EXPLORING COMMUNITY RESILIENCE IN DISASTER RISK REDUCTION AMONG COASTAL COMMUNITIES IN KILIFI COUNTY

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EXPLORING COMMUNITY RESILIENCE IN DISASTER RISK REDUCTION AMONG COASTAL COMMUNITIES IN KILIFI COUNTY

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ABSTRACT

The importance of disaster risk reduction (DRR) has increased globally as recent years have seen a marked rise in the incidence and effect of disasters that result in significant human and financial losses. The frequent large-scale losses to infrastructure and livelihoods brought on by these catastrophes and their catastrophic effects increase the poor condition, widen the gap between the haves and have-nots, and harm the process of sustainable development itself. Concerns about climate change, associated extreme weather, and their effects all worsen community resilience. Due to the nature and susceptibility of their means of subsistence, disasters and poverty are frequently believed to be closely associated and causally linked. These unequal disaster impacts are most common in communities and mostly affect their livelihoods. This study therefore intends to explore impact of community resilience on disaster risk reduction among community in Kilifi county. The study used cross sectional research design and targeted local community organizations and related stakeholders. The study used structured questionnaires to gather the information for the study which will be analyzed using descriptive analysis using the SPPS software. For qualitative data, thematic and content analysis was used. The data was then presented in tables, graphs and charts. Results showed integrated community development programmes, financial sector programmes and all-inclusive education programmes had positive significant impact on disaster risk reduction among rural coastal communities in Kilifi county. The study recommended that it was important for all stakeholders to incorporate integrated community development programs, financial sector programs and all-inclusive education programs to foster community resilience in disaster risk reduction. The researcher further suggested that further research by other scholars can be done on disaster risk management policy implications on disaster risk reduction

Keyword: *Disaster Risk Reduction, Sustainable Development, Climate Change, Integrated Community Development, Education Program, Financial Management*

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INTRODUCTION

Resilience has become one of the most important concept in risk management theory, policy, and practice, reflecting a multidisciplinary approach to its measurement (Izumi, 2019). While many factors contribute to a community's resilience, including social, economic, institutional, infrastructure, and environmental factors (Leykin, 2016). The social dimension is a key component that is mainly responsible for how well a community can collectively prepare for, mitigate, withstand, and recover from disasters. A report by Food for the Hungry (FH,2017), a humanitarian organization reveal that every step of a community's transformative development journey is hampered by passive forces. Even as people make strides toward escaping poverty, there are active forces working to drag people back into it. According to a recent study conducted in 14 nations, as many as 62% of people who escape poverty eventually fall back into it (FH, 2017). Natural and man-made disasters including earthquakes, floods, droughts, and war are among the elements that cause poverty. The recurrent escalation of these disasters' paints a gloomy picture on the country's preparedness and their resilience to overcome them.

Increased challenges in the world ranging from disasters to pandemics for instance, the outbreak of COVID-19 pandemic wrecked world economies, the Cyclone Harold that struck the Pacific region, Typhoon Hagibis in February 2020, Canada's Manitoba Province and Ottawa City flooding brought on by snowmelt while safeguarding first responders from, COVID-19 exposed the world's preparedness and resilience in overcoming such challenges. The same crises have also been experienced in Africa for instance in South Africa, parts of the country were badly hit by flooding after heavy rainfall brought by Tropical Cyclone Eloise in January 2021 displacing 367 people, in the Democratic Republic of Congo (DRC) more deadly floods and landslides were experienced in the Eastern Provinces leaving a trail of deaths and destruction (ACAPS, 2022), Zimbabwe experienced Cyclone Idai in Eastern region in 2019, but a year later people still remain amid the wreckage in makeshift shelters (UNHCR report 2020). A report compiled by Global Development (GD,2020), an organization supported by Bill and Melinda Gates foundation cites that as a result of Zimbabwe's government's failure to relocate its citizens or construct alternative housing, thousands of people are still residing in the ageing makeshift tents that were brought in by the UN agency for refugees and can soon be rendered homeless. There is a shortage of both food, medical supplies and water. A year ago today, the stranded people received medical care, sympathy from around the world, and a flood of donations for aid, food, and makeshift shelters. However, those donors are dwindling, leaving the Garikai villagers feeling abandoned. This is an illustration of how poverty and lack of proper disaster preparedness affect disaster risk reduction (GD,2020). Similarly, cyclical droughts in northern Kenya destroy livelihoods, lack of water reduces the value of pastoralists' camel herds, crop harvests, and available drinking water (Chapungu, 2020).

The poverty levels in the African continent has had communities still living in poverty, which has to date in some parts of the continent worsen. Per capita incomes are declining levels of hunger are increasing. Environmental degradation witnessed in various parts of the continent and thus strong relationship exist between the state of the environment and poverty. The situation is said to be worsened by natural and other disasters (UNDP, 2020). Disaster is a phenomenon that leads to environmental, economic and social losses, it's often the cumulative impact of frequent but small and unspectacular disasters that cause the most losses, particularly the poor. The poor have no financial power or physical resilience to recover from any form of disaster, neither small nor cumulative losses (Lin & Chang, 2013). Losses incurred as a result of a disaster may include, loss of life, disease outbreak, malnourishment and

disruption of social services; others may include, loss of capital and livelihood, and interruption of development programs. Occurrence of disaster is when communities faces hazards with poor coping capacity, making them particularly vulnerable. In such circumstances, hazards can cause widespread injury and death, huge loss of property and destruction of the environment. The less fortunate are usually the most vulnerable to disasters and have the lowest capacity to recover from them. Often they are affected by the cost of emergency response since finances are sometimes diverted from poverty reduction and development initiatives to disaster response programs. Poverty alleviation strategies are supposed to reduce both the level of poverty and disaster risks in a community Omunga, 2014).

Himes-Cornell and Ormond (2018) observe that poverty is an issue that can be dealt with when the injustices and discriminations in the society which are often the major reason for poverty are faced out completely. If our leadership would adopt the human rights-based approach to handle issues in the communities, then various countries and nations will experience unprecedented economic growth with steady income. Sustainable development paradigms are set out in global frameworks such as the 2030 Agenda for Sustainable Development and the Sendai Framework for Disaster Risk Reduction 2015–2030. These instruments are designed to guide a coordinated, interlinked, government-led disaster risk management (DRM) effort on the part of the various stakeholders in the development process. DRM must be based on a comprehensive strategy for minimizing the impact and the economic and social effects of disasters by reducing communities' vulnerability to them and by enhancing their coping capacity. While each country is responsible for the national development policies that it pursues within these global frameworks, it is clear that, given the integrality of natural systems, national policies must take impacts beyond each country's borders into consideration. Incorporating DRM into planning systems and processes poses a number of challenges. Development planning must take into account the complex interrelationships existing among various elements (processes, instruments, institutions and stakeholders), and these interrelationships give rise to intertemporal, inter-sectoral and inter-scale challenges in the coordination and linkage of multiple actors (Máttar and Cuervo, 2017). Similar challenges also arise in DRM planning, since this entails the use of a long-term multi-sectoral strategy involving different levels of government, the private sector and civil society. National governments have to find ways to integrate their development and DRM planning processes (ECLAC, 2019).

Poverty levels in the rest of the worlds is declining, while increasing in Africa. According to World Bank (2020), the Sub-Saharan Africa is leading with the number of families languishing in poverty. Poverty can be measured in vast ways, for instance using per capita Gross Domestic Product of a country; how much any one person earns on average in dollars. Social indictors reflect the impact of poverty on a society or community. They include levels of hunger and access to social services such as health services and education (UNDP, 2003). Everybody is exposed to natural hazards and hence to disaster risks. The level of exposure and the ability to cope with disaster is, however, varied. Poverty is a major factor increasing disaster risk by increasing a community's vulnerability to disasters and reducing its coping capacity. Poverty and disaster form a negative feedback cycle. If a disaster strikes, the level of poverty in the community increases, leading to increased disaster risk. DRR should be factored into poverty reduction policies, strategies and initiatives at all levels. Poverty-stricken communities are far more vulnerable to disasters, and disasters in turn create even greater poverty. Therefore, by factoring DRR in poverty reduction, poor communities can receive greater protection, the negative spiral of poverty can be broken and poverty reduction efforts are made more sustainable.

Statement of the Problem

The concept of resilience is now routinely put forward by both policymakers and social activists as a way for communities to use and develop their resources and respond positively to change, including decarbonization to address climate change. The extent to which a community is able to utilize all its resources depends on the extent to which it feels empowered to take action and is a major determinant of its resilience (Revell & Dinnie, 2020). Globally, the emphasis on Disaster Risk Reduction (DRR) has gained greater attention as recent times have witnessed a substantial increase in the incidence and impact of disasters causing huge human and economic losses. Due to these disasters and their devastating impacts, the infrastructure and livelihoods suffer frequent damages on a large scale, worsening the poverty situation and further increasing the growing disparity amongst the haves and have-nots; and adversely affecting the very process of sustainable development itself. For instance, in Kenya, over time, there has been an increase in the frequency of natural catastrophes, which have caused fatalities, property damage, and environmental harm. Five percent of the population of Kenya is regularly affected by floods, which have a prevalence rate of 27 percent, leading to 60% of disaster victims' deaths as a result of flooding and other calamities (Oundo, 2010).

It is often seen that disasters and poverty are often co-related and bidirectional in their causative linkage largely due to nature and vulnerability of their livelihoods. Most of the times, these disproportionate disaster impacts on the poor are rarely reflected in the post-disaster damage and loss assessment or even in the multi-hazard risk assessments that are employed for development planning purposes (Mogoa, 2016). Such estimates often consider only the losses in assets and not the socio-economic well-being losses of the affected poor. Further, most of the attention goes to 'intensive' disasters like earthquakes and cyclones, but the cumulative damage, particularly to the poor, posed by 'extensive' disasters such as drought, soil erosion, and persistent flooding, is often not given the needed attention (Steiner & Markantoni,2014). Thus, targeting the poor and the vulnerable as the face of resilience building through appropriate disaggregated poverty mapping in an integrated manner has been found as one of the strategies suggested by these international protocols and convention (Abuya & Mwanga, 2022).

Studies conducted point a glim picture on the community' preparedness to mitigate disasters as most communities still face challenges of high levels of poverty. For instance, a study by Revell and Dinnie (2020) in Scotland analyzes the current Scottish policy framework and aspirations for community empowerment and, through interviews with stakeholders, assesses the potential, this may provide for communities to become truly resilient and to actively engage with transformational change. Similarly, Mogoa (2016) found that poverty preconditions people to have less power, less hope and forces them into low self-esteem, integrity and confidence; thus leading to their vulnerability. Nyamboga, Nyamweya and George (2014) on their study on the effectiveness of poverty reduction efforts in Kenya, evaluated Kenyan government's policy initiatives on poverty alleviation and observed that poverty reduction efforts have been unsuccessful due to weak mapping and coordination of the lead institutions, duplication of efforts, inadequate coverage by region and even gender, competition among and between players, and lack of clear policy direction. Obwini (2016) on a study of the influence of community driven development approach on poverty reduction in Kenya, examined the influence of interventions and priorities of community projects, financial support and community capacity building on communities' resilience to famine and food security. As much as many studies have been done concerning poverty and community empowerment, many of these have failed to demystify the connection between communities' resilience and disaster risk reduction to enable members of the communities overcome

the challenges. This study therefore explored community resilience in disaster risk reduction among coastal communities in Kilifi County.

Objective of the Study

The general objective of the study was to explore community resilience in disaster risk reduction among coastal communities in Kilifi County. specific objectives of the Study were;

- To assess the impact of integrated community development program in disasters risk reduction among coastal communities in Kilifi County.
- To explore the impact of financial programmes in disaster risk reduction among coastal communities in Kilifi county.
- To investigate the impact of all-inclusive education program in disaster risk reduction among coastal communities in Kilifi county.

LITERATURE REVIEW

Theoretical Review

The theoretical framework is the starting point which helps us to have a deeper understanding of the concept of poverty and disaster risk reduction. The theoretical framework plays significant role in research. First, introduces the researcher to a new view in the research problem. This enabled the researcher to understand the problem in the area of interest. Secondly, it enabled the researcher to conceptualize the topic in its entirety. This helped the researcher to acknowledge the problem from a wider perspective and thus enhanced the objectivity in the researcher's thinking (Kombo & Tromp, 2014). This study reviewed the following three theories;

Protection Motivation Theory (PMT)

According to the Protection Motivation Theory, (Rogers,1975) which was initially created for the health promotion and disease prevention sector, people are compelled to respond in a protective manner to a perceived threat. PMT has four key components: "threat appraisal," "coping appraisal," which includes "response efficacy" (the conviction that particular procedures will lessen the threat), and "self-efficacy" (a person's perception of their own capacity to carry out the necessary steps to lessen the threat). Any hazard for which an individual is capable of carrying out, an efficient recommended response can be considered under the umbrella of the protection motivation theory (Floyd, Prentice-Dunn & Rogers, 2000) Self-efficacy has been identified as "the most potent predictor of behavioral intentions," according to Maddux and Rogers (1983), which come before actual activity (Beatson R, McLennan, 2011).

The goal of PMT is to identify and evaluate the threat, then respond to this evaluation with practical and efficient mitigation alternatives. As a result, PMT is applicable to a wide range of societal issues. It has been used in research on adaptations to climate change (Koerth & Hinkel, 2015; Grothmann et al.,2005) as well as studies of natural disasters, including an earthquake in the United States and floods in Germany and France. This is in line with Rogers' finding in his 1983 revision that both individuals and groups' protection motivation and coping strategies may be influenced by other circumstances.

Disaster Theory

In their disaster crunch model, Davis and Wall (1992) contend that a natural phenomenon is not a disaster until it comes into contact with a hazard. This example highlights a fundamental knowledge of the cause-and-effect procedures that result in disaster. The disaster's triggering circumstance is a hazard. The population is more susceptible to a certain risk as a result of the dangerous conditions, which are in turn brought on by societal pressures that are always changing. There is a clear development from underlying problems, to dynamic pressures, and ultimately to dangerous situations before vulnerability occurs. Therefore, a disaster occurs when a risk affects those who are at risk for it, leading to unimaginable pain, loss of life and livelihoods, as well as property destruction.

Tearfund (2006) explained in a progressive manner the two models that have been developed to help build an understanding about disasters. The

'Crunch' model explains what a disaster is and why it happens. The "Release' model looks at how disasters can be avoided or minimized. To reduce the risk of disaster, the factors that causes risk should be addressed. This means working against all the components of the crunch model. Action may be necessary at local, national and even international level.

Theory of Planned Behavior (TPB)

The Theory of Planned Behaviour (Ajzen, 1985) assumes that the best prediction of behavior is given by asking people if they are intending to behave in a certain way. Disaster preparedness is defined as actions taken in advance of a disaster to make sure the resources needed to respond effectively are accessible. Understanding the elements that affect whether disaster preparedness behaviors (DPB) are performed or not is essential for disaster preparedness. This study uses the TPB theory to increase our understanding of DPB in order to reduce risks associated with disasters. The application of TPB model explains a significant amount of variance in intentions and behavior and assist in developing interventions to disaster risk reduction among stakeholders that are affected.

Conceptual Framework

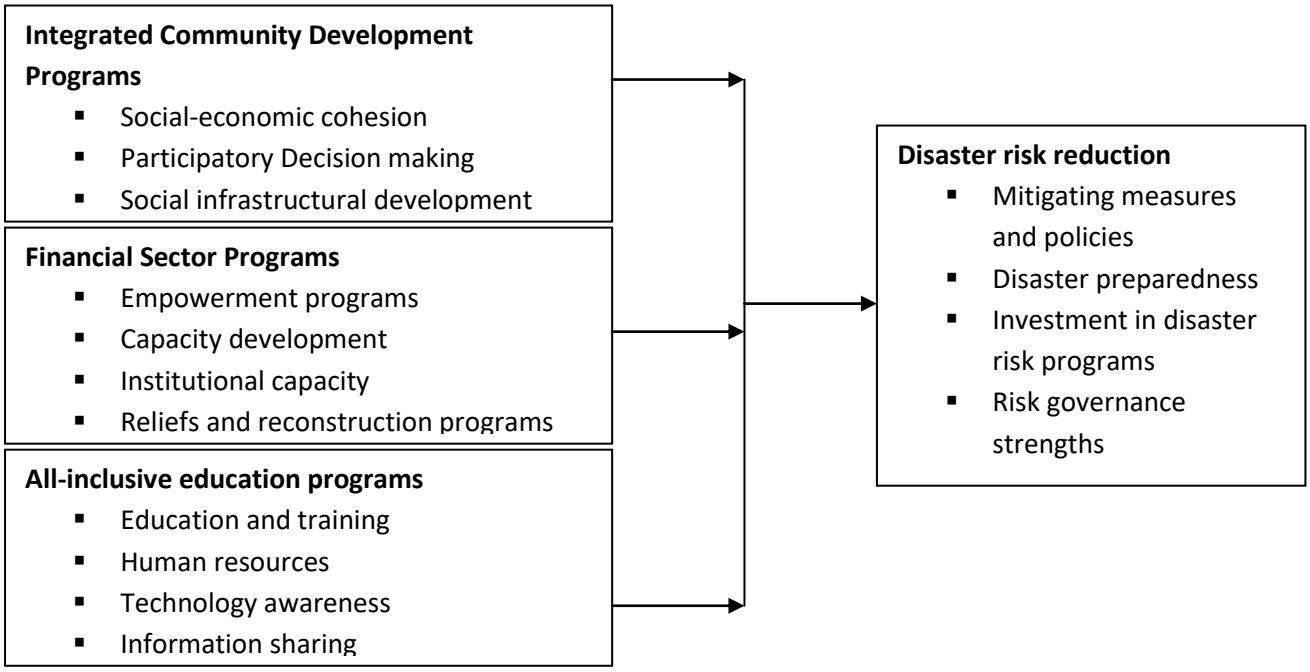

Figure 1: Conceptual Framework

METHODOLOGY

This study adopted a cross sectional research design. The target population for this study were all non-governmental organizations working the community in Kilifi County and other key stakeholders. The sampling frame for this study was the list of 11 non-governmental organizations operating in Kilifi county that are mainly concerned with empowering the community towards poverty alleviation. The sample size for the study was 70 respondents drawn across the NGOs and community groups in Kilifi County. Multistage sampling techniques was used in this study, which was informed by the variation and distribution of the study population.

The study used two sources of data collection; secondary and primary. Secondary data included a review of empirical literature and documents around the study issues. For primary data collection, a well-structured questionnaire was employed to assist the researcher gather primary

data for the study. The questionnaire was developed in line with the study objectives and experiences derived from a review of literature on exploring resilience in disaster management, with a key focus on impact of poverty on disaster risk reduction. The questionnaire had both structured and unstructured set of questions formulated from the variables of the study. Besides these, Likert type of questions was also used to limit response from the respondents. After the collection of data using questionnaires, the questionnaires was checked for inaccuracies on concerns that had not been fully addressed. The study used the statistical procedures (SPSS version 23) for data entry and analysis. Quantitative data was analyzed by using quantitative methods through frequencies, mean scores, percentages and standard deviation. The process of qualitative data analysis involved identifying, examining and interpreting patterns and themes in the textual data to determine how these patterns and themes contribute to the research objectives and questions. The study also used inferential statistics to aid in establishing the relationship between the independent variables and the dependent variable of the study. This helped in drawing conclusions on whether a relationship existed or not so as to formulate a recommendation. regressions model was used to establish the degree of relationship between the independent variables and the dependent variable of the study. The multiple regressions model was used to measure the extent of their relationship.

The following regression model formula was applied;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where: -

Y = Disaster Risk Reduction

X_1 = Levels of poverty

X_2 = Financial sector development

X_3 = All Inclusive Education Program

X_4 = Adoption capacity

β_0 = Intercept of Y

RESULTS AND DISCUSSION

Response Rate

The researcher administered a total of 70 questionnaires to the study respondents drawn from non-governmental organizations working the community in Kilifi county. Out of this number, 58 questionnaires were collected fully filled translating to 83% response rate. However, 12 questionnaires representing 17% were not returned by the respondents.

Reliability Test Results

The reliability test was performed on the constructs to test the validity and reliability of the research instrument in obtaining reliable data on the constructs of the study. The dependent variable and the three independent variables' Cronbach's alpha reliability test findings were reported in this section. According to the findings, Cronbach's alpha values ranged from 0.714 to 0.786. The disaster risk reduction had a Cronbach|s Alpha value 0.714, integrated rural development programme had 0.786, whereas financial sector development had 0.720 and all-inclusive education programme had 0.702. All factor categories' Cronbach's alpha values were discovered to be more than 7.00 which is considered sufficient evidence of internal consistency. According to Cohen, Manion, and Morrison (2007), Cronbach's alpha values above 0.50 are considered acceptable, those above 0.70 are considered good, and those above 0.90 are considered exceptional.

Table 1: Reliability Results

Variable	Cronbach's Alpha (α)	Status	Number of constructs
Disaster risk reduction	0.714	Good	8
Integrated rural development program	0.786	Good	8
Financial sector development	0.720	Good	7
All-inclusive education program	0.702	Good	9

Source; Research data (2023)

Descriptive Analysis

This section presents descriptive analysis of the data collected by the use of primary data. The researcher carried a descriptive analysis on the study variables and the results on community resilience were measured by (integrated rural development programme, financial sector development and all-inclusive education programme) while disaster risk reduction were measured by (mitigation measures, policies, disaster preparedness, risk programs, and the strength of risk governance).

Integrated Community Development Programmes

The purpose of this variable was to look into how integrated community development programs impact on disaster risk reduction among coastal communities in Kilifi county. This variable specifically looked at the impact of social economic cohesion, participatory decision making and social infrastructure development on disaster risk reduction. The respondents were asked to rate their opinions on a scale of 1 to 5, where 1 meant they strongly disagreed, 2- meant they disagreed, 3 meant they weren't sure, 4 meant they agreed, and 5 meant they strongly agreed. Table 2 showed the findings from the respondents.

Table 2: Impact of integrated community development program on disaster risk reduction

Statement	SD %	D %	N %	A %	SA %	MEAN	STD
Disasters have adverse effects on the livelihoods of the poor by harming their sources of income.	0	5.5	11.5	49.2	32.8	1.81	.712
Families who lose their sources of income following a disaster, remain vulnerability to future disasters.	1.7	3.4	13.8	37.9	43.1	1.83	.920
Community engagement and strong social networks are instrumental in identifying priorities and solutions that are appropriate, lasting, and supported by the affected community.	0	1.7	15.5	46.6	36.2	1.83	.752
In order to achieve development that is resilient to disasters and climate change, social justice and equality are essential components.	17.2	34.5	22.4	13.8	12.1	2.69	1.259
Disasters and climate-related events are making low-income populations more susceptible to financial shocks and economic distress.	0	0	10.3	55.2	34.5	1.76	.630
Participatory decision making by all stakeholders is critical for the success of community initiatives and interventions for disaster management	0	3.4	24.1	37.9	34.5	1.97	.858
The most vulnerable people have limited access to resources, to enable them restart their livelihoods after disaster.	5.2	1.7	6.9	53.4	32.8	1.93	.971
Effective community-based adaptation to disasters can be possible through enhanced social infrastructure	0	20.7	34.5	22.4	22.4	2.53	1.063

Financial Sector Programmes

The second variable of the study involved examining the impact of financial programmes in disaster risk reduction among coastal communities in Kilifi county. The researcher required the respondents to rate their opinion by ticking the correct box with relevant answer as per their opinion. The answers were on a five scale likert question where 1=strongly disagreed, 2=disagreed, 3=neutral, 4=agreed, and 5=strongly agreed. The findings were presented in Table 3 below;

Table 3: Impact of financial sector programmes on disaster risk reduction

Statement	SD %	D %	N %	A %	SA %	MEAN	STD
Empowerment programs for the community is a good way to deal with future potential risks	0	0	0	6.9	93.1	1.07	.256
Disaster management efforts through financial capacity development are sustainable ways of reducing vulnerability in disaster areas.	0	5.2	8.6	62.1	24.1	1.95	.736
Promoting community groups and other informal settings builds on their institutional capacity to address challenges that render them vulnerable.	0	0	3.4	60.3	36.2	1.67	.543
Reducing risk requires introduction of an effective financial collaboration between civil society, state agencies, and private sector through various programs.	0	3.4	12.1	53.4	31	1.88	.751
Financial reliefs to vulnerable communities do not affect their resilience due to sustainability concerns	0	3.4	6.9	48.3	41.4	1.72	.744
Government funding and donor aid for community reconstruction programs improve community's ability to cope up with disaster challenges	0	5.2	8.6	46.6	39.7	1.79	.811
Areas affected by floods experience infrastructural damage and disruption of services with huge financial implications	5.2	17.2	12.1	37.9	27.6	2.34	1.207

All-inclusive Education programs

The last objective sought to establish the impact of all-inclusive education programs in disaster risk reduction among coastal communities in Kilifi County. The researcher required the respondents to rate their opinion by ticking the correct box with relevant answer as per their opinion. The answers were on a five scale likert question where 1=strongly disagreed, 2=disagreed, 3=neutral, 4=agreed, and 5=strongly agreed. The findings were presented in Table 4 below;

Table 4: Impact of all-inclusive education programs

Statement	SD %	D %	N %	A %	SA %	MEAN	STD
Understanding the information disseminated by a government is essential for speeding up response time and minimizing the number of fatalities and financial losses in disasters areas	0	0	0	12.1	87.9	1.12	.329
Governments using their emergency authorities provide programs used to educate people in disaster-risk preparedness.	0	1.7	6.9	70.7	20.7	1.90	.587
Understanding disaster risk, is first based on the idea that people who are at risk from natural disasters should have access to information	0	1.7	10.3	48.3	39.7	1,74	.715
A transparent information exchange with regular updates, employing vulnerability maps, remote sensing, global positioning system, and other contemporary technology is a priority area of concern	0	0	12.1	65.5	22.4	1.91	.583
Poor response to disasters coupled with lack of disaster preparedness and/or awareness are some of the challenges facing our communities	0	1.7	10.3	41.4	44.8	1.72	.849
Capacity building through training of community members improve on their ability to respond and manage disaster risks.	0	5.2	10.3	67.2	17.2	2.03	.700
New technology such geospatial technologies could be used to manage the risks of severe occurrences and deal with the aftershocks of disasters	0	6.9	17.2	32.8	43.1	1.95	1.115
Providing information associated with disaster risk and response actions to concerned stakeholders increases the level of disaster preparedness, and mitigation measures.	5.2	12.1	13.8	39.7	29.3	2.24	1.159

Disaster Risk Reduction

The general objective of this study sought to explore community resilience in disaster risk reduction among coastal communities in Kilifi county. The researcher required the respondents to give their opinion based on the statements provided relating to disaster risk reduction. The respondents were required to rate their opinion through a scale of 1-5, where; (1) Strongly Disagree; (2) Disagree; (3) Not sure; (4) Agree and (5) Strongly Agree. Their responses were represented in Table 5 below;

Table 5: Disaster Risk Reduction

Statement	SD %	D %	N %	A %	SA %	MEAN	STD
Scientific approaches based on high-tech community-managed systems can be used to lessen the harmful consequences of disasters	**0**	**0**	**0**	**8.6**	**91.4**	**1.09**	**.283**
Integration of participatory approach helps in mitigating, and eliminating disaster risk, and helps to maintain disaster resilience in the community.	**0**	**0**	**10.3**	**72.4**	**17.2**	**1.93**	**.525**
Risk governance strengths promotes risk reduction and enhances resilience towards sustainable disaster risk management	**0**	**0**	**13.8**	**60.3**	**25.9**	**1.88**	**.623**
Better actions or choices made by governments, communities, and all parties involved should serve as the foundation for understanding and development of community resilience	**0**	**1.7**	**5.9**	**39.7**	**51.7**	**1.59**	**.702**
A good starting point in addressing disasters associated to the weather is through investment in disaster risk management programs at community level,.	**0**	**1.7**	**12.1**	**63.8**	**22.4**	**1.93**	**.645**
Empowering community to respond and deal with the potential effects of a disaster, involves preventive measures that are implemented before an imminent threat of a disaster	**0**	**0**	**0**	**13.8**	**86.2**	**1.14**	**.348**
Disaster response policy promotes integrated approaches so that all stages of the disaster risk management continuum are considered together in a coherent way	**0**	**1.7**	**1.7**	**79.3**	**17.2**	**1.88**	**.498**
It is necessary to encourage the culture of disaster awareness and disaster preparedness and response capabilities at all levels	**0**	**1.7**	**3.4**	**50.0**	**44.8**	**1.62**	**.644**

Regression Analysis

Regression analysis was used in the study to examine community resilience in disaster risk reduction among coastal communities in Kilifi county. Regression analysis was used as a crucial tool for estimating, making predictions, eliminating guesswork in decision-making, choosing the right variables to make the most informed choices, correcting errors to prevent expensive mistakes, and finally, looking at the data to reveal novel and innovative insights (Kothari & Gaurav, 2014).

Disaster risk reduction of explained variable was measured by mitigation measures, policies, disaster preparedness, investment in disaster risk programs and the strength of risk governance. Community resilience of explanatory variables were measured by integrated community development programmes, financial sector programmes, and all-inclusive education programmes:

Model Summary

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.763[a]	.615	.671	.000

a. Predictors: (Constant), IED, IRDP, FSD

The adjusted R square was 0.671. This implied that, 67.1% of the relationship could be explained by the constructs, i.e. integrated community development programmes, financial sector programmes and all–inclusive education programmes. The remaining 32.9% of the variations could be accounted for by other variables that were not considered under this study.

Analysis of Variance

Table 7: ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	11.659	3	3.886	4.924	.004[b]
	Residual	42.617	54	.789		
	Total	54.276	57			

a. Dependent Variable: DRR

b. Predictors: (Constant), IED, IRDP, FSD

The analysis of variance above was carried out to test whether the overall regression model was a good fit for the data. The table 7 above shows that the independent variables statistically and significantly predicted the dependent variable, F (3,54) = 4.924, P<.004 and at least one of the slope coefficients is none zero (i.e. the model was a good fit for the data).

Beta coefficients

Table 8: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.796	.486		3.695	.001
	IRDP	.441	.151	-.034	-.272	.005
	FSD	.563	.148	.512	3.802	.000
	IED	.614	.153	-.276	-2.048	.045

a. Dependent Variable: DRR

Table 8 shows the regression coefficients of each independent variable on disaster risk reduction among coastal rural communities in Kilifi County. The multiple regression model is presented below;

$Y= 1.796+ 0.441X_1+ 0.563X_2 + 0.614X_3+e_1$

Where,

Y= Disaster risk reduction

X_1= Integrated community development programmes

X_2= Financial sector programmes

X_3= All-inclusive education programmes

e_1= Error term

From Table 8, the co-efficient for integrated community development programmes had a p-value of 0.005 which is less than p< 0.05 implying a statistically significant effect on disaster risk reduction. The regression coefficient was 0.441, indicating that it positively affected disaster reduction. This therefore means that, an increase in integrated community development programmes by 1 unit, would result to an increase in disaster risk reduction by 0.441 units.

The co-efficient for financial sector programmes had a p-value of 0.000. This was less than p<0.05, leading to the conclusion that, financial sector programmes had a statistically significant effect on disaster risk reduction. The regression co efficient was 0.563 depicting a positive relationship with disaster risk reduction. The results implied that increase in financial sector programmes by 1 unit would significantly lead to an increase in disaster risk reduction by 0.563 units.

Lastly, results for all-inclusion education programmes had a p-value of 0.045 which is less

than 0.05 leading to the conclusion that all-inclusion education programmes had a statistically significant effect on disaster risk reduction. The regression coefficient was 0.614 depicting a positive significant relationship between all-inclusion education programmes and disaster risk reduction. Therefore, for every 1-unit increase in all-inclusion education programmes, there would be an increase in disaster risk reduction by 0.614 units.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary of Findings

The study focused on exploring community resilience in disaster risk reduction among rural coastal communities in Kilifi County. This county was preferred due to persistent cases of disasters that communities living there faced and formed the foundation upon which the recommendations can implemented to reduce the communities' vulnerability towards disasters and enhance their resilience. Community resilience is critical in overcoming the effects of disasters and require more attention more so by state agencies, donors, NGOs and even the community themselves in embracing those programmes that can sustain their economic and social livelihoods.

The first objective aimed at examining the impact of integrated community development programmes on disaster risk reduction among rural coastal communities in Kilifi county. The results demonstrated that disasters frequently have a negative impact on the poor community's source of livelihoods and most families get adversely affected, and remain vulnerable to future disasters and face myriad challenges that hamper them from recovery.

The findings further showed that community engagements and strong social networks were instrumental in identifying priorities and solutions that are appropriate, lasting, and supported by the affected community in addressing the needs of disadvantaged groups before and after hazard occurrences. Moreover, social justice and equality are essential components that would enable the community to achieve development. Disasters and climate-related calamities were the main factors that made low-income populations more susceptible to economic distress, suggesting a stronger connection between disaster and communities' ability to overcome disaster risks.

Participatory decision making by all stakeholders was found to be critical for the success of community initiatives and interventions for disaster management hence the need for dedicated and improved participatory approach on issues that affected the community in order to improve their resilience in disaster risk management. It was further observed that most vulnerable community members have limited access to resources that could enable them restart their livelihoods after disasters, and a call for establishment of social infrastructure and social cohesion among community members to foster community resilience.

The second objective of the study aimed at examining the impact of financial sector programs on disaster risk reduction among rural coastal communities in Kilifi County. The findings obtained showed that community empowerment programs provide effective way of dealing with future potential risks and disaster management efforts introduced by the NGOs and donor agencies through financial capacity development provided sustainable methods of reducing community vulnerability in disaster prone areas.

The findings further revealed that promoting community groups and other informal settings builds on their institutional capacity to address challenges that render them vulnerable and that introduction of an effective financial collaboration between civil society, state agencies, and private sector through various community initiative programs like financial reliefs advanced to vulnerable communities have no effect on rural communities' resilience due to sustainability concerns. Government funding and donor aid for community reconstruction programs improve

community's ability to cope up with disaster challenges leading to improved disaster preparedness. Consequently, the study results revealed that those areas affected by floods experience infrastructural damage and disruption of services with huge financial implications.

The third objective aimed at examining the impact of all-inclusive education programmes in disaster risk reduction among rural coastal communities in Kilifi county. The findings showed that governments use their emergency response units to initiate programs that educate people in disaster-risk preparedness before disaster occurrence and that this helps community members to acquire knowledge on disaster response and mitigation measures.

Understanding disaster risk, is first based on the idea that people who are at risk from natural disasters should have access to information as agreed by majority. The study further observed that majority of the respondents agreed that transparent information exchange with regular updates, and sharing of vulnerability maps, remote sensing, global positioning system, and other contemporary technology was a priority area that NGOs and other key stakeholders involved in disaster risk management should focus on to enable afflicted community members be informed.

Majority of the respondents also strongly agreed that poor response to disasters coupled with lack of disaster preparedness and/or awareness pose challenges to the coastal communities in Kilifi county. And that lack of coordinated response to disaster greatly affected the communities' ability not only to mitigate but also to recover from disaster effects, hence affecting their livelihoods. Capacity building through training of community members was found to improve on their ability to respond and manage disaster risks as opined by majority and the introduction of new technologies like geospatial technologies could act as a game changer in managing the risks of severe disaster occurrences.

The research found that scientific approaches on high-tech community-managed systems could be used to lessen the harmful consequences of disasters. The study further observed that integrating participatory approach in disaster risk reduction, helps in mitigating, and eliminating disaster risk, thereby sustaining disaster resilience among the community members along the coastal strip in Kilifi county, as opined by majority respondents

The strengths of risk governance in risk reduction and resilience towards sustainable disaster risk management provide better actions or choices by governments, communities, and all stakeholders involved and serves as the foundation for understanding and development of community resilience towards risk reduction. Similarly, the study found that a good starting point in addressing disasters associated with the weather was through investment in disaster risk management programs at community level, as opined by the majority of the respondents. Consequently, empowering community to respond and deal with the potential effects of disasters, should involve integration of preventive measures to be implemented before an imminent threat of a disaster.

The respondents agreed that disaster response policy promotes integrated approaches, so that all stages of the disaster risk management continuum are considered together in a coherent way to encourage the culture of disaster awareness, disaster preparedness and response capabilities at all levels to enable the members of the community, the government and other agencies to mitigate disaster risks alongside their preparedness to counter their effects and in sustaining their resilience to disasters.

CONCLUSION

As can be observed from the findings of the study, integrated community development programs such socio-economic cohesion, communal participatory approach to decision making and enhanced social infrastructure development played an important role in fostering community resilience towards disaster risk reduction initiatives and interventions. The need for community to pool together to

address disaster challenges came out strongly from the study.

Financial sector empowerment programs such community economic empowerment programs that brings together community members to access funding for income generating activities, entrepreneurship were found to be game changers in improving the vulnerable members and restoring their ability to overcome disaster effects. Capacity development and improved institutional capacity of the community groups and members to create awareness on the need for financial inclusion and access are all important programs that would increase community resilience in reducing the impact of disasters. Government funding through provision of financial relief aids were found not to be sustainable but would rather make community members reliant on them and become more vulnerable. Though reconstruction programs were found to be critically important as they aid in faster recovery process from the effects of disasters.

And an all-inclusive education programs by various state agencies, non-governmental organizations and other donor agencies such as education and training for community members on disaster preparedness, mitigation measures and disaster risk management are key in empowering vulnerable communities on disaster risk reduction. Community leaders and other key community stakeholders are channels of disseminating information on disaster awareness creation, and building a strong network of human resource around the community though which information can be shared. Integrating new technology and embracing emerging technological systems like geospatial technologies could be used to manage the risks of severe occurrences and deal with the aftershocks of disasters.

RECOMMENDATIONS

The study recommends the following based on the findings;

On integrated community development programmes, the study recommends that socio-economic cohesion should be harnessed in vulnerable communities that are faced with rampant cases of disasters to foster resilience in disaster risk reduction and risk management. The study also recommends that all NGOs, donor funded and state agencies operating along the coastal strip with vulnerable communities that are affected by disasters such as floods, rampant droughts and other calamities alongside those in Kilifi county, should embrace participatory approach to decision making on issues that affect the community to guarantee sustainable in their interventions and other community initiatives. Social infrastructure that brings together the community should be embraced to build on the community's ability to recover from such disaster shocks and distress.

On financial sector programmes, there is need for financial inclusion for all community vulnerable members, fostering of capacity development and empowering the community through institutional capacity development of their informal groups to enable them gain management skills in operation of their IGAs. Reconstruction programs should be geared towards realizing long term solutions to disaster challenges to avoid resource wastages.

On all-inclusive education programmes, the key stakeholders involved should adopt efficient channels for information sharing, dissemination and feedback process. Public barazas, religious outfits and schools can offer effective outreach channels to create awareness to the communities on disaster risk reduction methods and the need for the community to embrace sustainable methods of livelihoods. The study also recommends the use of new technologies in scientific approaches based on high-tech community-managed systems which can be used to lessen the harmful consequences of disasters.

Suggestions for further studies

The study objectives only accounted for 67% of the relationship between independent variables that were considered under this study. Therefore, the researcher suggests more studies on the effectiveness of community based disaster risk

reduction measures. Disaster risk management policy implications on disaster risk reduction presents another milestone for further research.

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