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Flood risk in Mozambique: communitarian strategies for vulnerability reduction from two case studies

Ricardo Acácio Xavier
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Resumo

Este artigo analisa o risco de cheias e as estratégias comunitárias de redução da vulnerabilidade nos distritos de Chinde e Mopeia, Província da Zambézia, Moçambique. Através de entrevistas, revisão bibliográfica e análise estatística, foram identificados fatores económicos, infraestruturais, políticos e individuais que contribuem para a vulnerabilidade. Os resultados revelam capacidade institucional limitada e exposição persistente em zonas de risco, apesar dos sistemas de alerta precoce. O estudo destaca abordagens comunitárias proativas, baseadas nos comités locais (CLGRD) e nos Centros de Recursos e Usos Múltiplos (CERUM), reforçando a liderança tradicional e a integração do conhecimento local na gestão de riscos.

Palavras-chave: risco de cheias; vulnerabilidade; adaptação comunitária; Moçambique; resiliência.

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Abstract

This paper examines flood risk and community vulnerability reduction strategies in Chinde and Mopeia districts, Zambezia Province, Mozambique. Using interviews, bibliographic review, and statistical analysis, it identifies economic, infrastructural, political, and individual factors contributing to vulnerability. Findings reveal limited institutional capacity and persistent exposure in flood-prone zones, despite existing early warning systems. The study highlights community-based approaches, emphasizing proactive adaptation through local committees (CLGRD) and Centres for Resources and Multiple Uses (CERUM). Strengthening traditional leadership and integrating community knowledge into disaster risk management can enhance resilience and sustainable adaptation to recurrent flood events.

Keywords: flood risk; vulnerability; community adaptation; Mozambique; resilience.

Introduction

In recent years, the world has witnessed a growing increase in disaster risk resulting from natural processes like river floods. The impact of these phenomena – depending on their magnitude and the socioeconomic and technological capacities of individuals, communities, and nations (Cutter et al., 2003; Mendes, 2010; Santos et al., 2022) – can lead to a range of consequences including displacement and permanent relocation.

These consequences are characterized both by their global nature and their uneven distribution, as well as by the increasing frequency and intensity of such natural phenomena at local, regional, and global levels. This implies that disaster risk is no longer solely relevant from the perspective of those directly affected but has instead become a global concern (Mattedi, Marcos & Brikner, 2019).

Although all countries and social strata are already experiencing the effects of these phenomena, less developed countries are suffering the most severe consequences, despite contributing little to the worsening of the flood triggering factors, like rainfall and storm patterns aggravated by the warming of the Globe. Therefore, it is urgent that such countries and their local communities strengthen their response and adaptive capacity.

Response and adaptive capacity, along with exposure and propensity to loss – commonly referred to as susceptibility – are three main characteristics that describe vulnerability (Birkmann et al., 2013). Specifically in regard to floods – where indirect impacts are particularly relevant in non-inundated areas in Africa – individuals, communities, and assets become vulnerable when they are unable to adequately anticipate, withstand, and recover from disaster threats, or when a range of elements they rely on – such as housing, water sources, crops, livestock, the economy, and employment – are placed at risk by flood-related physical processes, accompanied by political, socioeconomic, or environmental processes (Venton & Hansford, 2006; Yusmah et al., 2020). The intersection between vulnerability and hazardous processes increases the likelihood that a threat will result in harm to these people or systems.

Mozambique's legal and institutional framework for responding to calamities caused by natural processes has been strengthened in recent years (INGC, 2013, 2017). However, significant gaps and resource constraints remain, particularly in addressing the root causes of disasters through preventive measures. As a result, recovery planning often falls short of being effective, sustainable, and respectful of local customs and subsistence needs of affected communities (Jacobs and Almeida, 2020).

Research Questions and Purposes

The research aimed to assess the vulnerability and adaptive capacity of communities regarding the risk of floods, inundations, and climate change in the districts of Chinde and Mopeia, located in Zambézia Province, Mozambique, at the mouth of the transnational Zambeze river.

This purpose was derived from the following research questions:

- Why do so many people continue to fall victim to floods and inundations despite the existence of an operational warning and alert system for flood risks in Mozambique?
- Given the various intervention strategies including the use of new technologies, technical capacity building, and institutional coordination both nationally and among Southern African countries in early warning signals what has been failing in disaster risk reduction strategies?
- Finally, what factors lead communities residing in flood-prone areas to persist in living and conducting their activities in these locations (see Figure 1) rather than relocating to the safer areas designated by authorities?

Vulnerability Diagnostic of the Mopeia and Chinde Communities

Local interviews, bibliographic review and statistical analysis of official and geographical data allowed to identify four types of factors that influence vulnerability in Mopeia and Chinde.

A total of 72 interviews were conducted: 31 in the Mopeia district, 36 in the Chinde district, 1 in the Zambeze province capital (Quelimane) and 4 in the contiguous Caia district (at the south margin of the Zambeze river, Sofala province). The interviewees included public managers, officials, members of the Local Disaster Risk Management Committees (CLGRD), community leaders and the respective residents, i.e., people living in flood-prone areas and those living in resettlement neighbourhoods (the reason why some interviewees are located outside the Chinde and Mopeia district, as the Caia district, for example).

Apart from the analysis of the communitarian strategies of local communities, the interviews allowed for the design and implementation of a socioeconomic matrix of vulnerability in each district, through the application of a score-card system, from 0 to 5, to the following dimensions: agriculture, fishing, households, commerce, water sources and coal production. Both communities score 20 in a theoretical range of 0 to 30. Compared with droughts, soil loss and plagues, flooding surges with the highest vulnerability scores.

Combining the distinct techniques and methods of research, the following four vulnerability factors were saliented:

- Economic factors include poverty resulting from dependence on fragile livelihoods, lack of opportunities for access to credit, access to employment and to public investment; failure of resettlement programs (Figure 2); and the persistence of local customs.

Figure 1. Adaptation of residential houses in the flood prone areas in the study area, as a strategy to avoid relocation and loss of proximity to livelihood-essential resources.

Figure 2. Resettlement houses in the neighborhoods of "24 de Setembro" (Mopeia, top) and "Matilde" (Chinde, bottom)

- Infrastructural factors include lack of basic health, education, and sanitation services; insufficient and fragile water infrastructure (including inadequate roads and access, dams, dikes, and reservoirs); and rapid urbanization.
- Political factors include wars and successive political-military conflicts, which lead to temporary displacement and the destruction of infrastructure, as well as weak institutional coordination and cooperation both nationally and among countries.
- Individual factors include low levels of educational qualifications and limited access to information, weak public and institutional awareness, and a shortage of skilled human resources.

Communitarian Strategies for Vulnerability Reduction

Interviews with community leaders, decision makers and disaster risk practitioners at distinct levels of competence, defend a change from a reactive approach to a proactive one (Figure 3), that is sustained in an institutional regional level response based on Action Plans, and a more local – although vertically connected – approach that addresses risk preparedness and sustainable livelihoods, without the need for relocation (Figure 2).

Agriculture is the key activity for the subsistence of local communities, although some erroneous practices should be avoided, that increase soil loss and dependence on monoculture. Accessibility and energy supply are another key elements in a sustainable and resilient planning for vulnerability reduction.

Whenever relocation is unavoidable – and recognizing the extremely difficult challenge of reducing vulnerability drivers (low income, weak health and educational services and low economic dynamism) –, it becomes crucial to act on exposure at the level of urban and spatial planning, integrating various scales and administrative levels of management. Land management guidelines at provincial level need to be complied with at local level, with clear accountability for non-compliance from the defined norms, in order to avoid repeating mistakes of re-occupying incompatible areas for housing purposes.

The initiative for the community preparedness, however, still relies on a top-down mechanism, reflected on the legal creation and capacitation of two essential local-level bodies, the Centre for Resources and Multiple Uses (CERUM) and the Local Committees for Disaster Risk Management (CLGRD).

These bodies (CERUM and CLGDR) arise within the scope of the so-called 'precautionary principle,' proposed by Giddens (2000, p. 39), which, according to Mendes (2015, p. 36), is based on the surveillance system, alert system, monitoring, and knowledge exchange, as well as the adoption of positive measures and initiatives for managing situations of high uncertainty and advancing knowledge.

Based on this principle (Figure 3), the CERUM are tasked with working on the training and capacity-building of CLGRD and small and medium-sized enterprises on best practices that can help reduce vulnerability to disaster risk through actions that promote mitigation and adaptation. Meanwhile, CLGRD, in partnership with community authorities, train individuals and communities (both urban and rural) on how to deal with disaster risks and implement adaptation strategies in response to the increasing frequency of natural disasters and their impacts on communities (INGC, 2012).

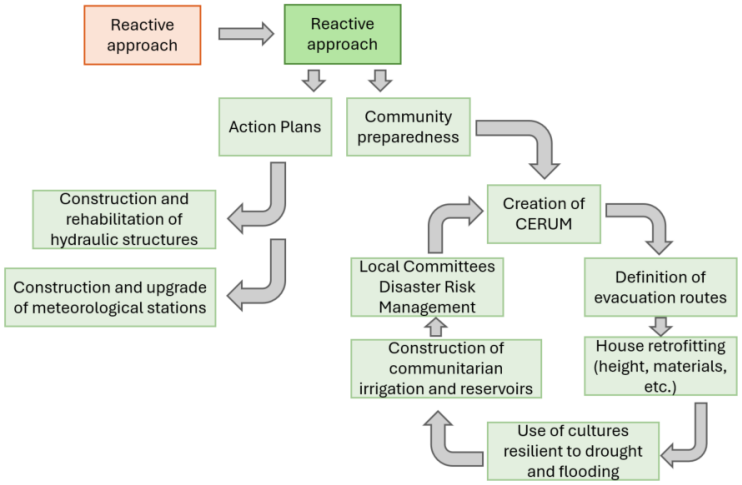

Figure 3. The change from a reactive to a proactive response in adaptation and mitigation of flood risk disasters.

Traditional and formal leadership mechanisms

Leadership in indigenous local communities is another key element to consider in disaster risk management in Mozambique.

According to Lourenço (2008), local community authorities and the political-administrative and spiritual power (inter)related to them have been and continue to be important agents of social cohesion and cultural identity, legitimising authority and regulating relations between the members of their community and with other surrounding communities, as well as with the environment. These aspects make community authorities highly respected and regarded locally. However, although Decree-Law 15/2000 gives them certain political-administrative powers, they are legitimised by the communities, which allows them to act as local political actors coordinating small activities (managing and resolving small social conflicts and in the processes of organising society) and assisting formal state institutions in coordinating disaster risk management and risk reduction activities in terms of raising awareness among communities and receiving displaced people in case of need.

It's important to note that among the community authorities there are two categories: community leaders, who have political-administrative functions; and traditional leaders (religious leaders) who look after spiritual matters. In this local political system, it is interesting to note that every spiritual leader is also a community leader, but not every community leader is a traditional (religious or spiritual) leader.

In general, community leaders have community and spiritual leaders in their court or council of elders whom the communities recognise as having spiritual power. Community members attach themselves to their power and ability and, according to local beliefs, it is believed that they can influence disaster control, namely 'by promoting or diverting the area of occurrence of natural phenomena' (Matusse, Barros, & Barros, 2009).

Final Remarks
Main contributions

The mapping of flood vulnerability factors in each district will assist local decision-makers in making informed decisions. The research included some training and capacity-building of Local Committees for Disaster Risk Management (CLGRD) and community leaders, which is expected to broaden awareness on climate issues (causes, impacts, and response strategies). The research prompts reflection on the history, values, cultures, practices, and customs that are often overlooked in the processes of relocating communities from risk zones to areas considered safe.

Limitations encountered during the research

Main limitations consisted of issues in accessing databases and documents in institutions dealing with disaster risk (INGD, INAM, ARA-Zambeze). Moreover, logistically, the lack of access roads prevented the visit to more communities in the selected districts. Finally, linguistic limitations of some communities, who only speak local languages, required the restructuring of techniques and data collection methods (resorting to the local language in some cases).

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