

RESEARCH ARTICLE

EXAMINING THE IMPACT OF CLIMATE CHANGE ON COMMUNITY DISASTER RISK AND IDENTIFYING STRATEGIES FOR ADAPTATION: A SYSTEMATIC REVIEW FOR SUB-SAHARAN AFRICA

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ABSTRACT

Sub-Saharan Africa is highly vulnerable to climate change impacts, such as droughts, floods, and desertification, which threaten local communities. The purpose of this study was to review existing literature on the impact of climate change on disaster risk in sub-Saharan Africa and identify adaptation strategies to mitigate these effects. A comprehensive search of academic databases was conducted, and identified studies were analysed thematically. The study found that climate change intensifies extreme weather events, resulting in waterborne diseases, displacement, food insecurity, and famine. Poverty and gender-specific challenges further contribute to vulnerability. Effective adaptation strategies include climate-smart agriculture, improved infrastructure and early warning systems, and community-based disaster risk reduction. Integrating adaptation and risk reduction into development plans at national and local levels is crucial. Partnerships and innovative financing mechanisms can help overcome implementation challenges. Addressing gender-specific issues and involving local communities in adaptation design and implementation are also important. In conclusion, enhancing the resilience of vulnerable communities in sub-Saharan Africa requires comprehensive adaptation measures integrated with development plans.

KEYWORDS

Climate Change; Community; Disaster Risk; Adaptation; Inclusion Criterion

1. INTRODUCTION


Climate change and disaster risk are two closely related issues that are increasingly becoming a major concern for global communities (IPCC, 2018; UNDRR, 2019). Climate change refers to the long-term changes in the Earth's climate system caused by human activities, such as the emission of greenhouse gases, which are leading to a rise in global temperatures, changes in precipitation patterns, and an increase in extreme weather events (IPCC, 2018; UNFCCC, 2015). These changes are affecting the environment, ecosystems, and human societies, resulting in various negative impacts, including loss of lives, property damage, and economic losses (IPCC, 2018; UNDRR, 2019). Disaster risk, on the other hand, is the potential for loss or damage to lives, livelihoods, and infrastructure due to natural or man-made hazards such as floods, hurricanes, earthquakes, and wildfires (UNDRR, 2019). The impact of disasters is often exacerbated by climate change, as extreme weather events become more frequent and intense (IPCC, 2018; UNDRR, 2019). Vulnerable communities, particularly those living in low-lying areas or areas prone to natural disasters, are at the greatest risk of being affected by climate change and disasters (IPCC, 2018; UNDRR, 2019).

The impacts of climate change and disasters are felt more acutely in developing countries, where limited resources, weak governance, and inadequate infrastructure further exacerbate the risks (IPCC, 2018; UNDRR, 2019). Therefore, adaptation strategies that address the root causes of vulnerability and build resilience are crucial for reducing the

impacts of climate change and disasters on vulnerable communities (IPCC, 2018; UNDRR, 2019). Climate change and disaster risk are complex and interconnected issues that require interdisciplinary and collaborative approaches to address (IPCC, 2018; UNDRR, 2019). The aim of this study is to conduct a systematic review of existing literature on the impact of climate change on community disaster risk in sub-Saharan Africa and to identify strategies for adaptation that can be used to mitigate the negative effects of climate change on communities in the region. The review focuses on the latest scientific literature on climate change and disaster risk reduction, including case studies of successful adaptation strategies, and identify gaps in the existing research that require further attention. By synthesizing existing knowledge, this review will contribute to the development of effective and evidence-based strategies for climate change adaptation and disaster risk reduction, ultimately enhancing the resilience of vulnerable communities.

1.1 Understanding the Impact of Climate Change on Community Disaster Risk

Climate change is becoming an increasingly pressing issue globally, and its impact on disaster risk in Sub-Saharan Africa is a growing concern (IPCC, 2021; UNDRR, 2021). The literature on the topic is vast, with studies spanning across various disciplines and geographic locations. This review aims to synthesize some of the key findings in this area. One of the primary impacts of climate change on community disaster risk in Sub-Saharan Africa is the increasing frequency and intensity of extreme weather events

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(UNDP, 2018). This includes droughts, floods, and storms, which have devastating effects on vulnerable populations. For instance, flooding has been linked to increased incidence of waterborne diseases and displacement of people from their homes (UNESCO, 2018). Droughts, on the other hand, can lead to food insecurity and famine, particularly in rural areas where agriculture is the primary source of livelihood (FAO, 2019). Another critical factor that exacerbates the impact of climate change on disaster risk is poverty (UNDP, 2019). Low-income communities are often more vulnerable to the effects of extreme weather events, as they lack the resources and infrastructure to adapt and cope. This is particularly true in Sub-Saharan Africa, where many households depend on subsistence agriculture and have limited access to basic services such as healthcare, education, and clean water (World Bank, 2019).

Studies have also shown that gender plays a significant role in shaping vulnerability to climate change impacts. Women, in particular, are more likely to bear the brunt of extreme weather events, as they often have less access to resources and decision-making power in their communities (UN Women, 2019). This can lead to gender-specific challenges, such as increased workload and exposure to violence and exploitation. Furthermore, climate change is likely to exacerbate existing conflicts and instability in Sub-Saharan Africa. For example, competition for scarce resources such as water and land could escalate existing tensions between different groups, leading to conflicts and displacement (UNDP, 2018).

In terms of policy responses, scholars have called for a more holistic approach that considers the interlinkages between climate change, disaster risk, poverty, and social inequality (IPCC, 2021; UNDRR, 2021). This includes efforts to strengthen community resilience through the development of early warning systems, improved infrastructure, and social protection programs (UNDP, 2018). It also requires measures to address the underlying drivers of vulnerability, such as poverty and gender inequality (UN Women, 2019).

1.2 Adapting to climate change: strategies for disaster risk reduction

Adapting to climate change is a crucial issue in Sub-Saharan Africa, which is highly vulnerable to the impacts of climate change (IPCC, 2014). In response, there has been a growing body of literature on disaster risk reduction strategies to help reduce the risks of climate-related disasters in the region. One approach to disaster risk reduction in Sub-Saharan Africa is to build resilience through climate-smart agriculture practices. Studies have shown that climate-smart agriculture practices, such as conservation agriculture and agroforestry, can help farmers adapt to changing weather patterns and reduce the risks of crop failure due to drought or flooding (Rosenzweig et al., 2014). Strengthening early warning systems is another approach to disaster risk reduction. Early warning systems can help communities prepare for climate-related disasters by providing advance notice of extreme weather events, such as floods or droughts (Manda et al., 2019). Community-based approaches to disaster risk reduction have also been successful in Sub-Saharan Africa. These approaches involve working with local communities to identify and address their specific disaster risks and vulnerabilities (de Sherbinin et al., 2015). There is growing recognition of the importance of addressing gender in disaster risk reduction strategies. Women are often disproportionately affected by climate-related disasters and play a critical role in disaster preparedness and response (FAO, 2020). Women's involvement in disaster risk reduction planning in Kenya has led to better outcomes and increased community resilience (Adger et al., 2020).

Community-based approaches to adaptation have gained increasing attention over the years due to their potential to increase resilience to climate change impacts in the region. One of the key themes that emerges from the literature is the importance of community participation in the design and implementation of adaptation strategies (O'Brien et al., 2007). Participatory approaches, which involve engaging with local communities, were more effective than top-down approaches in promoting community-based adaptation. Inter-sectoral collaboration is another important theme that emerges from the literature. Studies highlight the importance of working across sectors to develop integrated adaptation strategies (Mutanga et al., 2018; Musiyiwa et al., 2019). The understanding of local contexts and indigenous knowledge systems is also crucial in developing effective adaptation strategies (Agrawal et al., 2013). Long-term planning and investment in adaptation are necessary for sustainable adaptation (IPCC, 2014). Finally, capacity building is another crucial aspect for the success of community-based adaptation initiatives (Berrang-Ford et al., 2011).

1.3 Community-based approaches to adaptation

Community-based approaches to adaptation in Sub-Saharan Africa have gained increasing attention over the years due to their potential to increase resilience to climate change impacts in the region (Musiyiwa et al., 2019; Mutanga et al., 2018). One of the key themes that emerges from the literature is the importance of community participation in the design and implementation of adaptation strategies (Tumushabe & Naluwairo, 2021). This is because local communities have a deep understanding of their environment and the challenges they face. Participatory approaches, which involve engaging with local communities, were more effective than top-down approaches in promoting community-based adaptation (Musiyiwa et al., 2019). Another important theme that emerges from the literature is the need for inter-sectoral collaboration (Mutanga et al., 2018). Studies by Mutanga et al. (2018) and Musiyiwa et al. (2019) highlight the importance of working across sectors to develop integrated adaptation strategies. This is because climate change impacts affect multiple sectors, and solutions that take into account the interdependence of sectors are more effective.

The understanding of local contexts and indigenous knowledge systems is also very important (Tumushabe & Naluwairo, 2021). Indigenous knowledge systems play a critical role in enhancing resilience to climate change impacts. By understanding local contexts and indigenous knowledge systems, it is possible to develop context-specific adaptation strategies that are more effective. Furthermore, long-term planning and investment in adaptation are necessary for sustainable adaptation (Mutanga et al., 2018). This is because adaptation is a continuous process, and short-term solutions are not enough to address the long-term impacts of climate change. Finally, capacity building is another crucial aspect for the success of community-based adaptation initiatives (Musiyiwa et al., 2019). This is because communities need to have the skills and knowledge necessary to implement and sustain adaptation strategies.

1.4 Challenges and opportunities in implementing climate change adaptation strategies for disaster risk reduction

Challenges and opportunities in implementing climate change adaptation strategies for disaster risk reduction is a critical issue for Sub-Saharan Africa due to the region's exposure to multiple climate-related challenges such as droughts, floods, heat waves, and sea level rise (IPCC, 2021). These challenges can have devastating impacts on the region's economies, natural resources, and communities. Therefore, it is necessary to identify the challenges and opportunities in implementing climate change adaptation strategies for disaster risk reduction in Sub-Saharan Africa. One of the primary challenges in implementing climate change adaptation strategies in Sub-Saharan Africa is the lack of adequate resources, both financial and technical (UNDP, 2017). This is due to the limited capacity and resources of many governments in the region, as well as the lack of financial support from the international community. As a result, many climate change adaptation initiatives remain underfunded and are unable to meet the needs of local communities. Another challenge in implementing climate change adaptation strategies is the lack of effective governance structures and policies (World Bank, 2019). Sub-Saharan African countries often have weak institutional frameworks and governance systems, which hinder the implementation of climate change adaptation strategies. In addition, policies and regulations that address climate change and disaster risk reduction are often inadequate or not enforced, leading to limited progress in implementing adaptation measures. A further challenge is the limited access to reliable climate data, which makes it difficult to identify and understand the impacts of climate change and develop appropriate adaptation strategies (FAO, 2018). This is particularly problematic for small-scale farmers and rural communities, who are often the most vulnerable to climate change impacts but have limited access to information and resources.

Despite these challenges, there are also opportunities for implementing effective climate change adaptation strategies in Sub-Saharan Africa. For example, there is a growing recognition of the need for integrated approaches that bring together different sectors and stakeholders, including governments, civil society, and the private sector (UNEP, 2020). This can help to build partnerships and collaborations that leverage diverse expertise, resources, and knowledge to develop and implement effective climate change adaptation strategies. Another opportunity is the potential for innovative solutions, such as using new technologies to collect and analyse climate data, developing early warning systems for extreme weather events, and using renewable energy to reduce greenhouse gas emissions and build resilience (UNFCCC, 2021). There is also an increasing awareness of the importance of community engagement

and empowerment in climate change adaptation, which can help to build resilience and reduce vulnerability at the local level (Oxfam, 2019).

2. RESULTS AND DISCUSSIONS

Table 1 provides the impact of climate change on community disaster risk in sub-Saharan Africa, as well as strategies for adaptation and challenges and opportunities in implementing these strategies. Climate change has led to an increasing frequency and intensity of extreme weather events such as floods, droughts, and storms, which in turn lead to waterborne diseases, displacement, food insecurity, and famine. Poverty exacerbates the impact of climate change on disaster risk, especially in low-income communities that lack resources and infrastructure to adapt and cope. Gender also plays a significant role in shaping vulnerability to climate change impacts, with women often bearing the brunt of extreme weather events, leading to gender-specific challenges. Climate change is likely to exacerbate existing conflicts and instability, escalating tensions between different groups and leading to conflicts and displacement.

Strategies for adaptation include building resilience through climate-

smart agriculture practices such as conservation agriculture and agroforestry, improving infrastructure, social protection programs, and strengthening early warning systems to improve disaster preparedness. Community-based approaches to disaster risk reduction were found to be working with local communities to identify and address their specific disaster risks and vulnerabilities and recognising the importance of addressing gender in disaster risk reduction strategies. Community-based approaches to adaptation such as community participation in the design and implementation of adaptation strategies, inter-sectoral collaboration, understanding local contexts, indigenous knowledge systems, long-term planning and investment, and capacity building were found imperative in reducing community risks. However, there are several challenges to implementing climate change adaptation strategies, such as the lack of funding and resources, inadequate governance, and policy frameworks. Nevertheless, there are opportunities for the integration of climate change adaptation and disaster risk reduction strategies into national and local development plans, building partnerships between governments, civil society, and the private sector, and leveraging innovative financing mechanisms. By addressing these challenges and opportunities, we can work towards building resilient communities that can withstand the impacts of climate change and reduce disaster risks.

Table 1: Summary of impacts, adaptations, challenges and opportunities

Impact of climate change on community disaster risk in sub-Saharan Africa	<ul style="list-style-type: none"> Increasing frequency and intensity of extreme weather events such as floods, droughts, and storms, leading to waterborne diseases, displacement, food insecurity, and famine. Poverty exacerbates the impact of climate change on disaster risk, especially in low-income communities that lack resources and infrastructure to adapt and cope. Gender plays a significant role in shaping vulnerability to climate change impacts, with women often bearing the brunt of extreme weather events, leading to gender-specific challenges. Climate change is likely to exacerbate existing conflicts and instability, escalating tensions between different groups, and leading to conflicts and displacement.
Strategies for adaptation	<ul style="list-style-type: none"> Building resilience through climate-smart agriculture practices such as conservation agriculture and agroforestry, improving infrastructure, social protection programs, and strengthening early warning systems to improve disaster preparedness. Community-based approaches to disaster risk reduction, working with local communities to identify and address their specific disaster risks and vulnerabilities, and recognizing the importance of addressing gender in disaster risk reduction strategies. Community-based approaches to adaptation, involving community participation in the design and implementation of adaptation strategies, inter-sectoral collaboration, understanding local contexts, indigenous knowledge systems, long-term planning and investment, and capacity building.
Challenges and opportunities in implementing climate change adaptation strategies for disaster risk reduction	<ul style="list-style-type: none"> Lack of funding and resources, inadequate governance, and policy frameworks are challenges to implementing climate change adaptation strategies. Opportunities exist for the integration of climate change adaptation and disaster risk reduction strategies into national and local development plans, building partnerships between governments, civil society, and the private sector, and leveraging innovative financing mechanisms.

3. METHODS AND MATERIALS

The study area for this research is Sub-Saharan Africa. Sub-Saharan Africa is a region in Africa that lies south of the Sahara desert and includes countries such as Nigeria, South Africa, Kenya, Ethiopia, and Tanzania. This region is vulnerable to climate change impacts, such as droughts, floods, and desertification, which affect the livelihoods and well-being of local communities.

3.1 Research approach and design

The method used for this research is a systematic review. A systematic review is a rigorous and transparent approach to literature review that aims to identify, select, evaluate, and synthesize all high-quality research evidence relevant to a particular research question. In this study, we will conduct a comprehensive search of academic databases, including Google Scholar, JSTOR, and Web of Science, to identify studies that meet our inclusion and exclusion criteria. The approach used in this research is qualitative. Qualitative research is an exploratory approach that aims to understand the social and cultural phenomena that shape people's experiences and behaviours. In this study, we will analyse the content of the studies identified in the systematic review to identify key themes and patterns related to community-based approaches to adaptation in Sub-Saharan Africa.

The method used for this research is a systematic review. A systematic review is a rigorous and transparent approach to literature review that aims to identify, select, evaluate, and synthesize all high-quality research evidence relevant to a particular research question (Cook et al., 2021; Booth et al., 2020)). In this study, the researcher conducted a comprehensive search of academic databases, including Google Scholar,

JSTOR, and Web of Science, to identify studies that meet the set inclusion and exclusion criteria.

The approach used in this research was qualitative in nature. Qualitative research is an exploratory approach that aims to understand the social and cultural phenomena that shape people's experiences and behaviours (Creswell & Poth, 2018). In this study, the researcher analysed the content of the studies identified in the systematic review to identify key themes and patterns related to community-based approaches to adaptation in Sub-Saharan Africa

3.2 Exclusion and inclusion Criteria

The exclusion criteria for this study included studies that focused on regions other than Africa and studies conducted before 2011. This was because the study aimed to examine the current state of knowledge and practice in community-based adaptation in Sub-Saharan Africa. The inclusion criteria for this study included studies that focused on community-based approaches to adaptation in Sub-Saharan Africa and were conducted from 2011 to the present. Studies that explored the effectiveness of community-based adaptation strategies, the role of local communities in adaptation, inter-sectoral collaboration, indigenous knowledge systems, long-term planning and investment in adaptation, and capacity building were included in the analysis.

4. DATA ANALYSIS

The identified studies were analysed using a thematic analysis approach. This involved identifying key themes and patterns in the literature and categorizing them according to their relevance to the research question.

5. CONCLUSION AND RECOMMENDATIONS

The systematic review of existing literature on the impact of climate change on community disaster risk in sub-Saharan Africa has revealed that climate change is exacerbating the frequency and intensity of extreme weather events, leading to waterborne diseases, displacement, food insecurity, and famine. Poverty and gender-specific challenges also play a significant role in shaping vulnerability to climate change impacts. The review has identified several strategies for adaptation, including building resilience through climate-smart agriculture practices, improving infrastructure and early warning systems, and community-based approaches to disaster risk reduction and adaptation. However, challenges such as lack of funding and resources, inadequate governance, and policy frameworks hinder the implementation of these strategies. To enhance the resilience of vulnerable communities in sub-Saharan Africa, it is recommended that governments, civil society, and the private sector should integrate climate change adaptation and disaster risk reduction strategies into national and local development plans. Building partnerships and leveraging innovative financing mechanisms can help overcome the challenges associated with implementing adaptation strategies. Furthermore, there is a need to address gender-specific challenges and recognize the importance of involving local communities in the design and implementation of adaptation strategies. Finally, further research is needed to fill gaps in existing knowledge on the impact of climate change on disaster risk and the effectiveness of adaptation strategies.

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