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in the Informal Settlements of Nyeri Town**



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Challenges Encountered During Disaster Risk Reduction Initiatives in the Informal Settlements of Nyeri Town

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ABSTRACT

Purpose: This study aimed to assess the challenges encountered during the implementation of DRR initiatives in informal settlements of Nyeri Town, Kenya specifically Majengo Witemere, Ngangarithi kwa Mwaura, Mathari “Transformer,” and Ruring’u Muslim Village. It also explored behavioral factors influencing community engagement using the Theory of Planned Behaviour (TPB).

Methodology: A descriptive cross-sectional research design was employed to facilitate analysis of multiple variables related to DRR participation. The study targeted 97,469 residents, from which a stratified sample of 384 respondents was drawn using simple random sampling to ensure representation. Data were collected through structured questionnaires consisting of both closed- and open-ended questions. Ethical approval was secured, and informed consent was obtained from all participants.

Findings: Results showed that 43.5% of residents were unaware of ongoing DRR initiatives. Key challenges identified included low community awareness, inadequate funding, weak institutional coordination, and socio-political barriers such as insecure tenure. Demographic factors particularly education and religion were significantly associated with DRR awareness. Application of the TPB revealed that negative attitudes rooted in past institutional failures, weak subjective norms due to fragmented leadership, and limited perceived behavioral control because of poverty and resource scarcity critically undermined community participation in DRR activities.

Unique Contribution to Theory, Policy and Practice: The study deepens theory on vulnerability and resilience, informs inclusive urban governance through grassroots integration in DRR, and promotes practical approaches like participatory risk mapping and tailored capacity-building for informal settlements in Nyeri Town.

Keywords: *Disaster challenges, Informal Settlements, Disaster Awareness*

1.0 Introduction

Introduction

Disaster risk reduction (DRR) has increasingly become a central concern for both local and international development efforts, particularly in urban informal settlements where vulnerability to hazards is high. Informal settlements, often characterized by poor housing, inadequate infrastructure, and insecure land tenure, pose significant challenges for implementing effective DRR strategies (UNISDR, 2015). In Kenya, urban centers like Nyeri Town have seen the rapid growth of such settlements, including Majengo Witemere, Ngangarithi kwa Mwaura, Mathari “Transformer,” and Ruring’u Muslim village. These areas are particularly prone to disaster risks due to poor planning and limited government intervention, making them critical focal points for understanding the complexities of DRR implementation.

Despite increasing national and county-level efforts to improve disaster preparedness, informal settlements remain under-prioritized in risk reduction planning (Twigg, 2015). In these marginalized areas, DRR initiatives often face significant barriers such as lack of community engagement, insufficient funding, and weak institutional coordination. This study seeks to fill this gap by examining the specific challenges faced during DRR initiatives in the informal settlements of Nyeri Town. Previous research has pointed out that low levels of awareness, poor communication channels, and limited access to education hinder the success of DRR strategies in vulnerable communities (Bongo et al., 2018). This is particularly relevant in the case of Nyeri’s informal settlements, where a significant proportion of residents lack formal education, formal employment, or access to DRR-related information. In addition, insecurity, both in terms of land tenure and the physical safety of program implementers, creates further obstacles for DRR initiatives. Understanding these localized challenges is essential for tailoring interventions that are both community-driven and context-sensitive.

The study specifically investigates DRR challenges as perceived by residents of the four informal settlements mentioned, using quantitative data to explore the extent of awareness, the nature of implementation barriers, and proposed mitigation strategies. A key focus is placed on how demographic factors such as education, religion, and occupation influence awareness and compliance with DRR policies. Ultimately, this research aims to inform both policy and practice by providing data-driven insights into the complex realities of disaster risk reduction in marginalized urban spaces. It is anticipated that the findings will not only highlight the constraints hindering effective DRR implementation in Nyeri’s informal settlements but also propose actionable measures to address them. As emphasized by Kelman, Gaillard, and Mercer (2020), reducing disaster risk requires a holistic understanding of vulnerability’s underlying drivers, including social, economic, and institutional dimensions. This study contributes to that

understanding by examining the intertwined structural and community-level barriers that shape DRR outcomes in Nyeri Town.

1.1 Problem statement

Disaster Risk Reduction (DRR) initiatives are critical for enhancing resilience and minimizing the adverse effects of hazards, particularly in informal settlements where vulnerabilities are often pronounced due to inadequate infrastructure, poverty, and unregulated urban development (UNISDR, 2015). Despite the implementation of various DRR strategies in informal settlements such as Majengo Witemere, Ngangarithi kwa Mwaura, Mathari “Transformer,” and Ruring’u Muslim village in Nyeri Town, the prevalence and impact of disasters continue to pose significant threats to residents' livelihoods, safety, and well-being. This raises critical questions about the efficacy and reach of current DRR initiatives.

Recent data indicates that 43.5% of residents in these settlements are unaware of any DRR programs in their areas, suggesting a substantial information gap (Field Survey, 2025). Furthermore, multiple barriers hinder the successful implementation of DRR initiatives, including a lack of community participation, limited government support, inadequate funding, and insufficient education among residents. These challenges undermine the intended objectives of DRR, ultimately leaving informal settlements highly susceptible to recurring disaster risks.

The disconnect between DRR policies and local realities is exacerbated by socio-economic and demographic disparities. Statistical analyses show significant associations between education and religion with awareness and compliance levels concerning disaster policies, highlighting systemic inequalities in access to vital information and services. This uneven landscape limits community resilience and reduces the potential for sustained risk reduction outcomes (Twigg, 2015).

Moreover, while some residents favor knowledge-based and preparedness-focused DRR strategies, the implementation of these approaches is constrained by insecure land tenure, lack of technical expertise, and hostile attitudes towards program implementers. These operational and social barriers indicate the need for a context-specific, inclusive, and participatory DRR approach that aligns with local capacities and challenges (Pelling & Wisner, 2009).

In light of the above, there is a critical need to comprehensively investigate the specific challenges hindering effective DRR implementation in Nyeri Town’s informal settlements. This study aims to bridge that gap by identifying and analyzing these obstacles to inform more effective, community-driven disaster risk reduction interventions.

1.2 Objective of the study

The general objective of this study was to assess the challenges encountered during disaster risk reduction initiatives in the informal settlements of Nyeri town

- To identify and analyze the key challenges hindering the effective implementation of Disaster Risk Reduction (DRR) initiatives in informal settlements in Nyeri Town.
- To assess the level of community awareness, participation, and perceptions regarding existing DRR strategies in selected informal settlements of Nyeri Town.

Research questions/Hypothesis

- What are the key challenges hindering the effective implementation of Disaster Risk Reduction (DRR) initiatives in the informal settlements of Nyeri Town?
- What is the level of community awareness, participation, and perception regarding existing DRR strategies in the selected informal settlements of Nyeri Town?

2.0 Literature Review

2.1 Theoretical Review

Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB), developed by Ajzen (1991), suggests that human actions are guided by three components: attitudes, subjective norms, and perceived behavioral control. These components collectively shape an individual's intention to perform a particular behavior. In the context of disaster risk reduction (DRR) in informal settlements of Nyeri Town, the theory provides a valuable lens to examine why communities either engage or fail to engage in DRR initiatives. If residents hold negative attitudes toward DRR activities viewing them as ineffective, irrelevant, or externally imposed their willingness to participate diminishes, undermining the success of the interventions (Ajzen, 1991).

Attitudes towards DRR in informal settlements are often shaped by past experiences and trust in institutions. Studies have shown that when communities perceive DRR strategies as externally driven or not tailored to their specific needs, they tend to disengage from such efforts (Paton, 2003). In settlements like Majengo Witemere and Ruring'u Muslim Village, a history of minimal government response and poor follow-up on community concerns can lead to widespread skepticism. This affects how residents evaluate DRR programs and whether they view participation as worthwhile or beneficial.

Subjective norms social pressures and expectations also influence community participation. In informal settlements, where social cohesion may be weak and leadership structures fragmented, community members may not feel socially obligated to take part in DRR measures (Bandura, 1997). When local leaders, elders, or peer groups are not actively promoting or participating in DRR, the community is less likely to engage. Conversely, studies have shown that strong community-based support and collective identity significantly enhance participation in disaster preparedness (Twigg, 2007).

Perceived behavioral control refers to individuals' beliefs about their capacity to influence outcomes. In marginalized urban communities, this is often constrained by poverty, lack of information, insecurity of tenure, and limited resources. If residents feel they lack the tools, skills, or institutional backing to engage in DRR, their intention to act is significantly reduced, regardless of attitude or social pressure (Bandura, 1986).

2.2 Empirical Review

Challenges hindering the effective implementation of Disaster Risk Reduction (DRR)

Several empirical studies have documented the institutional and policy-related challenges that hinder effective DRR implementation in Kenya. Rotich (2019) noted that Kenya lacks a unified disaster management policy, legal framework, and institutional coordination mechanism. This vacuum has led to poor coordination of disaster response efforts, duplication of roles, and ineffective resource use. The absence of standard operating procedures (SOPs) and emergency operation plans contributes to delayed response times and inefficient recovery processes. Saja et al. (2019) similarly emphasized that fragmented legal and institutional frameworks often result in reactive, uncoordinated disaster interventions. These structural deficiencies limit the nation's capacity to address disasters holistically, especially in the absence of a guiding strategic framework.

Limited funding and resource allocation have also emerged as significant barriers to DRR. Rotich (2019) observed that government allocations for disaster preparedness are insufficient, and donor support is often conditional or inconsistent. This financial constraint affects every aspect of disaster management from data collection and risk mapping to public awareness campaigns and the construction of resilient infrastructure. Studies by Kirui et al. (2011) and Omolo & Simatwa (2010) showed that counties lack the budgetary capacity to implement safety protocols, especially in schools and public institutions, leaving communities vulnerable.

The social and community-based challenges in informal settlements further complicate DRR efforts. Kariuki (2015) found that mistrust between residents and external actors such as government officials or NGOs leads to rejection of interventions, especially those perceived as threats to land tenure or housing security. Informal settlements are often unplanned and lack legal recognition, which limits government and donor engagement in projects such as sanitation, evacuation infrastructure, and emergency preparedness programs (RoK, 2013). High population mobility, insecurity, and limited community participation in planning also hinder long-term DRR engagement (Syagga & Mitura, 2001). This creates a persistent gap in disaster awareness, risk perception, and local ownership of DRR activities.

Empirical evidence also highlights the technical and data-related limitations affecting DRR in Kenya. While some sectors like drought management have made strides in data availability, other sectors face serious deficiencies in disaster trend analysis, monitoring, and evaluation (Rotich,

2019). Birkmann & von Teichman (2010) stressed that the lack of accurate, locally tailored disaster risk and vulnerability data contributes to poor planning and ineffective evacuations. Additionally, studies by Nguyen et al. (2018) and Islam, Chu & Smart (2020) reported that local governments often lack the technical capacity to interpret risk data and integrate it into development and land-use planning. In many cases, community facilities used as shelters during disasters are ill-equipped to serve displaced populations, reflecting the disconnection between policy, technical planning, and actual community needs (Nikoo, 2018; McGranahan, 2015).

Level of Community Awareness, Participation, and Perception Regarding Existing DRR Strategies

Empirical studies consistently reveal that community awareness and participation in DRR strategies across Kenya remain limited, particularly in informal settlements. Rotich (2019) notes that Kenyan communities are generally not well-informed about disaster preparedness and coping mechanisms, which contributes to heightened vulnerabilities and delayed responses during emergencies. The lack of a coordinated disaster management policy and public sensitization has exacerbated this gap, resulting in reactive rather than proactive community involvement in DRR efforts.

Saja et al. (2019) emphasized that meaningful community engagement is often missing in the disaster planning and response process. The failure to incorporate local perspectives has not only weakened the perception of DRR relevance among communities but has also resulted in poor adoption of disaster mitigation measures. This lack of grassroots involvement leads to interventions that are either misaligned with local needs or met with resistance, reducing the overall efficacy of DRR programs.

Further, Bang et al. (2019) and Nguyen et al. (2018) identify that weak national coordination and absence of localized strategies contribute to poor public understanding of disaster risks. Communities often lack guidance and do not perceive DRR strategies as part of their responsibility. Instead, DRR is viewed as a government-led or donor-driven exercise. This perception hampers local participation and prevents the co-production of risk-reduction strategies that are grounded in local realities.

Additionally, the World Water Council (2018) and Kariuki (2022) argue that the top-down governance approach undermines community ownership of DRR initiatives. When communities are not involved in the design or implementation of these strategies, they develop low trust and commitment toward DRR programs. This has been particularly evident in urban informal settlements where residents are suspicious of official initiatives, fearing displacement or eviction, thereby avoiding participation in enumeration or risk assessments (Kariuki, 2015).

Overall, the empirical evidence underscores a critical need to enhance community awareness, foster inclusive participation, and shift perceptions through locally grounded, participatory DRR

planning processes. Such approaches would help build trust, improve preparedness, and align interventions with community-specific needs.

3.0 METHODOLOGY

3.1 Research design

This study used descriptive cross-sectional study design. This design is preferred because it allows for investigation of more than one variable (Mugenda & Mugenda, 2010). The current study focuses on the challenges encountered during disaster risk reduction initiatives in the informal settlements of Nyeri town.

3.2 Research Population and sample

The study targeted residents of the four informal settlements of Nyeri town with a population of 97,469 people. The four settlements were Majengo, Ruringu, Ngangarithi and Mathari in Nyeri town. The population of study was the male and female residents of informal settlements of Nyeri town. It was also decided to include population of different ages, religions, occupation and education. The study used a sample size of 384 respondents that was divided proportionally between the four settlements. The study used simple random sampling to identify the respondents. Simple random sampling reduced bias and gave each individual in the informal settlements a chance to participate. The study used questionnaire which included a mix of closed-ended and open-ended questions.

3.3 Ethical Considerations

During the research period, the researcher was visiting the four settlements; Majengo, Ruringu, Ngangarithi and Mathari in Nyeri town. It was his responsibility to make formal introductions to the household head. To enable this, scientific approval for the study will be sought from Graduate Studies Committee. Ethical approval was sought from the Meru University Institutional Research Ethics Review Committee. Permission to collect data was obtained from the Nyeri County Commissioner's office and the Nyeri County Government. Consent to participate in the study was sought from the potential respondents.

3.4 Research Variables

Challenges encountered during disaster risk reduction was the independent variables while the dependents variable were hindrance of the effective implementation of Disaster Risk Reduction (DRR) and level of community awareness, participation, and perception regarding existing DRR strategies

3.5 Data Collection

This research used the primary and secondary data. The researcher recruited 20 Research Assistants to aid in collection of data in informal settlements. The Research Assistants was required

to have at least a diploma level of education and willing to participate in the study. They were trained for 2 days on the purpose of the study and were involved in the pilot study to gain experience. The 4 informal settlement areas were mapped and each section was assigned 5 Research Assistants to collect data.

4.0 Statistical Analysis

The following statistical were used,

1. Frequencies
2. Chi-square tests

4.1 Demographic Data Analysis

Demographic data analysis involves examining and interpreting information related to specific characteristics of a population or sample. In this context it included respondents' age, gender, occupation, marital status, level of education, and religion

Table 1: Demographic results

Demographic Variables	Frequency	Percentage
Gender		
Male	184	47.9
Female	200	52.1
Total	384	100.0
Age of Respondents		
20-30	141	36.7
31-40	88	22.9
41-50	75	19.5
51-60	48	12.5
>60	32	8.4
Total	384	100.0
Type of occupation		
No Employment	146	38.1
Salaried Employment	47	12.2
Self-employment	191	49.7
Total	384	100.0
Marital Status		
Divorced	22	5.7
Married	184	47.9
Not Ready to answer	28	7.3

Single	126	32.8
Windowed	24	6.3
Total	384	100.0
Level of Education		
College University	91	23.7
No Education	23	6.0
Primary	97	25.3
Secondary	173	45.0
Total	384	100.0
Religion		
Christian	263	68.5
Muslim	114	29.7
None	7	1.8
Total	384	100.0

Table 1 demographic data analysis. The study reveals that gender distribution among the respondents surveyed indicates that Females slightly outnumber Males in the sample, with Females comprising 200(52.1%) and Males comprising 184(47.9%) of the total respondents. This information is crucial for understanding the demographic composition of the sample and can inform further analyses or decisions based on gender-specific insights. The study shows that the largest group of respondents falls within the 20-30 years age range, comprising 141(36.7%) of the total sample. Successively smaller percentages of respondents fall into older age brackets, with fewer respondents aged 51-60 years, 48(12.5%) and over 60 years, 32(8.4%). Age determines the level of vulnerability of an individual to respond to disasters. It also influences person's contribution to social networking and communal activities. The findings indicate that, there is significant number of non-employed residents 146(38.1%) in the informal settlement of Nyeri town. Unemployment may drive individuals to indulge in some informal activities that may accelerate the effects of a disaster when it occurs. The findings show that majority of the respondents 187(47.9%) were married. Marital status may influence the capacity of a household to mitigate a disaster. This result indicates that, majority of the respondents 293(76.3%) were literate (at least reached up to primary level). The level of education is very important to establish extend of awareness of the residents on disaster risk preparedness. The results further shows that majority of the residents in the informal settlements of Nyeri town are Christian as indicated by 263(68.5%). Religions may affect the level of acceptance of some of policies related to disaster risk reduction.

4.2 Key challenges hindering the effective implementation of Disaster Risk Reduction (DRR)

Respondents were asked whether they are aware of any policy rule concerned with disaster risk reduction and to state the one that they know. The result was recorded in table 2.

Table 2: Challenges encountered when initiating disaster risk reduction programme

	Frequency	Percent
Hostility from local community	20	5.2
Inadequate funding	62	16.1
Insecure land tenure	22	5.7
Insecurity of the programme implementers	16	4.2
Lack of community participation	69	18.0
Lack of education among the residents	67	17.4
Lack of expertise	57	14.8
Lack of support from the government	71	18.5
Total	384	100.0

Table 2 sheds light on the main challenges faced during the initiation of disaster risk reduction programs in the informal settlements of Majengo, Ruring'u, Ngangathiri, and Mathira. A lack of government support emerged as the most prevalent obstacle, as reported by 71 or 18.5% of respondents. This was closely followed by the lack of community participation, indicated by 69 or 18.0% of respondents.

Additional challenges were also reported. A lack of education among residents was recognized by 67 or 17.4% of respondents. Inadequate funding was pointed out by 62 or 16.1% of the respondents. Lack of expertise was another significant hurdle, as mentioned by 57 or 14.8% of the respondents.

Other less frequently reported obstacles included insecure land tenure (22 or 5.7% of respondents), hostility from the local community (20 or 5.2% of respondents), and insecurity of the programme implementers (16 or 4.2% of respondents). These findings reflect a wide range of challenges faced during the implementation of disaster risk reduction programs, from funding and support issues to education and community engagement difficulties.

4.3 Mitigation of challenges encountered when initiating disaster risk reduction programme

In this section, respondents were asked to choose from a given list of mitigation measures, the one that they think can mitigate the challenges encountered when initiating disaster risk reduction programme. The result was recorded in table 3.

Table 3: Mitigation of challenges encountered when initiating disaster risk reduction programme

	Frequency	Percent
Decreasing exposure to hazards	118	30.7
Improving management of land and the environment	82	21.4
Improving preparedness for adverse events.	122	31.8
Lessening vulnerability of people and property	62	16.1
Total	384	100.0

Table 3 delineates the primary mitigation measures against challenges encountered when initiating disaster risk reduction programs, as per the respondents' views. The most favored approach was improving preparedness for adverse events, backed by 122 or 31.8% of respondents.

The second most endorsed measure was decreasing exposure to hazards, supported by 118 or 30.7% of respondents. This was closely followed by improving management of land and the environment, indicated by 82 or 21.4% of respondents.

Lessening the vulnerability of people and property was considered the least impactful mitigation measure, as suggested by 62 or 16.1% of respondents. These results highlight the respondents' priorities towards preparedness and hazard exposure reduction as key approaches to overcoming the challenges of initiating disaster risk reduction programs. The management of land and environmental factors also plays a significant role, while lessening vulnerability is viewed as less critical, comparatively.

4.3 Level of community awareness, participation, and perception regarding existing DRR strategies

Respondents were asked whether they are aware of any disaster risk reduction initiatives in their areas of residents and if so, to choose from a list, the one they consider the best disaster risk reduction initiative in their areas. The result was recorded in table 4.

Table 4: Awareness of any disaster risk reduction initiatives in the informal settlements**Are you aware of any disaster risk reduction initiatives in this area?**

	Frequency	Percent
Yes	217	56.5
No	167	43.5
Total	384	100.0

If YES Which do you consider the best disaster risk reduction initiative in this area?

Identify, assess and monitor disaster risks and enhance early warning.	36	16.6
Reduce the underlying risk factors.	53	24.4
Strengthen disaster preparedness for effective response at all levels.	42	19.4
Use knowledge, innovation and education to build a culture of safety and resilience at all levels.	86	39.6
Total	217	100.0

Table 4 provides insights into the residents' awareness and opinions regarding disaster risk reduction initiatives in Nyeri town's informal settlements. It reveals that a majority of respondents, 217 or 56.5%, are aware of these initiatives, while a significant group, 167 or 43.5%, lack this awareness. Among the aware respondents, preferences varied regarding the most beneficial initiatives. The use of knowledge, innovation, and education to build a culture of safety and resilience was considered the top initiative by the largest group of respondents, 89 or 39.6% of the aware group. Reduction of underlying risk factors was the second most favored initiative, as indicated by 53 or 24.4% of these respondents. Following this, 42 or 19.4% of the respondents ranked the strengthening of disaster preparedness for effective response as the third best initiative. The least preferred initiative was the identification, assessment, and monitoring of disaster risk along with enhancing early warning, as indicated by 36 or 16.6% of the respondents. These responses underscore the value placed on education and knowledge sharing in managing disaster risks, followed by risk reduction and preparedness measures.

4.4 Association of informal settlement demographic characteristics and the level of awareness of any policy rule concerned with disaster risk reduction

Association of informal settlement demographic characteristics and with awareness of any policy rule concerning with disaster risk reduction was calculated using chi-square and results recoded. The results showed that the level of awareness was higher for those reside in Ngangarithi informal settlement 63(60.6%) compared to the others. However, the results indicated that there was no significant association between the area of residence and level of awareness of any policy rule concerning with disaster risk reduction [$\chi^2 (3) = 7.026$, $p\text{-value} = 0.071 > 0.05$]. It was also

established that the level of awareness was higher for those in age bracket 20-30 years 75(53.2%), those who were salaried employed 26(55.3%), those who completed college and university education 54(59.3%) and those who had no religion 6(85.7%) but noted that, there was no significant association between the level of awareness of any policy rule concerning with disaster risk reduction with the age of the respondents and the occupation of the respondents as given by the p-values of 0.819 and 0.380 respectively.

The results showed that there was a significant association between the education level of the respondents and the level of awareness of any policy rule concerning with disaster risk reduction [$X^2(3) = 8.056$, p-value = 0.045 < 0.05].

The results also showed that there was a significant association between the religions of the respondents and the level of awareness of any policy rule concerning with disaster risk reduction [$X^2(2) = 10.031$, p-value = 0.007 < 0.05].

Table 5: Association of informal settlement demographic characteristics and the level of awareness of any policy rule concerned with disaster risk reduction

Demographic variables	Yes	No	N	Chi-square (X ²)	Degree of freedom	P-Value
Area of residence						
Majengo	44(44.4%)	55(55.6%)	99	7.026	3	0.071
Mathari	50(53.2%)	44(46.8%)	94			
Ngangarithi	63(60.6%)	41(39.4%)	104			
Ruringu	39(44.8%)	48(55.2%)	87			
Total	196(51.0%)	188(49.0%)	384			
Age bracket						
20-30	75(53.2%)	66(46.8%)	141	1.544	4	0.819
31-40	46(52.3%)	42(47.7%)	88			
41-50	39(52.0%)	36(48.0%)	75			
51-60	22(45.8%)	26(54.2%)	48			
>60	14(43.8%)	18(56.3%)	32			
Total	196(51.0%)	188(39.0%)	384			
Occupation						
No employment	68(46.6%)	78(53.4%)	146	1.936	2	0.380
Salaried employment	26(55.3%)	21(44.7%)	47			
Self-employment	102(53.4%)	89(46.6%)	191			
Total	196(51.0%)	188(49.0%)	384			
Level of education						
College University	54(59.3%)	37(40.7%)	91	8.056	3	0.045
No Education	9(39.1%)	14(60.9%)	23			
Primary	40(41.2%)	57(58.8%)	97			
Secondary	93(53.8%)	80(46.2%)	173			
	196(51.0%)	188(49.0%)	384			
Religion						
Christian	144(54.8%)	119(45.2%)	263	10.031	2	0.007
Muslim	46(40.4%)	68(59.6%)	114			
None	6(85.7%)	1(14.3%)	7			
Total	196(51.0%)	188(49.0%)	384			

5.0 Discussion, Conclusion and Recommendation

This section presents a comprehensive synthesis of the study's findings regarding the challenges encountered during disaster risk reduction initiatives in the informal settlements. It offers a critical analysis of the key results, drawing connections to existing literature and theoretical frameworks. The discussion explores the implications of residents' preferences and challenges in adopting DRR initiatives, while the conclusion summarizes the core insights and their relevance to effective disaster management. Finally, recommendations are provided to guide policymakers, community leaders, and stakeholders in addressing identified gaps and enhancing resilience through inclusive, knowledge-driven, and well-supported DRR interventions in informal settlements of Nyeri town, Nyeri county, Kenya, particularly in Majengo Witemere, Ngangarithi kwa Mwaura, Mathari "transformer", and Ruring'u Muslim village informal settlements.

5.1 Discussion of the Findings

The findings of the study indicate that a significant portion (56.5%) of residents in Nyeri's informal settlements are aware of the challenges associated with disaster risk reduction (DRR). The most favored DRR initiative among respondents (39.6%) was the promotion of knowledge, innovation, and education to build a culture of safety and resilience. This preference aligns with the Sendai Framework for Disaster Risk Reduction, which emphasizes the importance of understanding disaster risk as a foundational element in disaster management. The residents' inclination toward education-driven initiatives suggests that they value information and skills that can help them respond effectively to disasters.

Despite this positive outlook on education-based initiatives, the study revealed a notable deficiency in support for more technical approaches. Only 16.6% of residents considered the identification, assessment, and monitoring of disaster risks a priority. This may point to a lack of capacity or understanding at the community level concerning these technical aspects. Scholars such as Cardona et al. (2012) have underscored the significance of these components in effective DRR. The apparent gap in community-level technical engagement highlights an area that requires focused attention in terms of training and capacity development.

In addition to awareness and preferences, the study identified several key challenges impeding DRR efforts. The most critical among these were lack of government support (18.5%), inadequate community participation (18%), and insufficient education (17.4%). These challenges reflect systemic issues that hinder the implementation of robust DRR initiatives. The absence of strong institutional support, particularly from local governments, mirrors findings in the literature that emphasize the pivotal role of state actors in creating conducive environments for DRR through policy and resource allocation.

Furthermore, resource constraints including inadequate funding (16.1%) and lack of expertise (14.8%) were reported as significant barriers. Interestingly, hostility from the community and

security concerns were minimally reported, suggesting a generally stable environment for DRR programs. The community also identified proactive mitigation measures such as enhancing preparedness (31.8%), reducing exposure to hazards (30.7%), and improving environmental management (21.4%) as effective strategies. These responses demonstrate a growing awareness and willingness among residents to engage in sustainable risk reduction practices when provided with adequate support and information.

5.3 Conclusion

The study concludes that challenges regarding disaster risk reduction in Nyeri's informal settlements is moderate, with a significant proportion of residents valuing education and information as essential tools in managing disasters. This awareness, however, is not matched by technical capacity or comprehensive community involvement in more specialized areas like risk assessment and early warning systems. These gaps hinder the holistic implementation of DRR strategies, making the settlements more vulnerable to disaster impacts.

Although community members favor DRR initiatives related to knowledge and education, challenges such as lack of government support, weak community engagement, and inadequate funding and expertise continue to undermine DRR efforts. These challenges are interconnected and suggest that the institutional, structural, and socio-economic dimensions of disaster management need to be addressed simultaneously. Without addressing these underlying issues, sustainable DRR outcomes are unlikely to be realized in these vulnerable communities.

The study also revealed that despite limited resources and technical constraints, communities are aware of the importance of preparedness, hazard reduction, and environmental management. These findings demonstrate that residents have a foundational understanding of what constitutes effective DRR and are willing to participate in such programs if given the necessary support. This is an encouraging insight that can guide future policy and program design.

Ultimately, the study affirms that an integrated, inclusive, and well-resourced approach is essential for improving disaster resilience in informal settlements. Key success factors include enhancing local capacity, ensuring institutional support, incorporating DRR into development plans, and promoting community-driven strategies. Such a comprehensive approach will help bridge the gap between awareness and action, enabling more effective disaster preparedness and response.

5.4 Recommendations

- i. There is an urgent need to enhance public education and awareness about challenges in disaster risk and preparedness in Nyeri's informal settlements.
- ii. Local government institutions must integrate DRR strategies into County Integrated Development Plans.

- iii. Participatory approaches should be adopted to ensure community involvement in DRR planning and implementation. The establishment of local disaster committees, inclusion of community members in decision-making, and use of local knowledge in DRR design will enhance ownership and long-term sustainability.

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