The Influence of Community Drought Risk Management on Community Development in Tiaty Constituency, Kenya

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Submitted 30th October 2023; Accepted 13th January 2023; and Published 12th February 2024

ABSTRACT

Climate change contributed to an increase in the rate of disasters, particularly those with meteorological origins. This study assessed community drought risk management strategies and community development in Tiaty Constituency, Kenya. The objective was to determine the influence of disaster risk reduction programs in promoting community development in the area, grounded in the Environmental Community Development Theory. A mixed-methods research approach was adopted, with a target population of 12,153 people. The sample size comprised 395 respondents selected using stratified sampling techniques. Statistical Analysis Software version 25 was utilized for data analysis. Descriptive statistics were conducted to offer descriptive features of the study variables, with quantitative survey data expressed as mean averages. The study revealed that risk reduction programs focusing on environmental conservation and sustainable practices contributed to the long-term sustainability of communities in Tiaty Constituency. It was found that building community resilience extended beyond disaster management and contributed to overall community development, aimed at achieving sustainable self-reliance. The findings highlighted the significant positive impact of drought risk reduction programs in aiding community development and resilience-building efforts. Based on the comprehensive findings, the study recommended prioritizing and expanding risk reduction programs, with a specific focus on environmental conservation, social cohesion, and community participation in hazard assessment, to inform planning and decision-making processes.

Keywords: *Community Drought, Risk Management, Community Development, Participatory Disaster Risk Assessment, Risk Reduction Programs, Community Organizations*.

I. INTRODUCTION

In recent past, there has been an increase in losses of lives and livelihood following disaster occurrence, as pointed out by the Environment Development International Institute in 2018 (Uddin, 2018). Changes in variability contributed an all-time high in disaster occurrence, more so in areas experiencing harsh climatic conditions (Argwins, 2018). This reflects that drought and floods are widespread compared to other natural hazards, with their impacts being on the rise. In as much as anthropogenic disasters have been on the rise, there is limited available global data that shows the changes over a time.

However, in 2012, it was highlighted in USA following the research findings on Epidemiology of Disaster of global technological disasters that summed up to 198. (American Red Cross Report, 2016). It is worth noting that Asia as a continent has recorded the highest toll of natural disaster occurrences (Daylla, 2019). It has been highlighted by Joshua *et al., (*2019) that however much there has been a growth in the occurrence of hazard events, indication is that catastrophic experiences are not only triggering impactful mitigations, but rather puts the population at risk as well. On the other hand, it has been agreed that preparedness at the individual, organizational, and community levels significantly facilitate hazards mitigation.

In Malaysia, Ings *et al.* (2019) determined that drought impacts are very diverse and can be classified as social, environmental, and economic. It was further highlighted by UNDP-UNSO (2011), that drought effects are often experienced within the economy and keep lingering for multiple years following the termination of drought episodes. The frequency of drought has become intense in that recovery measures face shorter time bound period to implement, thus increasing vulnerability of the local population (Wiseman et al., 2016). This creates a cycle of deficiencies for building back better. In essence, it is expected that a severe drought occurs in Kenya every 3-7 years. Community participation in disaster risk assessment is a process that is useful in the identification of potential risk within a community and possible mitigation measures as highlighted by Jurgen (2018). Such participatory process involves assessing hazards, vulnerability, capacity and designing appropriate risk reduction measures. These measures are carried out by the community and local partners to catalyze and promote community development programs towards the attainment of resilient communities. Following the nature of the findings, the immediate implementation of various risks reduction programs will be highly useful in reducing the vulnerabilities, therefore enhancing different existing capacities for individual survivability and community readiness thereby protecting lives and livelihood against shocks (Wedawatta *et al.*, 2016). Community empowerment is meant achieve proactive planning managing disasters as well as the creation of space for the development to advance. Since communities are involved in reducing disasters, their felt needs become inherent and resources utilization becomes effective.

In Nigeria, Ojukie (2018) highlighted that the reduction of risks at the community level offers great strength to the capacity of individuals and reducing vulnerabilities enable people to cope with hazards easily. This has become one of the key approaches in reducing disaster risks that have primarily evolved from risk reduction of disasters to management of community-based disasters (Valo, 2015). This approach may involve members of the community, more so those who are highly vulnerable in assessing risks, while identifying, appropriate risk mitigation measures, as they put genuine preparedness programs to aid in planning and inform better decision making.

In Zambia, it was determined by Hess *et al*. (2018) that the pastoralists' ability to respond to the current drought does not only depend on the degree or extent of drought occurrence but also the rate at which population grows together with their corresponding capacity to absorb shocks. On the other hand, factors such as changes in the rate of access to water, land, and outbreaks like floods affect the approach to the current crises (Hess, Wiseman & Robertson, 2006). Post drought evaluation carried out on the effectiveness of various response interventions by respective national government has given an indication of the fact that crisis management approaches had resulted in wastages and duplications due to poor coordination mechanism coupled with inappropriate and untimely responses interventions. Increased risk awareness and understanding of drought episode has gained traction thereby creating an enabling environment for understanding the nature of drought occurrences. This helps the government developing appropriate risk informed adaptation strategies and approaches to address the negative impacts of drought thereby reducing vulnerability while saving lives and livelihoods (Wilhite, 2014).

The Kenyan Government has made tremendous improvements in countering drought such as wastewater reuse, groundwater recharge and agro forestry (GoK Report, 2018). The National Drought Management Authority (NDMA), established in November, 2011, following a massive drought, is now mandated to lead and coordinate drought management practices and adaptations to climatic changes. Through the same body, drought management system has been well institutionalized and adopts a community-based risk reduction approach for droughts mitigation.

In the recent past, tenths of droughts events have been experienced in Kenya and had in turn caused a great negative impact on millions of individuals lives and livelihood (Argwins, 2019). Drought is a major natural disaster that undermines the development of communities around the world, particularly in developing countries with severe impacts on food security, water availability, and the livelihoods of vulnerable populations (Johnson et al., 2017), as its frequency and severity increase by the day.

Despite droughts being unpreventable hazard, its impact on people’s lives and livelihood can be mitigated by adapting appropriate community led disaster risk management strategies, where communities develop their own risk reduction measure and management strategies based on their unique circumstances and cultural practices enriched with locally available resources, with clear understanding of priority intervention that promote live saving and resilience building community development programs. Little is known about the influence of community drought risk management strategies in promoting community development, hence the need to understand how these strategies contribute to and enhances community development, including economic, social, and environmental dimensions (African Drylands Institute for Sustainability, 2016). Additionally, it is important to investigate what factors influenced the adoption and successful implementation of community led drought risk reduction measure. Therefore, the study was carried out with an aim of determining the influence of risk reduction programs in community drought risk management on community development in Tiaty Constituency, Kenya.

II. METHODOLOGY

Study Design

Research design is a blueprint or plan which is adopted in the collection of data and subsequent measurement as well as its analyses afterwards (Kathori, 2016). Mugenda and Mugenda (2013) noted that it entails the procedures and processes to be employed by researchers in a study for purposes of providing answers to research questions. In view of this, the study adopted the use of

a mixed study research method where both qualitative and quantitative techniques were applied. This design is recommended as it is suitable in obtaining accurate data. With regard to the present study, the design was suitable for determination of the influence of community drought risk management strategies on community development in Tiaty constituency in Kenya.

Study Location

The Location for the study was in Tiaty Constituency, in Baringo County. The constituency is in Baringo County, which falls under ecological zone V&VI. Some of the region's characteristics include unreliable rainfall and low erratic and expected prolonged rainfalls between March and May. On the other hand, the region experiences short rainfalls between October and November, with high temperatures extremely high throughout the year.

Target Population

As per Mugenda and Mugenda (2013), the population refers to the complete set of elements under the researcher's purview and focus in the study. The study's target population consisted of 12,203 individuals who held positions as representatives and directors within the National Drought Management Authority and the Kenya Red Cross Society., special programs, water/Irrigation and Health/Nutrition as well as household members in Tiaty Constituency.

Sample Size and Sampling Procedure

The present study incorporated the use of stratified sampling. According to Ohulo (2016), stratified sampling is a method that involves breaking down a population into subgroups or strata, based on specific characteristics. Subsequently, individuals or items are randomly chosen from each stratum in a manner that reflects the size of that stratum. This approach involved dividing the population into distinct strata, and then selecting a sample from each stratum, resulting in a more representative sample that accurately represents the entire population.
Determination of the study sample was carried out through Fischer's (1983) formula proposed by Mugenda and Mugenda (2009) to be suitable for a study with a population of more than 10,000, as has been presented. The 10%-point percentage for each sector:

$$n = \frac{z^2(p)(q)}{d^2}$$

Where:
n = sample size desired (>10,000)
P = Target population proportion (50%)
q = Target proportion population ((1-p))
d =Error margin at 0.05
Z = Normal deviation standardized (1.96 for this study)
Replacing the values in the formula gives a sample size of 384 as shown:

$$n = \frac{1.96^2(0.5)(0.5)}{0.05^2}$$

Thus 384 households were used in the representation for the ensure study.

Research Instrumentation

Primary data was considered by the study and collected through the use of structured questionnaire. The research instrument for the study was questionnaire, based on closed ended questions. The questionnaire was made up of two sections with the first covering the demographic factors relating

to the respondents and the second section capturing variable statements in relation to study objectives.

Data Collection Procedures

Briefing of the management was done by the researcher. The researcher provided a highlight of the rational for the research study and the importance of data collection. The researcher assured all the respondents of high confidentiality level. Drop and pick method will be used by the researcher to collect the study data. A letter of introduction from Mount Kenya University was presented to the respondents by the researcher prior to data collection. In ensuring total rates of response, the researcher provided time for gathering the filled questionnaires.

Data Analysis Procedure

The research gathered data of both qualitative and quantitative nature. Quantitative data analysis was carried out using descriptive statistics, which served to provide an overview of the study variables. The survey's quantitative data was presented in the form of mean averages, frequencies, and percentages, and Statistical Packages for Social Sciences, version 25, was used in the data analysis process. Qualitative data, on the other hand, underwent content analysis, which proved valuable in drawing conclusions from the study. The study's findings were also presented in the form of percentages and tables.

Ethical Considerations

The researcher sought research permissions from the participants in Tiaty Constituency before commencing the investigation. Consent was obtained from the respondents following comprehensive briefings in which the researcher explained the research's purpose, intent, and the assurance of confidentiality for their responses. The researcher also outlined the research procedures and the methods employed to ensure credibility. Additionally, it was essential for the researcher to use language that was respectful to all parties involved. The researcher further obtained the research permit from NACOSTI (approval no.147376). The research data obtained was kept confidential and no third party was allowed to access the responses highlighted by the respondents on the research instruments. The data was only used by the researcher to help in arriving at the conclusion of the study. The study kept all the participants anonymous. No personal information such as name and contacts were requested by the researcher. This was supported by an assurance from the researcher to the respondents

III. RESULTS

Descriptive Statistics Results

The role of participatory disaster risk approach

Respondents were required to rate the extent of agreement with the following statements that seek to establish the influence of participatory disaster risk assessment in community development in Tiaty Constituency, Kenya. Respondents agreed that their participation in hazard assessment enhances their self-reliance in the event of drought (mean=1.73 std dev=0.31). Respondents agreed to the statement that their participation in hazard assessments enhances ownership in drought mitigation to a greater extent (mean=1.42 std dev=0.16). Further to this, the study respondents also agreed to the statement that hazard assessment among the members of Tiaty constituency entails public participation of the residents to identify risk and opportunities that informed development programs in the area (mean=1.79 std dev=0.19) as indicated in Table 1 shown below.

Table 1:
Role of Participatory Disaster Risk Approach

Aspects of Measurement	Mean	Std. Dev
The participation of Tiaty resident in hazard assessment enhances their self-reliance in the event of drought.	1.73	0.31
Participation by Tiaty resident in hazard assessments enhances ownership in drought mitigation.	1.42	0.16
Hazard assessment among the members of Tiaty constituency entails public participation of the residents to identify risk and opportunities that informed development programs.	1.79	0.19
Drought risk assessment does not contribute to community development in Tiaty constituency.	1.79	0.61

Risk reduction programs in community drought risk management

Besides, the respondents agreed that disaster risk reduction planning contributes towards appropriate resource allocation and utilization in Tiaty constituency (mean=1.97 std dev=0.78). Respondents further agreed that successful implementation of drought risk reduction programs resulted in an increased community self-reliance (mean=2.46 std dev=1.39) as shown in Table 2.

Table 2:
Influence of Risk Reduction Programs in Drought Risk Management

	Mean	Std. Dev
Risk reduction plans during disaster contributed towards saving lives and livelihoods.	2.73	1.52
Community led participatory risk assessment enhances sustainability.	2.42	1.41
Disaster risk reduction planning contributes towards appropriate resource allocation and utilization in Tiaty constituency.	1.97	0.78
Successful implementation of drought risk reduction programs results to increased community self-reliance	2.46	1.39
Ownership of project is enhanced by the contingency planning in Tiaty during drought.	1.98	0.81
There is no significant effect of community reduction programs on community development with respect to risk reduction planning in Tiaty during drought.	2.15	1.19

Role of community organization in drought risk management

Respondents were required to rate the extent of agreement with the following statements that seek to establish the role of community organizations in community drought risk management on community development in Tiaty Constituency, Kenya. Respondents agreed that Community organization such CMDRRC helps in timely implementation of drought risk reduction programs in Tiaty Constituency (mean=1.69, std dev=0.43). The respondents also agreed that the commitment and participation in the reduction of disaster enhances sustainability in drought risks management leading to longer term self-reliance (mean=2.05, std dev=1.65). The respondents also agreed that Having active community organizations such as CMDRRC helps in timely resource mobilization and utilization for better resilience and community readiness (mean=1.97, std dev=0.82) as shown in table 3 below.

Table 3:
Role of Community in Drought Risk Management

	Mean	Std. Dev
Community organization such CMDRRC helps in timely implementation of drought risk reduction programs in Tiaty Constituency.	1.69	0.43
Commitment and participation in the reduction of disaster enhances sustainability in drought risks management leading to longer term self-reliance	2.05	1.65
Having active community organizations such as CMDRRC helps in timely resource mobilization and utilization for better resilience and community readiness.	1.97	0.82

The Committee enhances effective resource utilization during drought in Tiaty Constituency.	1.88	0.54
CMDRRC has no effect on community development in the constituency during droughts	2.46	1.79

Inferential Statistics Results

Regression analysis

From the regression model in table 4 below, the R square value was determined to be 0.816 meaning that 81.6% of the variation in risk reduction programs on the results from community development. The remaining 18.4 percent is due to other factors not tested in this model. On the other hand, the correlation was determined by an overall coefficient of correlation of (R) to be 0.672. R Square (0.816 in this case) represents the proportion of variance in the community development that can be explained by the predictor(s). In other words, about 81.6% of the variability in the dependent variable can be explained by the risk reduction programs in this model. This is a measure of how well the model fits the data. A higher R Square indicates a better fit. The results suggest that the risk reduction programs have a moderate positive relationship with the community development, and this relationship explains a significant portion of the variability in the community development in Tiaty Constituency.

Table 4:
Regression Model Summary for Risk Reduction Programs

Model Summary				
Model error	R value	R square	R square adjusted	Estimate
1	0.672[a]	0.816	0.581	.15443

Note: a. Predictors: (Constant), Risk Reduction Programs

Regression analysis interpretation

There was a high significance level which was justified by a P-value of 0.000, which is less than 0.05 which is useful in measuring significance level. From the presented findings in table 5, the overall significance of the model was determined to be 0.000. This was highly significance as it was determined to be 0.42. The study therefore concludes that there is a high level of statistical significance between risk reduction programs and community development in Tiaty Constituency.

Table 5:
ANOVA for Risk Reduction Programs and Community Development

Analysis of Variance					
Model 1	Sum of squares	Df value	Average square	F	Sig.
Regression	11.25	1	11.25	360.78	0.000[b]
Residual	1.82	146	.42		
Total	17.52	174			

a. Dependent Variable: Community Development
b. Predictor: (constant) Risk Reduction Programs

Table 6:
Coefficients for Risk Reduction Programs and Community Development

Model		Unstandardized coefficients		Standardized coefficients		
	Constant	B value	Error Std	β	T	Sig.
	Constant	1.47	0.381		7.128	0.000
	Risk reduction programs	.702	.121	.816	1.629	0.000

a. Dependent Variable: Community Development
b. Independent variable: Risk Reduction Programs

Community organization regression model summary

The study found a remarkably significant result, supported by a P-value of 0.000, which is less than the conventional threshold of 0.05 used to assess significance. Analyzing the data presented in the ANOVA table, the overall model's significance was confirmed to be 0.000, signifying a very high level of importance, as opposed to being only 0.49. In conclusion, the findings suggest a strong and statistically significant relationship between community organization and community development in Tiaty Constituency.

Table 7:
Regression Model Summary Community Organization

Model Summary				
Model error	R value	R square	R square adjusted	Estimate
1	0.751[a]	0 .674	0.594	.68351

Note: a. Predictors: (Constant), Community Organization

Table 8:
ANOVA for Community Organization and Community Development

Analysis of Variance					
Model 1	Sum of squares	Df value	Average square	F	Sig.
Regression	10.34	1	11.25	360.78	0.000[b]
Residual	1.91	146	.48		
Total	20.76	174			

Table 9:
Coefficients of Community Organization and Community Development

Model		Unstandardized coefficients		Standardized coefficients		
	Constant	B value	Error Std	β	T	Sig.
	Constant	1.29	0.286		7.128	0.002
	Risk reduction programs	.611	.582	.674	1.629	0.000

a.Dependent Variable: Community Development
b.Independent variable: Community Organization

IV. DISCUSSION

The study found a positive correlation between risk reduction programs and community development in Tiaty as indicated by the correlation of 0.816 and a significance value 0.001. This finding shows that adoption of risk reduction programs can improve the level of Community development in Tiaty Constituency. This is an indication that a unit change in risk reduction programs causes a change of 0.816 in community development in Tiaty Constituency. The analysis showed a positive significant relationship between community organization in community drought risk management on community development in Tiaty Constituency (r=0.674, p=0.001). This is an indication that a unit change in community organization causes a change of 0.674 in community development in Tiaty Constituency.

The coefficient of regression was conducted to determine the level of influence of the independent variables on the dependent variable. The analysis showed that the linear regression model $Y= \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \varepsilon$ is $Y=0.608+0.655X1+0.816X2+0.674X3$. The model shows that when other factors are held constant, an increase in the use of independent variables (Participatory

Disaster Risk Assessment, risk reduction programs and community organization) by 1% improves community development in Tiaty Constituency. The level of community development in Tiaty Constituency would be at 0.608 when all the variables are held constant. Therefore, a unit change in participatory disaster risk assessment would positively increase community development by a coefficient factor of 0.655. A unit increase in risk reduction programs would positively change community development by 0.816. A unit change in community organization would positively change community development by 0.674. Hence, the independent variables positively influence the level of community development in Tiaty Constituency

Conclusion

In conclusion, the study conducted in Tiaty Constituency, Kenya, underscores the pivotal role of risk reduction programs, particularly those focusing on environmental conservation, social cohesion, and hazard assessment through public participation, in promoting the long-term sustainability and development of the community. The study also concludes that the empowering effect of successful risk reduction programs on community self-reliance highlights their potential to enhance the community's capacity to cope with and recover from challenges. The study findings confirmed the vital contribution made by local governing organizations such as CMDRRC in facilitating timely risk reduction programs, resource mobilization, and resource utilization during drought events thereby saving lives and livelihoods. The connection between community commitment, sustainability, and self-reliance further underscores the importance of active community engagement led by local community organization having the mastery of local dynamics. Lastly, the study highlights how well-executed risk reduction programmes can influence policy and program changes at various levels, ultimately creating an enabling environment for community development and sustainability in Tiaty Constituency.

Recommendations

Based on the comprehensive findings of the study in Tiaty Constituency, Kenya, it is strongly recommended that risk reduction programs, with a specific focus on environmental conservation, social cohesion, and community participation in hazard assessment, should be prioritized and expanded in the region. These programs play a vital role in fostering community resilience, unity, and sustainable development. To maximize their impact, community organizations, government agencies, and stakeholders should collaborate to ensure that risk reduction strategies are well-planned, resource allocation is based on thorough risk assessments, and that policies are influenced to support such initiatives. It is necessary to conduct future studies to determine the community managed disaster risk management as a strategy for resource mobilization to further advance local development. In addition, a further research is recommended to establish how community managed drought risk reduction contributes towards sectoral annual development planning and budgeting both at national and county level. Similarly, there is need to conduct CMDRR strategy geared toward promoting community development in other drought prone counties of Kenya to inform the uptake of CMDRR as a planning tool in Kenya.

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