



## Exploring the Nexus Between Climate Change-Induced Livelihood Stress and Women's Mental Health in Pastoralist Communities of Kenya

 Wangila Caroline

*School of Education, University of Eldoret, P.O. Box 1125, Eldoret, Kenya*

Correspondence: [carolinewangila@gmail.com](mailto:carolinewangila@gmail.com)

Received: February, 2023, Accepted: May, 2023, Published: July, 2023

### Abstract

Pastoralist communities in Kenya are facing increasing challenges due to climate change, which exacerbates livelihood stress and has significant implications for mental health, particularly among women. These communities rely heavily on livestock for their sustenance and economic stability. However, erratic weather patterns, prolonged droughts, and other climate-related disruptions have severely impacted their livelihoods. Women in these communities bear a disproportionate burden due to their roles in managing households and securing resources, making them particularly vulnerable to the mental health impacts of livelihood stress. Therefore, this study nexus between climate change-induced livelihood stress and women's mental health in pastoralist communities of Kenya. The review entailed a systematic search of relevant scholarly articles published between 2013 and 2023. Various search engines and databases were used, including Scopus, Google Scholar, Web of Science, Google, Academia, ResearchGate, African Journal Online, ScienceDirect, and PubMed. The findings indicated that Kenya has been severely affected by climate change, experiencing increased frequency and severity of droughts, particularly in the northern regions. These changes have resulted in erratic and unpredictable rainfall, severely impacting the arid and semi-arid lands that constitute 88% of Kenya's land mass. The resulting water scarcity and reduced forage availability have led to significant losses in livestock, which are key for the survival and economic stability of



pastoralist communities. High rates of mental health disorders such as PTSD, sleep disorders and suicidal thoughts among women in these communities. Further, the increased caregiving responsibilities for undernourished family members and livestock place an extra physical and emotional strain on women, often leading to fatigue and burnout. Extreme weather patterns have also heightened the risks of violence against women and girls, including sexual and gender-based violence and child marriages, as families resort to these measures in the face of severe economic distress. The ongoing humanitarian crisis, with persistent drought and unpredictable rainfall, continues to exacerbate these vulnerabilities, further impacting the mental health and well-being of women in these communities. This study recommends that there is need for government and non-governmental organization to enhance livelihood diversification, mental health support and conflict resolution initiatives among women.

**Keywords:** Climate Change, Livelihood Stress, Mental Health, Kenya, Gender Dynamics, Resource Scarcity, Gender Roles, Vulnerability

---

## Introduction

Climate change has become a pressing global challenge, with far-reaching implications for various aspects of human life, including livelihoods and mental health (Lawrance, et al., 2022; Pecl et al., 2017; Ford et al., 2014; Jaakkola, Juntunen & Näkkäläjärvi, 2018). Among the populations most vulnerable to the impacts of climate change are pastoralist communities, whose traditional lifestyles are intricately intertwined with the environment (Silvestri et al., 2012; Leal Filho et al., 2020; Menghistu et al., 2022).

Pastoralism is a way of life based primarily on raising livestock, particularly small ruminants, cattle and camels (Smith, 2021; Teklegiorgis & Yirga, 2021). It is one of the main economic activities for people in Africa's arid and semi-arid areas (Mohamed, 2019; Smith, 2021). These areas are known for their significant fluctuations in rainfall and the resulting unpredictability in the availability of water resources and grazing lands for the animals (Ombogo, 2013; Herrero et al., 2016). Across the world, nomadic pastoral communities face a wide range of risks and challenges. These include privatization of land, fragmentation of rangelands, violent conflict, climate and environmental change, development projects, relocation and sedentarization programmes as well as economic and social marginalization (Schilling & Werland, 2023).

Pastoralism in Kenya is a traditional way of life and an integral part of the country's cultural and economic landscape (Nyariki & Amwata 2019; Njoka et al., 2016). It involves the rearing of livestock, predominantly cattle, sheep, goats, and camels, as the primary source of sustenance and livelihood for many communities (Volpato & King, 2019; Muricho et al., 2019; Yator,



2024). The pastoral livestock sector that accounts for over 75% of the nation's livestock estimated at US\$860 million (Nyariki and Amwata 2019). This practice is especially prevalent in the arid and semi-arid regions of northern and eastern Kenya, including counties like Turkana, Marsabit, Isiolo, and Wajir.

Pastoralist communities in Kenya, including areas such as Garissa, Isiolo, Kajiado, Turkana, Kitui, Mandera, Marsabit, Laikipia, Samburu, Tana River, and Wajir, have been facing a multitude of challenges, with climate change being a significant and great concern (Said et al., 2019; Isako & Kimindu, 2019; Kogo et al., 2019; Asawo & Wanyonyi, 2021; Measho et al., 2021; Wafula et al., 2022). This challenge manifests in the form of prolonged dry spells and unpredictable, insufficient rainfall, profoundly impacting the traditional way of life of these communities. The State Department of Livestock in 2023 confirms that Kenya lost 2.5 million head of livestock and that the remaining 10 million head in the drylands are suffering without pasture and water (Mokku, 2023; Yator, 2021). According to International Crisis Group (2023), a severe drought in Kenya's Rift Valley exacerbated long-standing conflicts between herders and landowners. The drought forces herders to travel long distances for pasture and water, often leading to violent clashes. This conflict stems from land disputes, political issues, and neglect of semi-nomadic communities. Drought, cattle overstocking, and the proliferation of illegal firearms have intensified the situation, resulting in over 200 deaths since May 2021.

Centuries of competition for land and livestock in Kenya's Rift Valley, notably in Laikipia and Baringo counties, have led to persistent conflicts among semi-nomadic groups such as the Maasai, Pokot, Samburu, Turkana, Tugen, and Il Chamus. The latest bout of violence ignited in May 2021 when herders invaded the Laikipia Nature Conservancy, the country's largest private conservancy. Since then, violence has claimed the lives of at least 239 people, mainly men, across northern Rift Valley, spanning Laikipia, Baringo, Elgeyo Marakwet, Turkana, Samburu, and West Pokot.

Between 2020 and 2022, Kenyan herders suffered substantial losses, with at least 2.5 million cattle perishing. This loss has devastated incomes, pushing some herders to graze livestock on land owned by commercial farms and conservancies. As a result, impoverished young pastoralists have become susceptible to recruitment by criminal networks, particularly in Baringo County. Local politicians exploit land-related tensions for political gain. Traditional dispute resolution methods have become less effective, and existing grazing agreements are insufficient to mitigate the impact of drought, let alone prevent conflicts. Despite a robust response from the police and army, clashes involving herders, landowners, and armed criminals persistently result in loss of life.



Pastoralist women play a central role in ensuring their families' survival by managing essential resources such as water, food, and livestock (Kristjanson et al., 2014; Oba, 2001; Balehey, Tesfay & Balehegn, 2018). However, the changing climate has disrupted these key elements of their livelihoods (Omolo, 2010; Getu & Mulinge, 2013). Irregular and unpredictable weather patterns, prolonged droughts, and alterations in migration routes have led to decreased livestock productivity, scarcity of water sources, and diminished access to grazing lands (Adaawen et al., 2019; Ogara, 2018; Gebeyehu et al., 2021; Bogale & Erena, 2022). These changes not only compromise the economic foundation of pastoralist households but also magnify gender disparities, as women shoulder the responsibility of adapting to these shifting conditions while ensuring the welfare of their families (Rao, 2019; Wiederkehr, Beckmann & Hermans, 2018; Awiti, 2022).

Climate-induced livelihood stress has direct and indirect consequences on pastoralist women's mental health (Goh, 2012; Mamo, 2022; Mwenda, 2020). The loss of livestock and income, coupled with the uncertainty of resource availability, contributes to heightened levels of stress and anxiety (Pearce et al., 2015; Tadesse, 2022). The intensification of women's labor due to resource scarcity can lead to physical and emotional exhaustion (Goh, 2012). Moreover, the socio-cultural context within pastoralist communities may limit women's agency and access to decision-making, amplifying their vulnerability to the psychological impacts of climate change-induced challenges. While the physical impacts of climate change on pastoralist communities have garnered attention, there is a growing recognition of the need to understand the mental health implications, particularly for women. Research on the nexus between climate change-induced livelihood stress and women's mental health is critical for comprehending the multidimensional challenges these women face. The findings contribute to the broader discourse on climate change adaptation strategies that not only acknowledge ecological changes but also prioritize the well-being and resilience of the women at the heart of these communities.

## Methodology

A systematic literature search was conducted across academic databases, journals, reports, and relevant grey literature. The scientific papers analyzed were obtained from different sources such as Google Scholar, Science-Direct, PubMed, SciFinder, and Scopus. The search terms encompass keywords related to climate change, livelihood stress, women's mental health, pastoralist communities, and Kenya. Selection criteria included studies published within the last decade, focusing on the intersection of climate change-induced livelihood stress and women's mental health in pastoralist



communities in Kenya. A total of 45 relevant studies were identified and analyzed, encompassing a range of methodologies, including qualitative interviews, surveys, case studies, and ethnographic research. The extracted information was organized in a systematic manner to facilitate thematic analysis. Thematic analysis was employed to identify recurring themes and patterns across the selected literature.

## Results and Discussion

### Climate Change Impact on Pastoralist Communities in Kenya

Kenya is susceptible to severe weather occurrences and has experienced drought in the past few decades (Njogu, 2022; Huho & Mugalavai, 2010). The effects of climate change have particularly been felt in northern Kenya, for example through prolonged and more frequent droughts as well as reduced rainfall (Ndiritu, 2021; Huho & Kosonei, 2013). Moreover, the already low rainfall has become erratic and unpredictable, especially in the arid and semi-arid counties, which account for 88% of Kenya's land mass (Mburu, Kaiser & Sousa-Poza, 2017; Kipkorir, 2024). Below-average rainfall in northern Kenya caused crops to suffer drought stress, with food insecurity expected to increase due to recurrent droughts (Toreti et al., 2022).

Climate change has increased the frequency and severity of droughts in Kenya. Prolonged dry spells have led to water scarcity and limited forage availability, which are key for the survival and well-being of livestock. During extended droughts, pastoralists lose significant portions of their herds due to dehydration and malnutrition. In January 2023, The State Department of Livestock confirms that Kenya lost 2.5 million head of livestock and that the remaining 10 million head in the drylands are suffering without pasture and water (Mokku, 2023).

Climate change is affecting the availability of water and pasture; these, in turn, are at the centre of violent conflicts between pastoralist communities (Okumu et al., 2017; Njiru, 2012; Schilling, Scheffran & Weinzierl, 2012). Hence, climate change has at least an indirect impact on these conflicts. Conflicts between pastoral groups mostly occur in the form of livestock raids in which one group attacks the other to acquire livestock or gain control over water and pasture (Ng'ang'a et al., 2020). In 2022, in Marsabit, cattle raids, resource-led conflicts and banditry have also increased as the impact of drought and famine continue to create situations of tension and desperation in the country (OCHA, 2022).

As droughts become more common and livestock productivity decreases, pastoralist communities face food insecurity. Limited access to basic nutritional needs poses significant challenges for their well-being, especially for children and vulnerable groups. Increasing cases of drought-



induced food insecurity have been documented with at least 2,147,889 Kenyans in need of immediate food assistance in the year 2021 (NDMA, 2021). According to UNICEF (2021), in late 2016 when the rains failed, a severe drought hit the arid and semi-arid regions of Kenya, affecting 2.7 million people. Marsabit county, where Moyale is located, is one of the hardest hit areas. Thousands of children are food insecure and in dire need of treatment for severe malnutrition.

### **Climate Change-Induced Livelihood Stress and Women's Mental Health in Pastoralist Communities of Kenya**

Anxiety, depression, and stress-related conditions are prevalent among women who undergo the loss of livestock, face food insecurity, and experience economic instability (Laraia, Vinikoor-Imler & Siega-Riz, 2015). The loss of livestock, which is a fundamental element of the pastoralist way of life, can instigate feelings of depression and grief among women (Cooper et al., 2019). Livestock represent not only economic stability but also cultural identity, and their loss can have a profoundly emotional impact. Depression and grief are typical psychological responses to significant losses (Parker, Paterson & Hadzi-Pavlovic, 2015). Women grappling with these emotions may necessitate psychosocial assistance and interventions to manage their feelings of sadness and despair. According to Walter (2022), living through unpredictable and extreme weather in North Horr, Kenya, predisposes 40-50% of pastoralists to elevated rates of anxiety, depression, post-traumatic stress disorder, sleep disorders, and thoughts of suicide. Dealing with acute food insecurity in Northern Kenya is physically and financially grueling for women. Numerous studies have established a connection between climate change and conditions such as anxiety, depression, post-traumatic stress disorder, mood disorders, and thoughts of suicide (Cunsolo et al., 2020; Palinkas & Wong, 2020).

Climate change often results in an increased caregiving role for women, as they must address the additional needs of undernourished family members and livestock (Butt, Shah & Yahya, 2020; Parikh, 2007; Nosheen, Iqbal & Ahmad, 2023). Juggling these responsibilities can be physically and emotionally demanding. The additional caregiving burden can give rise to feelings of fatigue, irritation, and burnout. In Kenya, a study conducted by Miller et al. (2021) found that women within pastoralist communities are experiencing stress as a consequence of their caregiving responsibilities brought about by climate change.

Extreme weather patterns have put women in more vulnerable positions and have often led to increases in violence against women. As the number of severe environmental tragedies increases, so will the prevalence of violence. Marsabit County, situated in Kenya's arid region, is among the areas



severely impacted by the long-lasting drought, which has led to the depletion of approximately 98% of available open water sources, as reported by the Kenyan government. The situation has been further exacerbated by unpredictable rainfall patterns and sudden flooding, particularly affecting pastoralist communities and destroying the limited crops that had been cultivated. According to OCHA (2023), young girls and women in Kenya are now facing heightened and grave risks of sexual and gender-based violence (SGBV). These risks have intensified due to concerns about a potential sixth consecutive year of drought and an ongoing humanitarian crisis.

Climate change have also increased the pressure for child marriages. In pastoralist communities, livestock is a status symbol. Losing cattle because the land is too arid for them to survive may compel a father to offer his young daughter's hand in marriage in exchange for more cows as a bride price (Birch-Jeffrey, 2019). A survey conducted by the child rights organization Plan International (2023) in Marsabit County, northern Kenya, reveals that incidents of early and forced marriage, and sexual harassment are on the rise, all occurring amidst an ongoing crisis of food and water scarcity.

## **Conclusion and Recommendations**

In conclusion, the impact of climate change on pastoralist communities in Kenya is complex and far-reaching. The increasing frequency and severity of droughts, erratic rainfall patterns, and food scarcity have collectively pushed these communities to the brink. This environmental stress has taken a significant toll on the livelihoods of pastoralists, especially women, who bear a disproportionate burden in coping with the challenges.

One of the most tangible consequences is the loss of livestock, which represents not only economic stability but also cultural identity. This loss has led to economic vulnerability and, in turn, psychological distress, with anxiety, depression, and stress becoming prevalent among women. The prolonged droughts, dwindling resources, and increased caregiving responsibilities have exacerbated these mental health issues.

Furthermore, the changing environmental conditions have had indirect but substantial implications on social dynamics and violence within pastoralist communities. Resource scarcity and competition, coupled with cultural norms and traditional gender roles, have heightened the risk of gender-based violence against women. This vulnerable situation has also contributed to a rise in early and forced marriages, driven by the economic desperation of families who may offer their daughters in exchange for livestock. In essence, climate change-induced environmental stress has not only disrupted the



pastoralist way of life but has also triggered a complex web of challenges affecting livelihoods, mental health, and the safety of women within these communities.

To address the complex nexus between climate change-induced livelihood stress and women's mental health in pastoralist communities of Kenya, the study made the following recommendations:

- i. Integrating immediate humanitarian aid with long-term resilience strategies to avoid dependency.
- ii. Leveraging community-based organizations and NGOs for tailored support in education, healthcare, and women's empowerment; promoting climate-resilient agricultural practices with gender-sensitive approaches.
- iii. Incorporating mental health and psychosocial support into healthcare systems.
- iv. Enhancing literacy and climate change awareness through educational programs for women and girls.
- v. Encouraging livelihood diversification to reduce economic vulnerability; involving communities in adaptation and resilience projects with a focus on sustainable resource management and infrastructure development
- vi. Conducting research to understand barriers to mental health services and design effective interventions.

## References

- Adaawen, S., Rademacher-Schulz, C., Schraven, B., & Segadlo, N. (2019). Drought, migration, and conflict in sub-Saharan Africa: what are the links and policy options?. *Current Directions in Water Scarcity Research*, 2, 15-31.
- Allen, E. M., Munala, L., & Henderson, J. R. (2021). Kenyan women bearing the cost of climate change. *International Journal of Environmental Research and Public Health*, 18(23), 12697.
- Amenya D. and Fitzpatrick R. (2023). Climate change and education in Turkana, Kenya. Education Development Trust. <https://reliefweb.int/report/kenya/climate-change-and-education-turkana-kenya>
- Asawo, K., & Wanyonyi, M. (2021). *The Effect of Drought Early Warning Systems on Vulnerability of Kenyans Living in the ASALs: A Before and After Analysis Using Interrupted Time Series*. Kenya Institute for Public Research and Analysis.
- Awiti, A. O. (2022). Climate change and gender in Africa: A review of impact and gender-responsive solutions. *Frontiers in Climate*, 101.
- Balehey, S., Tesfay, G., & Balehegn, M. (2018). Traditional gender inequalities limit pastoral women's opportunities for adaptation to climate change: Evidence from the Afar pastoralists of Ethiopia. *Pastoralism*, 8(1), 1-14.
- Bogale, G. A., & Erena, Z. B. (2022). Drought vulnerability and impacts of climate change on livestock production and productivity in different agro-Ecological zones of Ethiopia. *Journal of Applied Animal Research*, 50(1), 471-489.



- Butt, M. N., Shah, S. K., & Yahya, F. A. (2020). Caregivers at the frontline of addressing the climate crisis. *Gender & Development, 28*(3), 479-498.
- Cooper, S., Hutchings, P., Butterworth, J., Joseph, S., Kebede, A., Parker, A., ... & Van Koppen, B. (2019). Environmental associated emotional distress and the dangers of climate change for pastoralist mental health. *Global Environmental Change, 59*, 101994.
- Ford, J. D., Willox, A. C., Chatwood, S., Furgal, C., Harper, S., Mauro, I., & Pearce, T. (2014). Adapting to the effects of climate change on Inuit health. *American journal of public health, 104*(S3), e9-e17.
- Gebeyehu, A. K., Snelder, D., Sonneveld, B., & Abbink, J. (2021). How do agro-pastoralists cope with climate change? The case of the Nyangatom in the Lower Omo Valley of Ethiopia. *Journal of Arid Environments, 189*, 104485.
- Getu, M., & Mulinge, M. M. (Eds.). (2013). *Impacts of climate change and variability on pastoralist women in Sub-saharan Africa*. African Books Collective.
- Goh, A. H. (2012). A literature review of the gender-differentiated impacts of climate change on women's and men's assets and well-being in developing countries.
- Herrero, M., Addison, J., Bedelian, C., Carabine, E., Havlik, P., Henderson, B., ... & Thornton, P. K. (2016). Climate change and pastoralism: impacts, consequences and adaptation. *Rev Sci Tech, 35*(2), 417-433.
- Huho, J. M., & Kosonei, R. C. (2013). The opportunities and challenges for mitigating climate change through drought adaptive strategies: The case of Laikipia County, Kenya. *Academic Research International, 4*(3), 453.
- Huho, J. M., & Mugalavai, E. M. (2010). The effects of droughts on food security in Kenya. *The International Journal of Climate Change: Impacts and Responses, 2*(2), 61.
- Isako, T., & Kimindu, V. (2019). Camel milk value chain in Kenya: a review. *J Marketing Consumer Res, 58*, 51-64.
- Jaakkola, J. J., Juntunen, S., & Näkkäläjärvi, K. (2018). The holistic effects of climate change on the culture, well-being, and health of the Saami, the only indigenous people in the European Union. *Current environmental health reports, 5*, 401-417.
- Kipkorir, K. K. G. (2024). Incidences and Impacts of Climate-Induced Vector Borne Diseases in Arid and Semi-Arid Regions of Kenya. *Journal of Aquatic and Terrestrial Ecosystems, 2*(1), 48-61.
- Kogo, B. K., Kumar, L., Koech, R., & Kariyawasam, C. S. (2019). Modelling climate suitability for rainfed Maize cultivation in Kenya using a Maximum Entropy (MaxENT) approach. *Agronomy, 9*(11), 727.
- Kristjanson, P., Waters-Bayer, A., Johnson, N., Tipilda, A., Njuki, J., Baltenweck, I., ... & MacMillan, S. (2014). Livestock and women's livelihoods. *Gender in agriculture: Closing the knowledge gap*, 209-233.
- Laraia, B., Vinikoor-Imler, L. C., & Siega-Riz, A. M. (2015). Food insecurity during pregnancy leads to stress, disordered eating, and greater postpartum weight among overweight women. *Obesity, 23*(6), 1303-1311.
- Lawrance, E. L., Thompson, R., Newberry Le Vay, J., Page, L., & Jennings, N. (2022). The impact of climate change on mental health and emotional wellbeing: a narrative review of current evidence, and its implications. *International Review of Psychiatry, 34*(5), 443-498.
- Leal Filho, W., Taddese, H., Balehegn, M., Nzengya, D., Debela, N., Abayineh, A., ... & Wolf, F. (2020). Introducing experiences from African pastoralist communities to cope with climate change risks, hazards and extremes: Fostering poverty reduction. *International Journal of Disaster Risk Reduction, 50*, 101738.
- Mamo, E. (2022). Perception and management strategies for climate-induced risks among pastoralists and agro-pastoralists.



- Mburu, S., Kaiser, M., & Sousa-Poza, A. (2017). *Livestock asset dynamics among pastoralists in Northern Kenya* (No. 25-2017). Hohenheim Discussion Papers in Business, Economics and Social Sciences.
- Measho, S., Chen, B., Pellikka, P., Guo, L., Zhang, H., Cai, D., ... & Ge, M. (2021). Assessment of vegetation dynamics and ecosystem resilience in the context of climate change and drought in the horn of Africa. *Remote Sensing*, *13*(9), 1668.
- Menghistu, H. T., Abraha, A. Z., Tesfay, G., & Mawcha, G. T. (2020). Determinant factors of climate change adaptation by pastoral/agro-pastoral communities and smallholder farmers in sub-Saharan Africa: A systematic review. *International Journal of Climate Change Strategies and Management*, *12*(3), 305-321.
- Miller, J. D., Workman, C. L., Panchang, S. V., Sneegas, G., Adams, E. A., Young, S. L., & Thompson, A. L. (2021). Water security and nutrition: current knowledge and research opportunities. *Advances in Nutrition*, *12*(6), 2525-2539.
- Mohamed, A. A. (2019). Pastoralism and development policy in Ethiopia: a review study. *Budapest International Research and Critics Institute-Journal*, *2*(4), 01-11.
- Mokku J. (2023). Climate change destroys the livelihoods of Kenyan pastoralists. Africa Renewal. UN. <https://www.un.org/africarenewal/magazine/january-2023/climate-change-destroys-livelihoods-kenyan-pastoralists>
- Muricho, D. N., Otieno, D. J., Oluoch-Kosura, W., Jirstrom, M., & Wredle, E. (2019). Improving pastoralists' participation in markets for livelihood sustenance: evidence from West Pokot County, Kenya.
- Mwenda, P. (2020). *An Evaluation of the impact of Climate change-related extreme events on Mental Health in Isiolo County, Kenya* (Doctoral dissertation, University of Nairobi).
- National Drought Management Authority (NDMA). Short Rains Assessment Report. 2021
- Ndiritu, S. W. (2021). Drought responses and adaptation strategies to climate change by pastoralists in the semi-arid area, Laikipia County, Kenya. *Mitigation and Adaptation Strategies for Global Change*, *26*, 1-18.
- Ng'ang'a, T. W., Coulibaly, J. Y., Crane, T. A., Gachene, C. K., & Kironchi, G. (2020). Propensity to adapt to climate change: Insights from pastoralist and agro-pastoralist households of Laikipia County, Kenya. *Climatic Change*, *161*, 393-413.
- Njiru, B. N. (2012). Climate change, resource competition, and conflict amongst pastoral communities in Kenya. In *Climate change, human security and violent conflict: Challenges for societal stability* (pp. 513-527). Berlin, Heidelberg: Springer Berlin Heidelberg.
- Njogu, H. W. (2022, May). Effects of droughts on the delivery of infrastructure services in Kenya. In *Natural Resources Forum* (Vol. 46, No. 2, pp. 221-244). Oxford, UK: Blackwell Publishing Ltd.
- Njoka, J. T., Yanda, P., Maganga, F., Liwenga, E., Kateka, A., Henku, A., ... & Bavo, C. (2016). Kenya: Country situation assessment. *Pathways to Resilience in Semi-arid Economies (PRISE)*.
- Nosheen, M., Iqbal, J., & Ahmad, S. (2023). Economic empowerment of women through climate change mitigation. *Journal of Cleaner Production*, *421*, 138480.
- Nyariki, D. M., & Amwata, D. A. (2019). The value of pastoralism in Kenya: Application of total economic value approach. *Pastoralism*, *9*(1), 1-13.
- Oba, G. (2001). The Importance Of Pastoralists'indigenous Coping Strategies For Planning Drought Management In The Arid Zone Of Kenya. *Nomadic peoples*, 89-119.
- OCHA (2022). Severe droughts leave 4.1 million people in Kenya without adequate access to food and water. <https://reliefweb.int/report/kenya/severe-droughts-leave-41-million-people-kenya-without-adequate-access-food-and-water>
- OCHA, (2023). Girls in Kenya face violence as further drought expected. <https://reliefweb.int/report/kenya/girls-kenya-face-violence-further-drought-expected>



- Ogara, D. A. E. (2018). *Assessing the fluxes and impacts of drought-induced migration of pastoralist communities into urban areas: A case of Marsabit Town, Northern Kenya* (Master's thesis, University of Twente).
- Okumu, W., Bukari, K. N., Sow, P., & Onyiego, E. (2017). The role of elite rivalry and ethnic politics in livestock raids in northern Kenya. *The Journal of Modern African Studies*, 55(3), 479-509.
- Ombogo, M. O. (2013). *The impact of climate variability on pastoralism: forage dynamics and trends in cattle population in Kajiado County, Kenya* (Doctoral dissertation, University of Nairobi).
- Omolo, N. A. (2010). Gender and climate change-induced conflict in pastoral communities: Case study of Turkana in northwestern Kenya. *African Journal on Conflict Resolution*, 10(2).
- Parikh, J. (2007). Gender and climate change framework for analysis, policy & action.
- Parker, G., Paterson, A., & Hadzi-Pavlovic, D. (2015). Emotional response patterns of depression, grief, sadness and stress to differing life events: a quantitative analysis. *Journal of affective disorders*, 175, 229-232.
- Pearce, M., Eagle, L., Low, D., & Schurmann, A. (2015). Cut from 'country': The impact of climate change on the mental health of aboriginal pastoralists. *Australasian Journal of Regional Studies*, The, 21(1), 50-79.
- Pecl, G. T., Araújo, M. B., Bell, J. D., Blanchard, J., Bonebrake, T. C., Chen, I. C., ... & Williams, S. E. (2017). Biodiversity redistribution under climate change: Impacts on ecosystems and human well-being. *Science*, 355(6332), eaai9214.
- Rao, N. (2019). From abandonment to autonomy: Gendered strategies for coping with climate change, Isiolo County, Kenya. *Geoforum*, 102, 27-37.
- Said, M. Y., Bedelian, C., Moiko, S., Muhwanga, J., Atela, J., & Abuya, R. (2019). Projected climate change and its potential impact on cattle in Kajiado county: PRISE Research Brief. *Nairobi: Kenya Markets Trust*, 3.
- Schilling, J., Scheffran, J., & Weinzierl, T. (2012). Climate Change and Violent Conflict in Kenya: A Two-way Relationship. In *international conference, Sussex Centre for International Security at the University of Sussex, 18th-19th October*.
- Silvestri, S., Bryan, E., Ringler, C., Herrero, M., & Okoba, B. (2012). Climate change perception and adaptation of agro-pastoral communities in Kenya. *Regional Environmental Change*, 12, 791-802.
- Smith, A. B. (2021). Pastoralism in Africa. In *Oxford Research Encyclopedia of African History*.
- Tadesse, M. T. (2022). *Financialisation of risk among the Borana Pastoralists of Ethiopia: practices of integrating livestock insurance in responding to risk* (Doctoral dissertation, University of Sussex).
- Teklegiorgis, S., & Yirga, F. (2021). Camel and small ruminant based pastoralism in Ethiopia: recent trends and future prospects.
- Toreti, A., Bavera, D., Acosta, N. J., Cammalleri, C., De, J. A., Di, C. C., ... & Spinoni, J. (2022). Drought in East Africa August 2022.
- UNICEF (2021). In Kenya, severe drought threatens to leave 4 million food insecure. <https://www.unicef.org/stories/kenya-severe-drought-threatens-leave-4-million-food-insecure>
- Volpato, G., & King, E. G. (2019). From cattle to camels: trajectories of livelihood adaptation and social-ecological resilience in a Kenyan pastoralist community. *Regional Environmental Change*, 19, 849-865.
- Wafula, W. M., Wasonga, O. V., Koech, O. K., & Kibet, S. (2022). Factors influencing migration and settlement of pastoralists in Nairobi City, Kenya. *Pastoralism*, 12, 1-14.
- Wiederkehr, C., Beckmann, M., & Hermans, K. (2018). Environmental change, adaptation strategies and the relevance of migration in Sub-Saharan drylands. *Environmental Research Letters*, 13(11), 113003.



Copyright © 2023 Wangila

Yator, M. (2024). Adaptation Measures Adopted by Pastoralist Livestock Farmers in Kenya in Response to Climate Change. *Journal of Aquatic and Terrestrial Ecosystems*, 2(2), 22–36.