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Research Article

Local Communities Participation in Flood Disaster Risk Reduction along the Little Ruaha River Basin, Tanzania: Opportunities and Challenges

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ABSTRACT

This paper examines the opportunities and challenges for local communities' participation in flood disaster risk reduction along the Little Ruaha river basin, Iringa district, Tanzania. A mixed research design was employed to collect data from 129 heads of household in Mbuyuni and Magozi villages. Structured interviews, focus group discussions, in-depth interviews and field observation were used to collect primary data whereas secondary data were collected through documentary review.

Keywords: Flood disaster risk; Local communities; Little Ruaha river basin; Tanzania

INTRODUCTION

Flooding remains one of the most devastating natural disasters in the world, despite significant investments in prevention and management in recent decades. Floods often occur without warning, with a sudden surge that always causes disasters for unprepared communities. Floods have undesirable impacts including damage to public facilities such as offices, roads, bridges, death, health risks, mental trauma, disruption of educational activities, materials loss, disruption of economic activities and water pollution. AL-Hussein et al.; Yusuf et al. and Ghambi et al. observed that in recent years, floods have become more frequent and of increasing severity resulting into loss of life, injury, homelessness, damage to infrastructure and environment as well as impacting on other critical sectors such as education and agriculture [1].

Conceptual framework

This study is informed by the Integrated Flood Risk Management (IFRM) framework (Figure 1) which has been modified from Ilieva et al. The IFRM consists of structural and non-structural approaches in reducing flood disaster risk. Through structural system, the IFRM involves direct measures that aim at controlling flow of water on the right channels. Such measures include engineering structures like building flood defenses (levees and walls), constructing drainages, widening and deepening river depth and other structures that have capacity to reduce the speed and intensity of floods. Besides, the structural approach involves natural system like conserving wetlands and natural buffers that are helpful in reducing vulnerability of local communities and their livelihoods to floods. Through non-structure system, the IFRM involves measures such as policies on land use planning, environmental management, building codes, communities preparedness to disaster emergency, response and recovery knowledge. According to the IFRM, effective flood risk management requires ranges of different stakeholders from all levels. However, the flood vulnerable communities should be at the centre. Indeed, this conceptual framework was chosen to guide this study because it acknowledges the participation of local communities in reducing their vulnerability to floods through structural and/or no-structural interventions [2].

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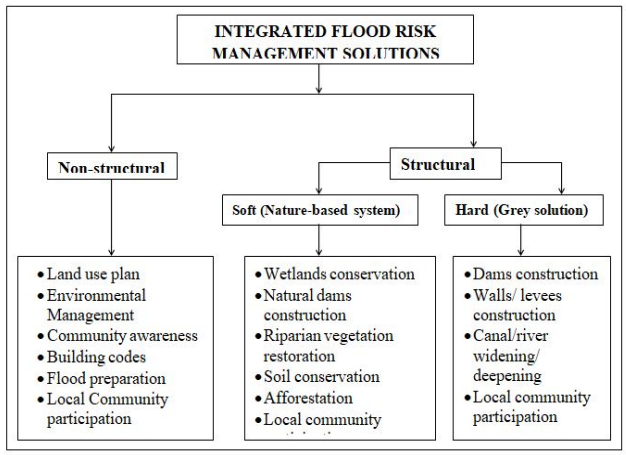


Figure 1: The integrated flood risk management.

The objective of IFRM is to cost-effectively manage the risks posed by floods across landscapes, considering existing and future scenarios, and to improve flood resilience by minimizing economic damages and loss of life, and limiting potential negative impacts to health, well-being, and economic development; maximizing sustainable economic benefits of land use; and improving or maintaining floodplain ecosystems dependent on flood inundation. The framework, in addition, admits that there are localized opportunities and challenges for local communities' participation in reducing flood disaster risk through structural and non-structural measures. The advantages of IFRM include being robust, flexible, and adaptable, as well as comprehensive. Therefore, the framework was suitable to assess the available opportunities and challenges for local communities' participation in flood disaster risk reduction along the Little Ruaha river basin that is prone to floods because it values the invaluable role played by local communities in reducing their vulnerability flood disaster risk [3].

MATERIALS AND METHODS

Description

The study was conducted along the LRRB in Iringa district. The LRRB lies within longitudes 35° 30' E and 35° 36' E and latitudes 7°11' S and 8° 36' S (Figure 2) [4].

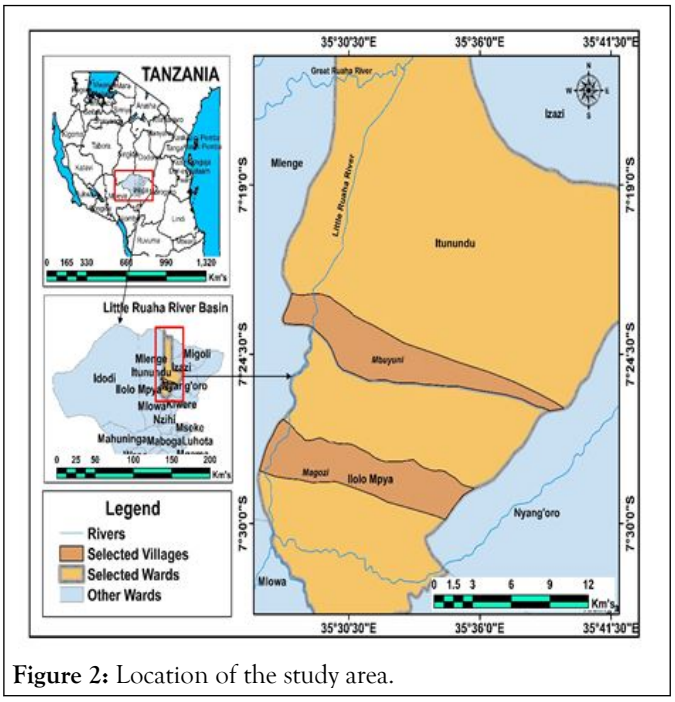


Figure 2: Location of the study area.

Research design

This study employed the mixed research design to collect quantitative and qualitative data from the participants. The design was chosen because since the study used both quantitative and qualitative data, the mixed research design was relevant for handling the quantitative data and perceptions of the different research participants. The bottom line of opting for the mixed research design was to improve the validity and reliability of the research findings through triangulation of quantitative and qualitative research designs in data collection and analysis [5].

Sample size

Iringa district was selected purposively because it covers a large area of a low-lying plain that is prone to floods compared with other districts in the LRRB watershed area. Similarly, purposive sampling was used to select Mbuyuni village from Itunundu ward and Magozi village from Ilolo Mpya ward because of their exposure and vulnerability to floods in relation to the distance from the Little Ruaha river. Correspondingly, these villages are found in the catchments of the Ihemi Cluster in the Southern Agricultural Growth Corridor of Tanzania (SAGCOT) which intends to enhance agricultural production. Thus, the villages being located in the SAGCOT zone, the livelihood of the people were affected by the recurrent floods. The sampling frame of this study consisted of 1,290 heads of household, 900 from Mbuyuni and 390 from Magozi villages [6].

Data collection

Primary data were collected through structured interviews, in-depth interviews, direct field observation and Focus Group Discussions (FGDs). Questionnaires with open and closed-ended questions were administered to 129 household heads. Open-ended questions were used to collect qualitative data

based on respondents' experience on their participation in flood disaster risk reduction. Closed-ended questions were used to collect quantitative data to ensure uniformity in responses and simplify data coding and entry into data analysis software. In-depth interviews were used to collect data from key informants to determine official support during the study. Two FGDs one in each village were conducted to collect narrative information from 16 participants. Documentary review was used to collect secondary data. The secondary data sources included Village land use plan, village disaster risk mitigation by-laws and coordination, Iringa district socio-economic profile, climate risk profile series-Iringa district, and Tanzania Water Resources Management Policy [7].

Data analysis

Quantitative data which were collected through questionnaires were edited, coded and entered into Statistical Products and Service Solutions (IBM SPSS) version 27. Descriptive statistics such as frequency and percentages were calculated by using the software. Similarly, cross-tabulations were run in order to show relationships between, for instance, opportunities for local communities to participate in flood disaster risk reduction and the studied villages. Content analysis technique was used to analyse qualitative data whereby themes and subthemes were generated [8].

Ethical consideration

Research clearance was sought from the University of Dar es Salaam and it was then submitted to Iringa Regional Administrative Secretary, who then submitted to the VEOs in the respective villages for the data collection exercise. Similarly, participants were informed that participation in this study was voluntary and, in addition, their anonymity was guaranteed.

RESULTS AND DISCUSSION

Local communities opportunities

According to Wisner et al.; Parvin et al. and Chawawa most of households living in flood prone areas are aware of the risks caused by floods. Thus, they always participate in disaster risk reduction depending on the opportunities available. Yet, the opportunities vary across space and scales. This study examined the opportunities available for local communities participation in flood disaster risk reduction in the study area, and the findings are presented in Table 1 [9].

Table 1: Opportunities for local communities participation in floods disaster risk reduction (N=129).

Opportunities	Villages				Total	
	Mbuyuni		Magozi			
	Frequency	%	Frequency	%	Frequency	%
Availability of resources	77	86	25	64	102	79
Community awareness of flood DRR	63	70	30	77	93	72
Presence of local department for DRR	48	53	29	74	77	60
Stakeholders' support	50	56	25	64	75	58

Note: *Based on multiple response analysis

DRR: Disaster Risk Reduction

The findings show that about 79% of the respondents said that they had resources for floods disaster risk reduction (Table 1). Through FGDs it was noted that the availability of land added people's livelihoods thus, reduced individuals' flood vulnerability. Furthermore, the availability of water in the Little Ruaha River was used for domestic and for irrigation agriculture. In-depth interviews with VEOs indicated that communities in the study area had social cohesion. It was further noted that social cohesion was formed through neighborhoods and clan organizations. During FGDs in Magozi village it was found that people had technology that was used to build houses that were less affected by floods. Similar FGDs revealed that houses that were less affected by floods were built using burnt brick with mortar together with raised foundation. However, In-depth interviews with VEOs noted that communities had resources, but still majority were vulnerable to

floods because of un-equal access to resources. Similarly in-depth interview with VIDMAC in Mbuyuni village noted that men had more access to resources than women. In a similar vein, the FGDs in Mbuyuni village showed that flood disaster risks in the village were caused by poor building codes. Furthermore, it was noted that majority of the residents built and conducted livelihoods in the flood prone area.

The findings show that access to resources in the study area varied across group. This implies that some group was more vulnerable to floods than others due to variation in the access to resources. The Sendai framework advocates the need for gender inclusive policies on resources access and control in order to reduce vulnerability of one group from different hazards, International Strategy for Disaster Reduction (ISDR). Equally, interview with DEO noted that poor farming methods accelerated floods in the study area. For instance, similar interview found that most people cultivated and grazed near the river banks, the situation which increased soil erosion hence accelerated floods' intensity.

Challenges of local communities participation

The study examined the challenges for local communities participation in floods disaster risk reduction along the LRRB and the findings are presented in Figure 3.

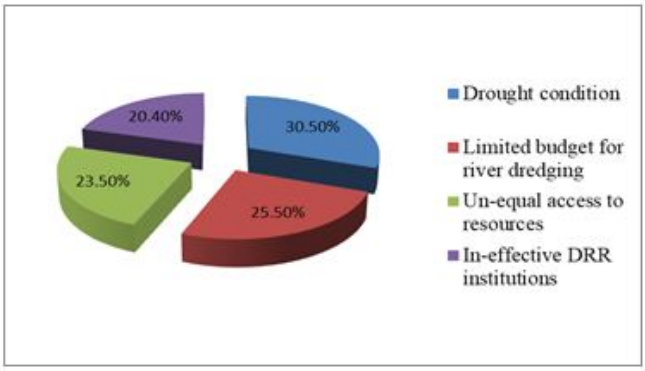


Figure 3: Challenges for local communities participation in floods DRR.

The findings in Figure 3 indicate that 30.5% of the respondents affirmed that drought condition was the leading limiting factor for local communities participation in floods disaster risk reduction. It was revealed during FGDs and in-depth interview with DEO that people planted trees to reduce soil erosion and floods intensity. But due to prolonged dry season most trees dried as presented by the DEO in Iringa district.

The findings presented show that prolonged dry season affected afforestation practices that were essential in reducing flood disaster risks in the study area. In-depth interview with VEO of Mbuyuni village revealed that the village had a by-law that requires every household to plant at least five trees per year. Further, the interview showed that many households implemented the by-law, but due to prolonged dry season many trees dried while still young. Field observation found few planted trees which survived along the river banks and mostly were *Mangifera indica* and *Phragmites australis*. Evidence showed that the study area lies in the semiarid with annual rainfall ranging between 500 mm to 600 mm and average temperature from 20°C to 25°C. Thus, it is evident that communities had an opportunity of using ecosystem-based practice to reduce floods disaster risk. But the prolonged dry season affected the practice. According to the UNDRR, vulnerable communities should be able to understand risk drivers in all scopes so as to adopt mitigation strategies that suit the context.

CONCLUSION

The study found strong opportunities for local communities participation in floods disaster risk reduction in the LRRB. Yet, the opportunities varied across individuals and communities. Hence, some groups were more actively participants in flood disaster risk reduction than others. Further, the study found that socio-political and economic challenges limited local communities participation in flood disaster risk reduction in the study area. Communities vulnerability to floods was caused by weak financial capacity, poor land use plan and weak institutional capacity. For the sake of rebuilding communities resilience to floods, local communities participation in the study area should be assisted by the government and other stakeholders through capacity building. The support should be emphasised at floods disaster risk prevention, preparation, mitigation, response and recovery stages. The support to flood vulnerable communities from different stakeholders should also focus on assisting them in adapting to sustainable livelihoods, increases individuals income as well as understanding from disaster risks in all dimensions.

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