Disaster Mitigation Measures as Strategies of Disaster Risk Preparedness in Informal Settlements of Nyeri Town, Nyeri County, Kenya

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Abstract

Purpose: The main objective of this study was to examine disaster mitigation measures as strategies of disaster risk preparedness in informal settlements of Nyeri town, Nyeri County, Kenya. To achieve this, the study was guided by two specific objectives: To identify the role of stakeholders in disaster management in the informal settlements of Nyeri Town and to determine the challenges encountered during disaster risk reduction initiatives in the informal settlements of Nyeri Town.

Methodology: The study adopted a descriptive research design using primary data collected through a structured questionnaire. The population for this study was 384 respondents of the four settlements of Nyeri town, that is, Majengo Witemere Ngangarithi, Mathari and Ruring'u Muslim village. The study used a sample of 384 respondents that was divided proportionally between the four settlements.

Findings: The study found out that, majority of the respondents [93.0%] was aware of the disasters that can affect them in their area of residents. The study further established that, majority of the residents 196 (51.0%) were aware of the existence of disaster risk reduction policies as compared to 49.0% who were not aware of any disaster risk reduction policy. The results also showed that there was a significant association between the level of education of the respondents and the level of awareness of the disaster that could affect them [X^2 (3) = 14.848, p-value =0.002<0.05] and the religions of the respondents and the level of awareness of the disaster that could affect them [X^2 (2) = 7.090, p-value =0.029<0.05]. The results however indicated that, there was no significant association between the level of awareness of the disaster that could affect the respondents with the area of residents, age of the respondents and their occupation as given by the p-values of 0.393, 0.485 and 0.390 respectively. The study further established 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], and 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]. It was concluded that Risk assessment as a step for successful disaster reduction measures will ensure that the community members are aware of the possible hazards. National and County government should incorporate the national and international policies and guidelines in their policy.

Recommendations: The Government should be keen on learning on previous disasters that have affected other informal settlements and other parts of the country by having disaster management well kwon by the communities living in informal sectors. The researcher further recommends to the scholars to consider research on Disaster risk preparedness as the strategy of counties development agenda and Social and economic potentials that the County Governments can tap in informal settlements.

Keywords: *Role of stakeholders, challenges, disasters risks, preparedness*

1.0 INTRODUCTION

Informal settlements are groups of people living on land they have no legal claim to and construct houses without approved plan resulting in squatter settlements, slum or shanty town (Doveym, 2013). They are found across the globe mainly in developing countries in urban areas. The settlements are growing and an estimated 1 Billion people in the world live in slums. Problems in urban areas are caused by the change in cities over time. This change such as different economic base (service industries instead of manufacturing) or different activities or population movement leads to different needs within the urban areas (Wekesa, Steyn & Otieno, 2011).

Disasters are worldwide phenomena that range from being highly localized to global in scope (Ronan et al., 2015). Regardless of their origin and classification, all disasters have a public health importance due to their potential to cause loss of lives and livelihoods. What differs, however, is the community's preparedness, which determines its ability to cope and prevent loss of lives and livelihoods during the event and immediately after (Levac, Toal-Sullivan & OSullivan, 2012). Disaster preparedness is a continuous and integrated process resulting from a wide range of risk reduction activities and resources rather than from a distinct sectoral activity by itself (Munasinghe & Matsui, 2019). Predicting a disaster before it happens allows mechanisms such as evacuations that drastically reduce loss of lives and properties. Cities and urban areas provide important opportunities for the development of communities and nations (Baker & Grant Ludwig, 2018). Risks caused by rapid and often improper urbanization compounded by natural hazards create some of the major challenges in the 21st Century. Lam et al. (2017) estimate that by 2050 , 66 per cent of the world's population will be urban, while rapid and unplanned urbanization will also continue to see a dramatic rise in informal settlements. Aside from the negative impacts of improper urbanization on socioeconomic development, the risks and humanitarian consequences of rapid urbanization are alarmingly increasing (Etinay, Egbu & Murray, 2018).

Rapid urbanization and the increasing complexity in urban contexts require better understanding of risk factors and sources of vulnerability and exploring innovative ways for effective disaster risk reduction and response and cooperation with other stakeholders (Baker & Grant Ludwig, 2018). Public education and awareness are necessary in order for members of local communities to collect and document information of disasters that they have encountered and lessons learnt as prerequisites of preparedness for future disasters (Paton, 2019). It is important, to incorporate homegrown coping mechanisms for each community. These activities are supposed to be devoted to the local authorities and provincial administration units in every community. The repetitive nature of both the natural and man-made disasters in the 25years suggests that despite the legal, institutional and policy framework, local communities are not adequately prepared for disaster prevention, control and mitigation (Levac et al., 2012). It is likely that these programs have not been devolved and adequately implemented at community levels.

1.1 Problem Statement

This research sort to examine disaster mitigation measures as strategies of disaster risk preparedness in informal settlements of Nyeri town, Nyeri County, kenya. This is because there is no recent research which have been conducted on risk preparedness in Nyeri County despite the county government of Nyeri considering only Weitemere, Chania and Transfoma informal settlements in their Nyeri Municipality Integrated Development Plan (MIDP) 2018- 2022 and leaving other major informal settlement and allocating budget to only these areas. The informal

settlements, including the Nyeri town informal settlements are faced with many problems of which some of them are their own creation. They have lot of activities some of which are illegal and because of this, they chase away donors and other agencies that may be willing to assist, for example when the government tried to count them, they rejected thinking they are going to be evicted. Some well to do people have grabbed land and then sell to the low-income population and because of that they make the residents hostile to anybody who doesn't live in that area (Kariuki 2015). The top-down approach of governance affects initiatives in disaster risk reduction negatively because the communities are not involved and they are expected to give information of effects of disaster on economy, labour markets, infrastructure, public health and transportation. There is a top-down approach that creates risk informed governance that involves community in deciding on disaster risk reduction (World Water Council, 2018). A study on urbanization disaster and displacement in Central America and south East Asia Found that lack of local governance prioritization of the office duties and insufficient technical abilities to create customized local tools is one of the challenges of disaster preparedness (Obutho, 2002). Lack of political will to prioritize disaster preparedness is a challenge. There is no community initiative to curb disasters and no studies have been done to scientifically analyze the problems. This study therefore seeks to examine disaster mitigation measures as strategies of disaster risk preparedness in informal settlements of Nyeri town, Nyeri County, Kenya.

1.2 Objective of the Study

The general objective of this study was to examine disaster mitigation measures as strategies of disaster risk preparedness in informal settlements of Nyeri town, Nyeri County, Kenya. The specific objectives were:-

- To identify the role of stakeholders in disaster management in the informal settlements of Nyeri Town.
- To determine the challenges encountered during disaster risk reduction initiatives in the informal settlements of Nyeri Town.

1.3 Research Questions

i) What are the roles of stakeholders in disaster management in the informal settlements of Nyeri Town?

ii) What are the challenges encountered during disaster risk reduction initiatives in the informal settlements of Nyeri Town?

2.0 LITERATURE REVIEW
2.1 Theoretical Review

2.1.1 Theory of Human Motivation by Maslow

According to Maslow (1943), theory of Human Motivation by Maslow discusses the two objectives of the study which were to identify the role of stakeholders in disaster management in the informal settlements of Nyeri Town and to determine the challenges encountered during disaster risk reduction initiatives in the informal settlements of Nyeri Town. Maslow's theory of human motivation is cited as a general description of the priorities of human needs and wants. There is no doubt that Maslow's reasoning, particularly his theory of hierarchies of needs and motivation has proven helpful within the contexts of perspectives on growth and even equality, as Maslow ealize ed the potential of every human being. In Maslow's thinking, the 'individual' is seen as the most important actor, and his/her individual agency supersedes other motivations of

action (Maslow 1943). As a humanistic psychologist, Maslow believed that every person has a strong desire to realize his or her full potential, to reach a level of 'self-actualisation'. He was the founder of the new movement of humanistic psychology that reached its peak in the 1960s, and whose main point was to emphasise the positive potential of human beings (Schacter et al. 2012). His thinking has deeply influenced the paradigm of the development agenda, both in theory and in practice, and set the foundation for moral thinking on individual entitlements.

2.2 Empirical Review

2.2.1 Role of Stakeholders in Disaster Management

Efficient disaster mitigation is dependent on collaboration between people from the emergency rescue services, voluntary organizations, United Nations Non-Governmental Organizations, actors from the government ministries, and external expert organizations (Chan, Nozu & Cheung, 2020). Collaboration includes working to achieve common goals and all types of collaboration include information sharing between the involved parties (Robinson & Gaddis, 2012). Reports from recent disasters suggest poor collaboration between emergency rescue agencies (NOU: 2012: 14). Stakeholders in a process are actors (person or organizations) with a vested interest in the policy being promoted. These stakeholders can be grouped into the following categories: international/donors, national political (legislators, governors), public (ministry of health (MOH), social security agency, ministry of finance), labor (unions, medical associations), commercial/private for-profit, nonprofit (nongovernmental organizations (NGOs), foundations) civil society, and users/consumers (Schmeer, 2008).

Communities, particularly those most vulnerable are the key stakeholders in disaster management (Ainuddin & Routray, 2012). These are most vital to people-centered early warning systems. National governments are responsible for the technical systems necessary for the preparation and issuance of timely and effective hazard warnings for their respective countries. The governments must be actively involved in the design and maintenance of early warning systems. It should also have the capacity to instruct or engage the local population to increase their safety and reduce the potential loss of resources on which the community depends. International bodies should provide support for national early warning activities and foster the exchange of data and knowledge between individual countries (Daly et al., 2017).

Non-governmental organizations (NGOs) play a critical role in raising awareness among individuals and organizations involved in early warning and in the implementation of early warning systems, particularly at the community level (Mojtahedi & Oo, 2017). The private sector is also essential as they are usually better equipped to implement ICT-based solutions. The media plays an important role in improving the general population's disaster consciousness and disseminating early warnings. The scientific community has a critical role in providing specialized scientific and technical input to assist governments and communities in developing early warning systems (IASPOINT, 2017).

Mohammad and Mojtahedi (2014) explored why stakeholders take proactive and/or reactive approaches in DRR. The study established that power and legitimacy of stakeholders' result in a proactive approach if stakeholders consider value maximization paradigm in their decision-making process. Powerful and legitimate stakeholders may take reactive approaches because of intuitive reasoning paradigm. Stakeholders may shift from a reactive to proactive approach and vice versa based on the combination of urgency attribute and decision-making paradigms. Burnside-Lawry

and Carvalho (2016) examined one local government's efforts to increase local-level engagement in building community disaster resilience. Preliminary results indicate that strong political leadership and inter-departmental coordination have contributed to engaging local-level participation in disaster risk reduction in the Municipality of Amadora, Portugal. The Findings indicate that the implementation of a wide spectrum of public engagement initiatives has increased awareness of hazard risks amongst specific demographic groups and improved community and government capacity to identify and implement risk reduction strategies.

No single group or organization can address every aspect of disaster risk reduction (Mojtahedi et al., 2017). The thinking sees disasters as complex problems demanding a collective response co-ordination event in conventional emergency management is difficult for many organizations to converge on a disaster area in order to assist. The relationship between types of organizations and sectors, e.g. public, private and non-profit, and communities, becomes more complex. Disaster reduction requires strong vertical and horizontal linkages central local relations. (Mohammad & Mojtahedi, 2014)

2.2.2 Challenges Encountered in Disaster Risk Reduction Initiatives

Many countries are prone to numerous hazardous events, exacerbated by the vulnerability of their rapidly increasing population and leading to frequent disasters that often have dire fiscal and development implications (Bang, Miles & Gordon, 2019). Also, there are challenges to action on disaster risk reduction that can be considered "top-down" or "bottom up" challenges that reflect the difficulties inherent in engaging people in routine health-promotion and risk-prevention activities in general. The challenges identified by Nguyen, Ginige and Greenwood (2018) study included lack of capacity and coordination at the national level; gaps in legal frameworks, lack of guidance for implementation; complex institutional arrangements; incompatibility of building codes, lack of enforcement; lack of qualified human resources and inadequate understanding among the general public.

The informal settlements are faced with many problems of which some of them are their own creation. They have lot of activities some of which are illegal and because of this, they chase away donors and other agencies who may be willing to assist, for example when the government tried to count them, they rejected thinking they are going to be evicted. Some well to do people have grabbed land and then sell to the low-income population and because of that they make the residents hostile to anybody who doesn't live in that area (Kariuki 2015).

The top-down approach of governance affects initiatives in disaster risk reduction negatively because the communities are not involved and they are expected to give information of effects of disaster on economy, labour markets, infrastructure, public health and transportation. There is a top-down approach that creates risk informed governance that involves community in deciding on disaster risk reduction (World Water Council, 2018). A study on urbanization disaster and displacement in Central America and south East Asia Found that lack of local governance prioritization of the office duties and insufficient technical abilities to create customized local tools is one of the challenges of disaster preparedness (Obutho, 2002). Lack of political will to prioritize disaster preparedness is a challenge.

Funding is not uniform where wealthy towns and cities are able to mitigate disasters while poor towns lag behind (Islam, Chu & Smart, 2020). There is lack of cohesion and under prioritization of disaster preparedness relative to other needs such as livelihood and little time to dedicate to

disaster preparedness initiatives. Inadequate accurate and comprehensive disaster risk and population vulnerability records complicates the challenges. Also, there is need for maintained locally customized disaster management plans that would be shared with the community. This contributes to ineffective evacuation, overcrowding of shelters and difficult for the disaster management actors monitoring (Birkmann & von Teichman, 2010). School's sports facilities and community meeting halls are used as evacuation centers. These facilities are not prepared to ensure protection of the displaced. These areas are not able to meet the need of the displaced and are prone to disasters. Local governments do not consider risk reduction in land use plans and inability to interpret risk factors and incorporate them into development plans (Integrated Development and Maintenance Organization (IDMO), 2013).

A study by Soffie (2011) in South Africa, found that challenges facing DRR initiatives are rapid community growth, lack of land, conflicting development agendas, institutional capacity and community behavior. Learning from sustained success, the community derives initiatives to improve urban sanitation can meet the challenges (Mc Granahan, 2015). In a study done in India by Orangi pilot project and alliance of Indian partners identified, challenges, low-income status, and tendency to treat sanitation as private goods not suitable for public support make the sanitation challenges difficult to overcome (Mc Granahan, 2015). Other challenges included local collective action, coproduction challenges that means a process through which input from individuals not in the same organization is transformed into goods and services.

In informal settlements, land ownership is disputed making it difficult to have project like sewage networks (Granahan, 2016). Informal settlement is not legally recognized in planning, security of tenure, infrastructure development, budgeting, public utilities and public participation entrenched inequality, marginalization and exclusion which contribute to the phenomenon of slum and informal settlement (RoK, 2013)**.** High mobility of the people in slums from one slum to the other in search of informal employment leaving the houses very early in the morning and coming back late in the evening. Because of this, it is difficult to have people during household visits, and reliable follow-up appointments can be difficult.in addition there is lack of skilled labour due to unwillingness to work in the slums. People who do not reside in the area may not be willing to work in the slum due to insecurity (Syagga & Mitura, 2001)

3.0 METHODOLOGY
3.1 Research Design

This study used descriptive cross-sectional study design in which the awareness or condition and potentially related factors were measured at a specific point in time for a defined population according to Flick (2015). This design is preferred because it allows for investigation of more than one variable (Mugenda & Mugenda, 2010).

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. Sample size was calculated using Fisher et al. (1998) formula. 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.

3.3 Ethical Considerations

Scientific approval for the study was 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. The participants were guaranteed that the privacy of the data was protected by strict standard of anonymity.

3.4 Research Variables

Roles of stakeholders in disaster risk reduction and challenges in disaster risk reduction were the independent variables while the dependent variable was disaster risk preparedness.

3.5 Data Collection

This research used the primary and secondary data. The instrument used for the collection of the primary data was questionnaire containing questions to measure the level of awareness of the respondents on the type of disasters in their area and existence of policies related to disaster risk reduction. The secondary data constituted relevant literature such as journals, reports internet and related books which contributed to the development of study.

4.0 FINDING OF THE STUDY

4.1 Demographic Data Analysis

The study was interested in the demographic information of the respondents to help understand better the data on the topic under study. This entailed information on respondents' age, gender, occupation, marital status, level of education and religion.

Table 1: Demographic results

Demographic Variables	Frequency (n=384)	Percentage
Gender		
Male	184	47.9
Female	200	52.1
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
Type of occupation		
No Employment	146	38.1
Salaried Employment	47	12.2
Self-employment	191	49.7
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
Level of Education		
College University	91	23.7
No Education	23	6.0
Primary	97	25.3
Secondary	173	45.0
Religion		
Christian	263	68.5
Muslim	114	29.7
None	7	1.8

Table 1 shows that, the total number of female respondents was 200(52.1%) and that of men was 184(47.9%). This indicates that, gender inclusion was considered by the researcher. The study indicates that majority of the respondents 229(59.6%) are in their lower middle age and middle age of between 20-40 years. 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 indicate 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 Awareness of Roles of Stakeholders in Disaster Management

Respondents were asked whether they are aware of roles of stakeholders in disaster management and if so, to choose from a list, the role that they consider important in their area. The result was recorded in table 2.

Table 2: Awareness of roles of stakeholders in disaster management

Are you aware of roles of stakeholders in disaster Management?		
	Frequency	**Percent**
Yes	236	61.5
No	148	38.5
Total	**384**	**100.0**
If yes choose the role that you consider important to this area		
Developing disaster recovery plan	33	14.0
Policy change	13	5.5
Provision of aid	138	58.5
Provision of local technical assistance	52	22.0
Total	**236**	**100.0**

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Table 2 shows that, majority of the respondents 236(61.5%) were aware of the roles of stakeholders in disaster risk management while 148(38.5%) respondents were not aware of the roles of stakeholders in disaster risk management. Majority of the respondents 138 (58.5) of those who were aware of the roles of the stakeholders in disaster risk management stated that the most important role that they considered in their area was provision of aid. The second most important role that was considered was provision of local technical assistance as stated by 52(22.0%) respondents followed by 33(14.0%) respondents who considered that development of disaster recovery plan as the most important. The least important role was policy change as stated by 13(5.5%) respondents.

4.3 Existence of Organizations That Assist During Disaster

Respondents were asked if they are aware of any organization that assist them during disaster mitigation measures in their areas and if so, to choose from a list of organizations that they consider important in their areas of residents. The result was recorded in table 3.

Table 3: Existence of organizations that assist during disaster

Are you aware of any organizations that assist you during disaster?		
	Frequency	**Percent**
Yes	322	83.9
No	62	16.1
Total	**384**	**100.0**
If yes choose the organization that you consider important to this area		
Church organizations	84	26.1
County government	78	24.2
National government	8	2.5
None of the above	10	3.1
Red Cross	142	44.1
Total	322	**100.0**

The findings in table 3 indicate that, majority of the respondents 322(83.9%) were aware of organizations that assist them during a disaster while 62(16.1%) were not aware of any organization that assist them during a disaster. The research further established that, the most important organization that assists them during a fire disaster was Red Cross 142(44.1%) respondents followed by Church organizations 84(26.1%) respondents then County Government 78(24.2%) respondents and the least was the National Government 8(2.5%) respondents. 10(3.1%) respondents stated that none of the organizations mentioned assisted them when a fire disaster occurs in their area.

4.4 Type of Assistance Received from Organizations

Respondents were asked to give the type of assistance they receive from organizations when a disaster occurs. The result was recorded in figure 1.
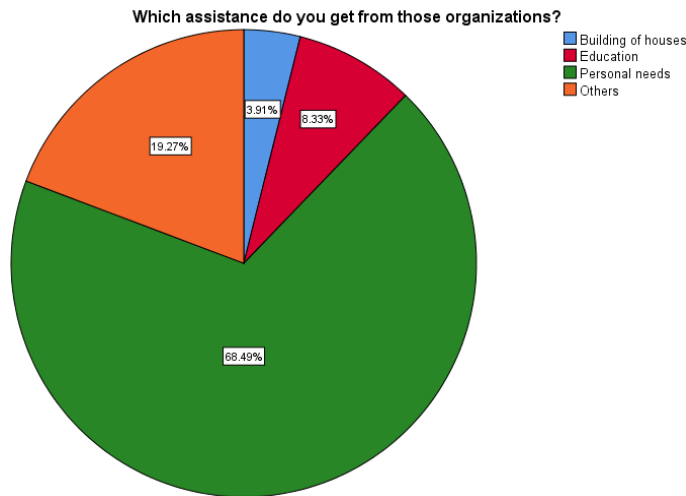
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Figure 1: Type of assistance received from organizations

The findings in figure 1 indicate that, majority of the respondents 263(68.5%) stated that they get personal needs assistance from organizations when a disaster occurs. 32(8.3%) of the respondents stated that they get education assistance from organizations while 15(3.9%) indicated that the assistance that they get from organization was building of houses. 74(19.3%) of the respondents get other assistance.

4.5 Challenges Encountered in Disaster Risk Reduction Initiatives

This study sought to identify the Challenges encountered in disaster risk reduction initiatives. This was achieved by engaging the respondents to give their views on various elements of challenges as follow.

4.6 Awareness of Any Disaster Risk Reduction Initiatives in the Informal Settlements

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**

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Table 4 shows that, Majority of the residents in the informal settlements of Nyeri town were aware of disaster risk reduction initiatives in their areas as indicated by 217(56.5%) of the respondents while 167(43.5%) of the respondents were not aware of any disaster risk reduction initiatives in their areas. Use of knowledge, innovation and education to build a culture of safety and resilience at all levels was considered the best disaster risk reduction initiative in the informal settlements of Nyeri town as supported by 89(39.6%) respondents followed by reduction of the underlying risk factors initiative as supported by 53(24.4%) respondents. Strengthening of disaster preparedness for effective response at all levels was considered the third best disaster risk reduction initiative as stated by 42(19.4%) respondents and the least initiative in the area was identification, assessment, monitoring disaster risk and enhancing early warning as stated by 36(16.6%) respondents.

4.7 Challenges Encountered when Initiating Disaster Risk Reduction Programme

In this section, the researcher wanted to identify challenges encountered when initiating disaster risk reduction programme. Respondents were asked to give their opinions from a list of challenges given. The result was recorded in table 5.

Table 5: Challenges encountered when initiating disaster risk reduction programme

What do you think are the 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 5 indicate that the main challenge encountered when initiating disaster risk reduction programme in the informal settlements of Majengo, Ruring'u, Ngangathiri and Mathira was lack of support from the government as stated by 71(18.5%) respondents followed by lack of community participation as supported by 69(18.0%) respondents. Other challenges included: Lack of education among the residents supported by 67(17.4%) respondents, Inadequate funding supported by 62(16.1%) respondents, Lack of expertise supported by 57(14.8%) respondents, Insecure land tenure supported by 22(5.7%) respondents, Hostility from local community supported by 20(5.2%) respondents and the list was Insecurity of the programme implementers supported by 16(4.2%) respondents.

4.8 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 6.

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Table 6: Mitigation of challenges encountered when initiating disaster risk reduction programme

How do you think these challenges can be mitigated? Choose one

	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 6 indicate that, the main mitigation measure against challenges that were encountered when initiating disaster risk reduction programme was improving preparedness for adverse events which was supported by 122(31.8%) respondents. The second mitigation measure was decreasing exposure to hazard which was supported by 118(30.7%) respondents followed by improving management of land and the environment as supported by 82(21.4%) respondents and the least mitigation measure was lessening vulnerability of people and property as supported by 62(16.1%) respondents.

5.0 DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1 Discussions of the Findings

5.1.1 Roles of Stakeholders in Disaster Management

Interviewees were interviewed to establish the roles of stakeholders in disaster management. The study found out that majority of the residents (61.5%) was aware of the roles of stakeholders in disaster management in their areas. The study revealed that, Provision of aid by the stakeholders (58.5%) was the main important role played by the stakeholders to their areas of residents. This was followed by provision of local technical assistance (22.0%) which was also considered as an important role of the stakeholder followed by development of disaster recovery plan (14.0%) while Policy change (5.5%) was considered as the least important role of stakeholders in disaster risk management in their area.

The study established that majority of the residents (83.9%) in the informal settlements of Nyeri town was aware of organizations that assist them when a disaster occur in their areas. The study further revealed that the most important organization that assist them when a disaster occur in their area was Red Cross (44.1%), followed by church organizations (26.1%), then County government (24.2%) and the least was National Government (2.5%). Presents of organizations in addressing disaster risk reduction is very crucial as no single group or organization can address every aspect of disaster risk reduction without collaboration with one another as stated by Mojtahedi and Oo (2017).The study revealed that NGOs (Red Cross and Church organizations) were the most important organizations that assist the community in disaster preparedness and support a study by Mojtahedi & Oo, (2017) which stated that NGOs play a critical role in raising awareness among individuals and organizations involved in early warning and in the implementation of early warning systems, particularly at the community level.

The study found out that the main assistance they receive from the stakeholders when a disaster occur in their area was personal needs (68.5%), followed by education assistance and the least was building of houses for the affected households. The assistance offered by the stakeholders are in

line with a study that was done in India on mitigation strategies for flash flooding which found that relocation is not preferred strategy and many people were interested in emergency planning at the households and village levels (Arlikatti et al., 2018).

5.1.2 Challenges encountered in disaster risk reduction initiatives

Interviewees were interviewed to establish the challenges encountered in disaster risk reduction initiatives. The study found out that, majority (56.5%) of the residents in the informal settlements of Nyeri town was aware of challenges in disaster risk reduction initiatives in their area. The study further established that, the best disaster risk reduction initiative that was considered by majority (39.6%) of the residents was use of knowledge, innovation and education to build a culture of safety and resilience at all levels. The second best initiative that was agreed by the respondents (24.4%) was reduction of the underlying risk factors initiative while the least disaster risk reduction initiative was identification, assessment and monitoring of disaster in their area of residents as supported by 16.6% of the respondents.

The study found out that the main challenges encountered when initiating disaster risk reduction programme in the informal settlements of Majengo, Ruring'u, Ngangathiri and Mathari was lack of support from the government 18.5%, lack of community participation 18.0%, lack of education among the residents 17.4%, inadequate funding 16.1%, lack of expertise 14.8% and hostility from local community 5.2%. Insecurity of the programme implementers 4.2% was not considered as the main challenge when initiating disaster risk reduction programme in their areas of residents. Hostility from local community had a lower score (5.2%.) which tries to differ with a study done by Kariuki (2015) who found out that many challenges in informal settlements are created by the community themselves, they chase away donors and other agencies who may be willing to assist, for example when the government tried to count them, they rejected thinking they are going to be evicted. Lack of support from the government had the highest score (18.0%) as the main challenge encountered in initiating disaster risk reduction programme in the informal settlements which was also stated by IDMO, (2013) research and quoted that, local governments do not consider risk reduction in land use plans and inability to interpret risk factors and incorporate them into development plans. To address the challenges of disaster risk reduction in informal settlements, County governments should be forefront and integrate the preparedness plans in the County Integrated Development Plans. Another study was done by Nguyen, Ginige and Greenwood (2018) identified some of the challenges as lack of capacity and coordination at the national level; lack of qualified human resources and inadequate understanding among the general public.

The study further established that the main mitigation measures against challenges that were encountered when initiating disaster risk reduction programme was improving preparedness for adverse events 31.8%, decreasing the elements at risks exposure to hazards 30.7%, improving management of land and the environment 21.4% and Lessening vulnerability of people and property 16.1%.

5.2 Conclusion

The study found out that majority of the residents was aware of the roles of stakeholders in disaster management in their areas, pointing out that the most important organization that assist them when a disaster occur in their area was Red Cross, followed by church organizations, then County government and the least was National Government. The Study concluded that, NGOs play crucial

roles in supporting communities when a disaster occurs and in supporting County Governments in strengthening institutions and provision of local technical assistance.

This objective was sought to determine the challenges encountered during disaster risk reduction initiatives in the informal settlements of Nyeri Town. The study found out that the main challenges encountered when initiating disaster risk reduction programme in the informal settlements of Nyeri town was lack of support from the Government, lack of community participation and lack of education among the residents. The study therefore concluded that, County Government of Nyeri does not offer adequate support in curbing disasters in informal settlements of Nyeri town. Creating awareness among community should be done regularly; training of members should be a priority even if it means calling personnel from disaster department or fire department. Also identify the problems experienced by community in relation to disaster management by ensuring the problems are addressed.

5.3 Recommendations of the study

Stakeholders and County Government of Nyeri should enhance and employ non-structural measures in disaster mitigation such as community mental preparedness, training, insurance, discussion, and planning to ensure effective disaster risk preparedness in the County. To address most of the challenges facing the residents in informal settlements, County Government of Nyeri should fully support the community and encourage community participation at all levels starting from disaster risk assessment, policy formulation, designing and implementation of preparedness programs.

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