Opportunities and Constraints for Disaster Risk Reduction Resilience Building among the Kenyan Pastoral Communities, Mandera County, Kenya

Abstract

Climate-related hazards have been recorded as the major triggers for major disasters worldwide. However, extensive research in Opportunities and Constraints for Disaster Risk Reduction Interventions is greatly lacking. This study sought to research on this gap among pastoral communities of Mandera County. Three sampling techniques; stratified sampling, simple random and purposive sampling were used to collect data and information from key informants with a sample size of 157. The findings were analysed with Statistical Package of Social Sciences and Excel. Data were presented in tables, pie-chart and graphs. The hypothesis was tested by Chi-Square (X2). The null hypothesis of drought shocks had no association with effective and affordable practices of drought mitigation and preparedness in Mandera County, χ^2 =4.468, DF=6, P=0.624, failed to be rejected.

1.0 Introduction

1.1 Study Area

The study was carried in Mandera County, North Eastern region, Kenya, as per the figure 1 below.
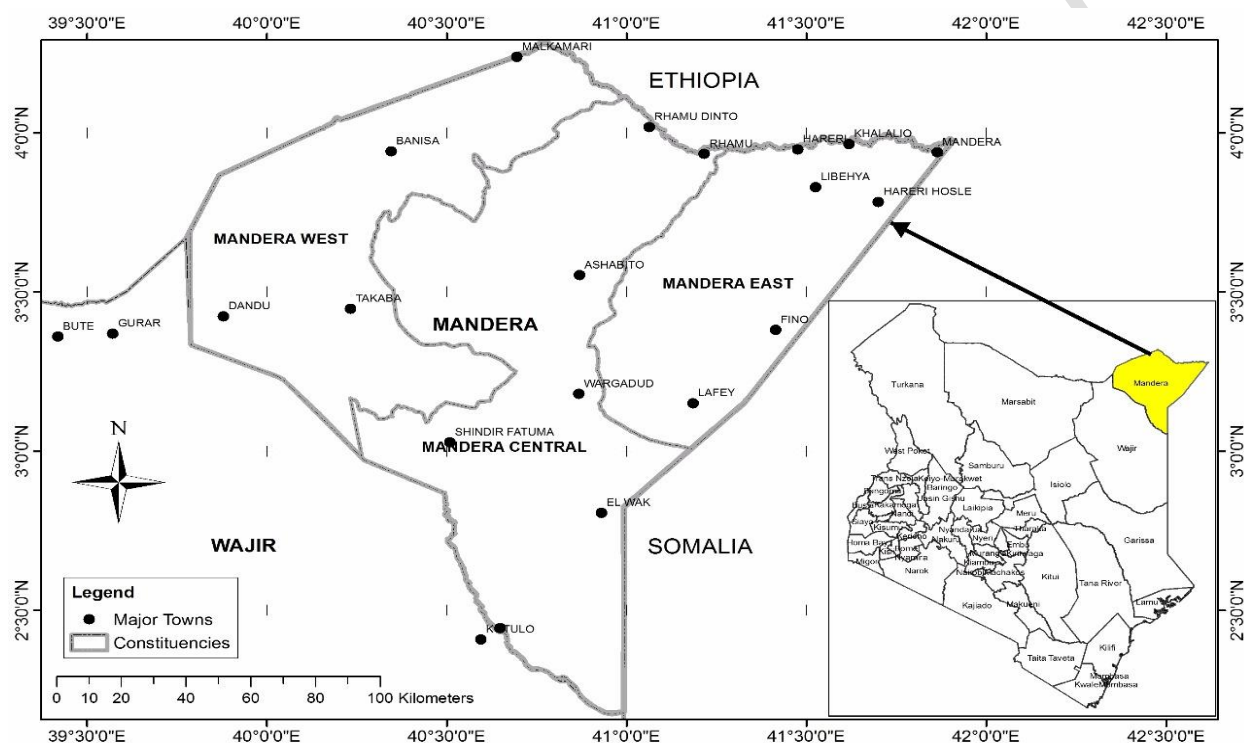

Figure 1: Study area map (Source; Author, 2021)

The study area is home to 125,763 houses and 33 persons per square kilometre (Kenya National Bureau of Statistics, 2019). The area borders Somalia and Ethiopia and it is made up of six sub-counties namely: Mandera East, Mandera North, Mandera West, Lafey, Banisa and Kutulo.

Mandera County has low rocky hills, Savana-like flora, with solitary hills covered with exotic Prosopis *juliflora* shrubs. The study area has an annual temperature of 24°C to 42°C in February and annual average rainfall of 191.7mm with short rains season occurring in April to May with average of 69.1mm, and long rains from October to December with an average of 122mm (Tawane and Mugalavai, 2019).

Methodology

1.2 Research Design

A descriptive research survey design was used by the study. The study utilized a descriptive research design to describe the features of a certain person or groups (Kothari, 2009). The descriptive survey design was designed to formulate goals, develop tools for data collection, selection of samples, data collection, processing, analysis and reporting results.

1.3 Target Population

The study area has a population of 867,457 (KNBS, 2019) spread over an area of 25,939 km^2.The study employed stratified sampling method to get the sample size from the main population size and the researcher used a formula by Mugenda and Mugenda (2003) which suggests that a sample size of 10-30% of the target population should be used in a descriptive study. From the formula below, by Mugenda and Mugenda (2003), from a targeted 1,569 households (N) the researcher interviewed 157 (n) households from the three sub-counties of Mandera County namely; Banisa, Mandera West and Mandera East.

$$n = \frac{10}{100} N \quad \text{(Mugenda and Mugenda, 2003)}$$

Where N is the target households and n is the sample size.

Therefore; $n = \frac{10}{100} X \ 1{,}569 = 156.9$

This study rounded off the figure to 157 households and used it as the sample size.

The household population of the three sampled sub-counties in the study area is captured in the table below. The data is as per the KNBS, 2019, census report.

Table 1: The data is as per the KNBS, 2019, census report

Constituency	Ward	Village	Household population	% Household (125,497)	Target Village Household population	Target Sample size
Banisa	Banisa	Tarama	19,327	15.4	499	50
Mandera West	Takaba	Takaba	19,828	15.8	514	51
Mandera East	Township	Bulla Mpya	21,836	17.4	558	56
Total			60,991	48.6	1,569	157

1.4 Data Collection Instruments

The study employed household survey, key informant, interviews and secondary data from Kenya Metrological Department. The study also employed the use of structured questionnaires, pilot testing and filling of observation checklists by the researcher at the study area.

2.0 Result and Discussion

2.1 Demographic Information

Table 2: The table below shows the rate of gender response from the study area.

| Village | Gender | | | | | |
| | Male | | Female | | Total | |
	F	%	F	%	F	%
Bulla Mpya	29	61.7	18	38.3	47	83.9
Takaba	29	67.4	14	32.6	43	84.3
Tarama	24	58.5	17	41.5	41	82.0
Total	82	62.6	49	37.4	131	100.0

The number of overall household respondents by gender comprised of 62.6% (n=82) male and 37.4% (n=49) female. The cultural household heads in Mandera are male only in rare occasions where a female heads the household. Therefore, this informed our gender sample outcome. This gender parity confirmed that we could rely on in assessing Disaster Risk Reduction Interventions for enhancing Resilience among Pastoral Communities of Mandera County.

2.2 Respondents Educational Level

The results of the survey showed that most of the interviewees received basic primary education. The study found out that 55.7% of the respondents had elementary school education, 18.3% high school education, 11.3% tertiary education, 3.8% university education and the rest had not attended any formal education system. Most participants believe that their low education can be ascribed to the way they live because they move from one place to place in search of food, water and grazing for their animals.

3.0 Opportunities and Constraints for Disaster Risk Reduction Resilience Building

To answer the research question on the opportunities and constraints for DRR, this study used the following conceptual framework which was adopted and modified from Barton *et al.,* 2001.
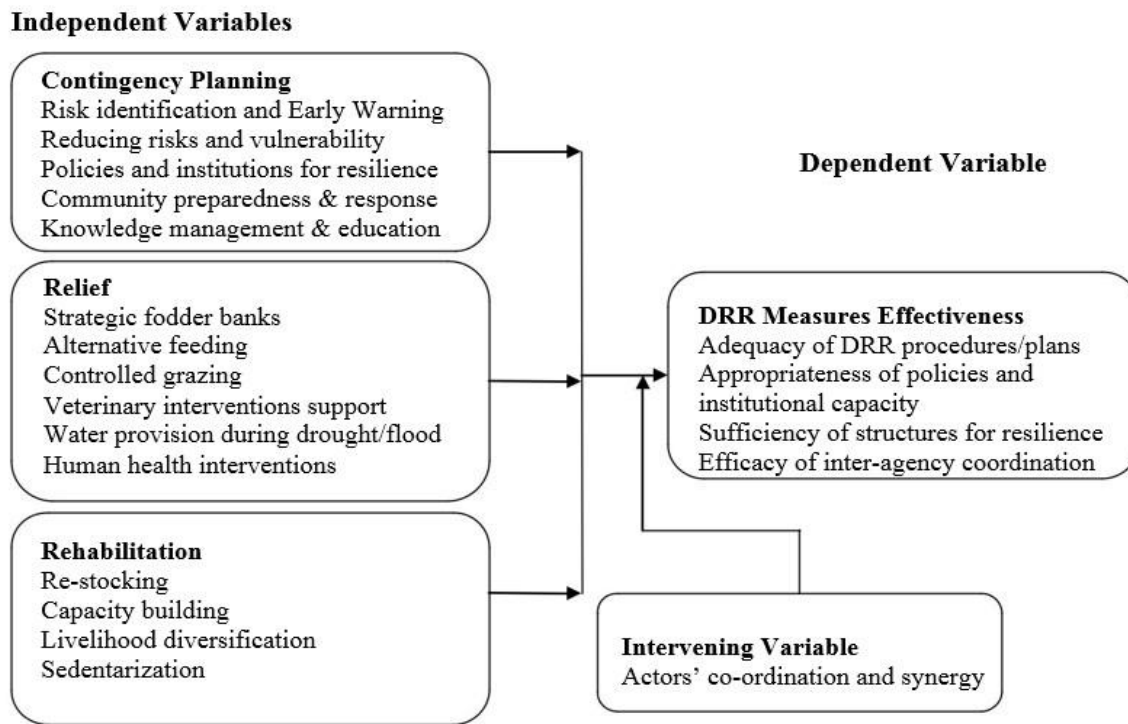
Independent Variables

Contingency Planning
Risk identification and Early Warning
Reducing risks and vulnerability
Policies and institutions for resilience
Community preparedness & response
Knowledge management & education

Relief
Strategic fodder banks
Alternative feeding
Controlled grazing
Veterinary interventions support
Water provision during drought/flood
Human health interventions

Rehabilitation
Re-stocking
Capacity building
Livelihood diversification
Sedentarization

Dependent Variable

DRR Measures Effectiveness
Adequacy of DRR procedures/plans
Appropriateness of policies and institutional capacity
Sufficiency of structures for resilience
Efficacy of inter-agency coordination

Intervening Variable
Actors' co-ordination and synergy

Figure 2: Research Conceptual Framework

From the conceptual framework, the interaction of the three variables; independent, intervening and dependent variables, helped the researcher to have informed and scholarly data which assisted in coming up with clear answers for the research objectives and questions.

3.1 Drought and Risk Management Interventions

The study evaluated the drought risk management strategies in the study area. The findings showed that a majority of 62.6 per cent (82) of respondents said there were interventions in their areas for drought risk management, compared to 26.0 per cent (34) for those who stated that the risk management interventions for drought were not being undertaken. A

minor number of 11.5% (15) of respondents did not know of the proximity of drought risk management actions.

3.2 Sources of Drought Risk Management Interventions

The research investigated how pastoralists manage the drought situation to determine the potential and constraints of Mandera County drought/disaster risk reduction. Risk knowledge relates to personal understanding and processing of danger information (Nguvava *et al.,* 2006). The study findings as per the figure below found out that 39.7% of the respondents got the information from family or own initiatives, while 32.1% got it through relative assistance and 28.2% from the relief authorities in the area.
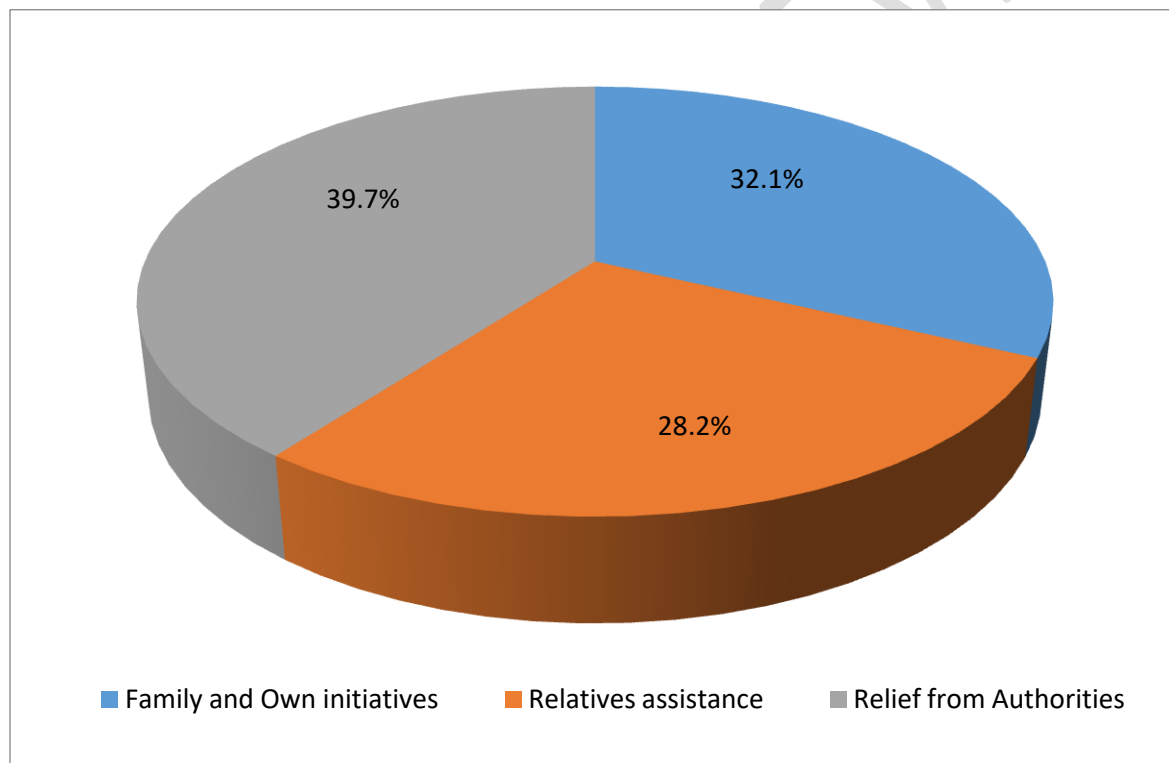

Figure 3: Drought Risk Management Interventions

3.3 Resilient Mechanisms towards Drought Risk Reduction

Coping, adjustment and resilience comprise portfolios and avenues for people to achieve their livelihood objectives. The strategies are divided into three basic categories: intensification and extension, diversification and migrations (Nyariki *et al.,* 2017). The reason is that the better one knows the hazard process, the better prepared response and preparedness measures are used to reduce vulnerability and hence catastrophe risk (Paton and McLaughlin, 2008; Hansson *et al.,* 2020).

As per the detailed graph below, the findings of this study on the coping, adaptation and resilient mechanisms employed by the Mandera county residents towards drought risk reduction.
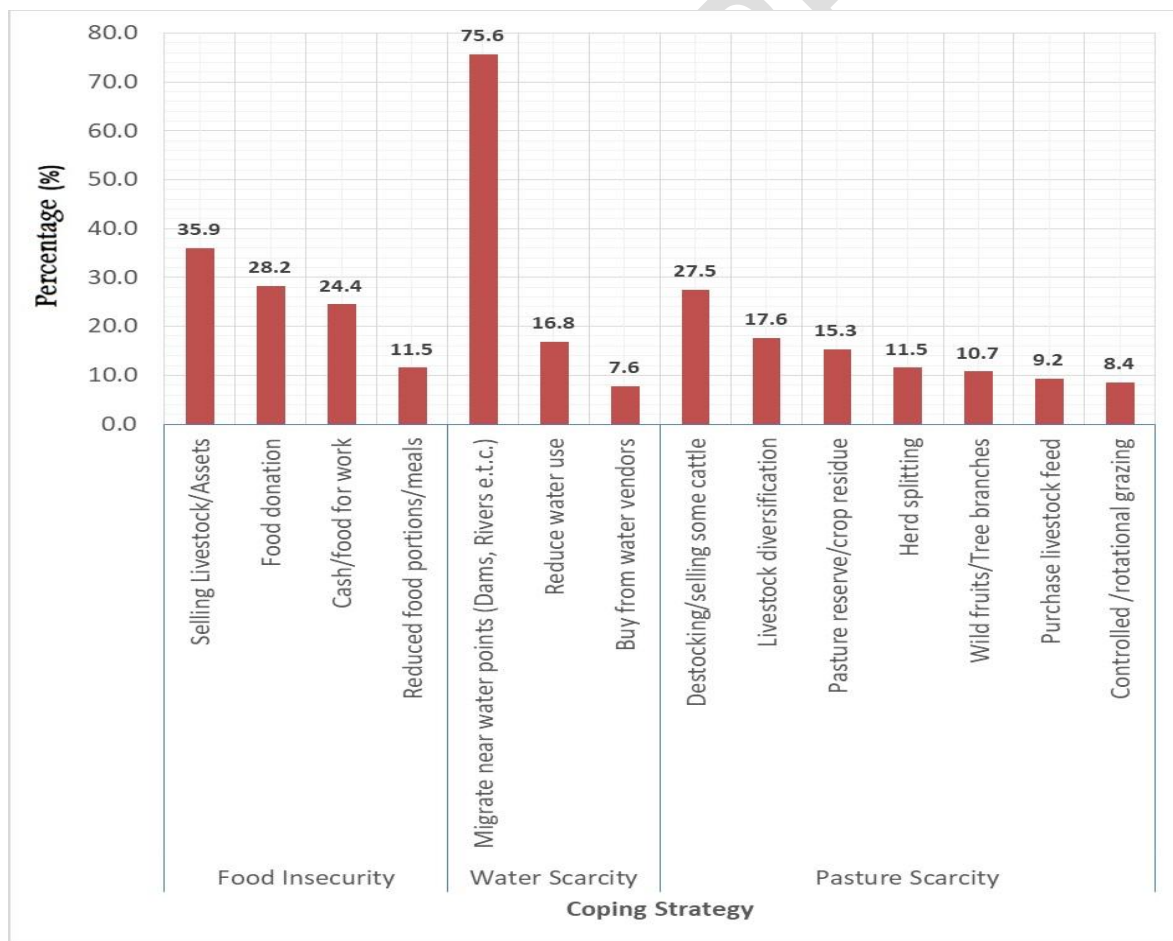

Figure 4: Resilient Mechanisms

Based on food insecurity, the respondents ranked selling of livestock and other assets at the top as attributed by 35.9%, followed by reliance on food aid/donation with 28.2%, then cash or food for work by 24.4% and reduced food portions/meals by 11.5%. Water scarcity were curbed by migration towards water point as reported by 75.6%, reduced water uses as alleged by 16.8% and buying from water venders as suggested by 7.6%.

The problem of pasture scarcity attracted a number of resilient mechanisms ranging from destocking or selling of some livestock as noted by 27.5% of respondents to livestock diversification (rearing of more resistant stock like camels) as suggested by 17.6%. Also, 15.3% reported on the use of pasture reserve and crop residue, 11.5% were for herd splitting, 10.7% suggested desperate measures of using wild fruits/roots and tree branches to feed their livestock, 9.2% opted to buying livestock feed and at the least were 8.4% cited controlled or rotational grazing to avoid overgrazing.

Some of the main informants interviewed commented on coping with the challenges of throughout the drought that herders, Mandera County Government, NGOs reacted to the crisis in a number of previously discussed techniques. The recovery time has been characterized as harder for the less favoured/poor community members, given the majority of their assets are lost during the drought. Drought-prone residents are able to replenish bank savings or animals borrowed from others during drought.

3.4 Impediments Hindering Efforts towards Drought Risk Reduction

The study investigates the impediments hindering efforts towards drought risk reduction in Mandera County, the respondents stated and rated what they consider as huddles.

Table 3. Drought Risk Reduction

Impediment	Little Extent		Moderate extent		Large Extent		Very Large		Total	
	F	%	F	%	F	%	F	%	F	%
Low/Lack of technical capacity	1	0.8	47	35.9	51	38.9	32	24.4	131	100.0
Poor inter-agency coordination	10	7.6	49	37.4	37	28.2	35	26.7	131	100.0
Lack/Limited funds	0	0.0	22	16.8	60	45.8	49	37.4	131	100.0
Lack/limited DRR measures	11	8.4	63	48.1	46	35.1	11	8.4	131	100.0
Lack/Limited preparedness	1	0.8	11	8.4	74	56.5	45	34.4	131	100.0
Other priorities	8	6.1	28	21.4	91	69.5	4	3.1	131	100.0

The study indicated that most respondents (38.9%) cited Low/Lack of technical capacity at the local level, followed by 35.9% moderate, 24.4 % extremely large, and 0.8 % minor. Poor inter-agency coordination and political will was cited as a hindrance by up to 37.4% of respondents, 28.2% by large, 26.72% by very large, and 7.6% by little. Also, 45.8% acknowledged very much, 37.4% acknowledged very much, and 16.8% acknowledged somewhat the lack of drought mitigation money. In most cases 48.1% of respondents suggested that the measures for reducing risk of drought were in a very moderate way a barrier, 35.1 percent to a significant extent and 8.4%, for very big and small amounts correspondingly. With regard to the unrestricted relation between readiness, advance detection and better communication strategies, 56.5 percent maintained a significant barrier, 34.4 percent claimed to be very extensive, 8.4% was moderate and 0.8 percent to a small level. Other Mandera County priorities have been

recognized as a hindrance to 69.5% of respondents to a big degree, 21.4% to a moderate degree, 6.1% to a small degree, and 3.1% to a really significant level.

4 Hypothesis Testing

This research employed statistical analysis to test the null hypothesis which was; Drought shocks has no association with effective and affordable practices of drought mitigation and preparedness in Mandera County, Kenya. The table below shows the analysis.

Table 4. Test hypothesis

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	4.468[a]	6	.614	.624
Likelihood Ratio	5.591	6	.470	.574
Fisher's Exact Test	4.764			.533
N of Valid Cases	131			

The cause of drought risk and the effective, cost-effective strategies of drought mitigation and preparedness were not significantly related to global warming; χ^2 (6, N=131) = 4,468a, P=0,624. Fisher's Exact Test, p=0.533, indicated that the two variables are not statistically associated. Both phi and Cramer's V have reported the precise significance of P=0.624, which implies that the hypothesis is null and that there is a notable link between climate change as the reason for the risk of drought disasters and effective and affordable dryness mitigation and preparedness activities.

5 Conclusion

The study explored the opportunities and constraints for Disaster risk reduction and resilience building, and from the findings, the study concludes that most respondents highlighted low/lack of local technical competence as a major barrier to reducing drought risk. Poor inter-agency coordination and political will were also mentioned up by respondents. Some responders said

lack of/limited drought risk reduction strategies was a hindrance. The absence of/limited relationship between readiness, early warning, and early response was major hurdle.

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