37284/eajenr.5.1.577

Kabote, S. J. (2018). Farmers' vulnerability to climate change impacts in semi-arid environments in Tanzania: A gender perspective. *International Journal of Scientific Research and Innovative Technology, 3*, 56–76. https://doi.org/10.5772/intechopen.72108

Kothari, C. R. (2011). *Research methodology: Methods and techniques.* New Age International.

Kotir, J. H. (2010). Climate change and variability in Sub-Saharan Africa: A review of current and future trends and impacts on agriculture and food security. *Environment, Development and Sustainability, 13*, 587–605. https://doi.org/10.1007/s10668-010-9278-0

Marschke, J. M., & Berkes, F. (2006). Exploring strategies that build livelihood resilience: A case from Cambodia. *Ecology and Society, 11*, 42.

Maxwell, J. A. (2012). *Qualitative research design: An interactive approach* (3rd ed.). SAGE Publications.

Muijeen, K., Kongvattananon, P., & Somprasert, C. (2020). The key success factors in focus group discussions with the elderly for novice researchers: A review. *Journal of Health Research, 34*(4), 359–371. https://doi.org/10.1108/JHR-05-2019-0114

Nordas, R., & Gleditsch, N. P. (2007). Climate change and conflict. *Political Geography, 26*, 627–638.

UNDP. (2009). *Human development report 2009.* http://hdr.undp.org/en/reports/global/hdr2009/

United Republic of Tanzania (URT). (2022). *The 2022 Population and Housing Census: Basic demographic and socio-economic profile; key findings.* National Bureau of Statistics (NBS) and Office of Chief Government Statistician (OCGS).

Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper and Row.