International Journal of Policy Design and Administrative Studies (IJPDAS)

INFLUENCE OF INSTITUTIONAL FINANCING IN EARLY WARNING SYSTEMS ON DROUGHT MITIGATION IN ARID AND SEMI-ARID LANDS

Hussein Idhoro and **Dr. Patrick Mbataru, PhD**

International Journal of Policy Design and Administrative Studies
ISSN: 2806-3600
Vol.3, Issue No. 1, 2026

INFLUENCE OF INSTITUTIONAL FINANCING IN EARLY WARNING SYSTEMS ON DROUGHT MITIGATION IN ARID AND SEMI-ARID LANDS

Hussein Idhoro
Corresponding author, Postgraduate student, Kenyatta University
Dr. Patrick Mbataru, PhD
Senior Lecturer, Department of Public Policy and Administration, Kenyatta University

Article History:
Published on: 26/10/2026
DOI:
https://doi.org/10.68715/ijpdas.v3.i2.a160

***How to Cite*:** Idhoro, H. I., & Mbataru, P. (2026). Influence of Institutional Financing in Early Warning Systems On Drought Mitigation in Arid and Semi-Arid Lands. *International Journal of Policy Design and Administrative Studies*, *3*(2), 1–16. **https://doi.org/10.68715/ijpdas.v3.i2.a160**

Abstract:

Purpose: This study assessed the influence of institutional financing in early warning systems on drought mitigation in Mandera County, Kenya. Specifically, it examined funding adequacy, timely disbursement, resource sufficiency, financial transparency, and responsiveness to vulnerable communities. The study sought to establish how institutional financing relates to effective drought preparedness and mitigation outcomes.

Methodology: The study employed a descriptive research design using mixed methods, guided by institutional theory. From 210 stakeholders, 136 respondents were selected through stratified random sampling, with 118 completing questionnaires. Data were collected through questionnaires, interviews, and focus groups. Descriptive statistics, Pearson correlation, regression analysis, and thematic analysis were employed.

Findings: Findings revealed unfavourable perceptions of institutional financing (mean = 2.59, SD = 0.69), particularly regarding timely fund disbursement (mean = 2.21) and funding adequacy (mean = 2.31). Drought mitigation received a moderate rating (mean = 3.06, SD = 0.80). Early warning information scored highest (mean = 3.64), while prompt response scored lowest (mean = 2.78). Institutional financing demonstrated a positive, statistically significant relationship with drought mitigation ($r = 0.571$, $p < 0.01$). Regression results indicated that financing explained 32.6% of variation in drought mitigation outcomes ($\beta = 0.571$, $p < 0.001$), highlighting the importance of reliable institutional funding for effective drought management.

Conclusion: The study concludes that institutional financing significantly predicts drought mitigation outcomes in Mandera County. Inadequate funding and delayed disbursement constrain timely responses despite reliable warning information. Strengthening financing mechanisms through adequate budget allocations, timely fund releases, transparent financial management, and vulnerability based resource distribution is essential for improving drought resilience.

Keywords: *Institutional Financing; Early Warning Systems; Drought Mitigation; Mandera County*

©2026 By The Authors. This Article is an open-access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (**https://creativecommons.org/licenses/by-nc-sa/4.0/**)

1. Introduction

1.1 Background of the Study

Drought is one of the most damaging hazards in arid and semi-arid lands (ASALs), where most households depend on livestock and rain-fed farming. Early warning systems (EWS) are meant to give governments and communities enough time to act before drought turns into hunger, livestock deaths and loss of income. Warnings, however, protect people only when institutions have the money to act on them. The World Meteorological Organization [WMO] (2022) reported that half of all countries still lack early warning systems and that about 60% of people in Africa are not covered by them. In East Africa, five consecutive droughts left 23 million people facing starvation in 2022 and required more than US$2 billion in aid (Funk et al., 2023). These figures show that warning information and the money to respond to it must work together.

Institutional financing refers to the money that national and county institutions set aside, release and account for in order to run early warning activities and support early action. When this money is adequate, released on time and used openly, institutions can monitor drought, share warnings and start protective measures early. When it is late or too small, warnings may be issued but action follows only after livelihoods have been damaged (Mwangi et al., 2022).

1.1.1 Global perspective

Drought affects every continent, and national wealth does not remove the risk. In Europe, the Joint Research Centre of the European Commission [JRC] operates the European and Global Drought Observatories, which provide real-time drought information (JRC, 2022). During the 2022 drought, the Centre reported that 47% of the European Union was under drought warning and 17% under alert (Toreti et al., 2022). In Spain, water stored in reservoirs in July 2022 was 31% below the ten-year average, a clear signal of developing shortage (JRC, 2022). Spain therefore illustrates how public investment in monitoring supports early awareness of drought.

In Asia, India finances drought management through national and state disaster funds. Sharma (2023), however, found that drought policy in the state of Madhya Pradesh remained mainly relief-oriented, with spending directed at support after a drought rather than prevention. The study also reported delays of four months to one year in releasing relief payments. India shows that having funds is not enough: money must also be released early and used for prevention.

1.1.2 Regional perspective

Africa carries a heavy burden because most livelihoods depend on rainfall. In West Africa, Niger has tested the use of early warning information to release funds before a drought becomes severe. Parodi et al. (2024) reported that Niger's drought plan was triggered for the first time in August 2022. Agreed triggers allowed funds to be reached three to more than nine months earlier than the usual practice of releasing money after an emergency declaration. The same authors noted that the funding remained too small to manage a large drought and that preparing communities for early action was difficult to finance.

In Southern Africa, Zimbabwe was one of four countries where the World Food Programme [WFP] and its partners acted ahead of the 2023/24 drought. Across Lesotho, Madagascar, Mozambique and Zimbabwe, early warning messages reached more than 1.2 million people, and US$14 million in pre-arranged financing was released (WFP, 2024). Niger and Zimbabwe show that agreed financing can bring action forward, but its size and reliability determine how well communities are protected.

1.1.3 Local perspective

Kenya has experienced three extremely severe droughts in the past decade, in 2010–2011, 2016–2017 and 2020–2022, and the last was the most severe and prolonged (Kiptoo, 2023). The President declared the drought a national disaster in September 2021 (ACAPS, 2022). By March 2023, more than 2.6 million livestock had died across 23 ASAL counties, and Mandera was among the counties with above-normal livestock deaths. About 4.4 million people needed assistance by February 2023 (Kiptoo, 2023).

The National Drought Management Authority (NDMA) is one of several institutions that provide early warning information in Kenya, and it manages the Drought Contingency Fund, which provides flexible money for county drought plans. Kiptoo (2023) observed that the fund is not always available when needed and is sometimes released after conditions have worsened, even where a warning had been issued. Mwangi et al. (2022) likewise stressed that Kenya needs enabling institutions and reliable financing if forecasts are to trigger early action consistently. These findings place institutional financing at the centre of drought mitigation in Kenya's ASALs.

1.1.4 Early Warning Systems and Drought Mitigation in Mandera County

Mandera County lies in north-eastern Kenya and is one of the eight counties served by the Hunger Safety Net Programme, which gives cash to poor pastoral households when drought is predicted (Kiptoo, 2023). The programme depends on early warning information, such as the vegetation condition index, to trigger payments. Early warning in the county therefore involves several institutions, including NDMA, the county government and humanitarian partners. Their ability to act on a warning depends on whether money is available when the warning is issued.

Institutional Financing

In this study, institutional financing means the adequacy, timely release, sufficiency, transparency and fair targeting of money for early warning activities. These five features show whether institutions can monitor drought, communicate warnings and prepare communities before conditions worsen (Mwangi et al., 2022).

Drought Mitigation and its Measurement

Drought mitigation refers to actions that reduce the harm drought causes to people, livestock and livelihoods. It was measured using six statements on reduced drought impacts, household preparedness, prompt response to warnings, community recovery, the accuracy and timeliness of early warning information, and reduced food insecurity and displacement. Respondents rated each statement on a five-point scale, and a mean score below 3.00 was treated as an unfavourable view.

1.2 Statement of the Problem

Kenya has invested in early warning systems, yet drought still causes heavy livestock losses and food shortages in its ASALs (Kiptoo, 2023). During the 2020–2022 drought, warnings were issued well before the worst effects, but the response came late (Kiptoo, 2023). Evidence from Kenya and elsewhere suggests that delayed and uncertain funding is a major reason why warnings do not always lead to timely action (Funk et al., 2023; Mwangi et al., 2022; Parodi et al., 2024).

To the researcher's knowledge, most available studies describe national systems or humanitarian programmes. Few studies measure, at county level, how stakeholders working with early warning systems judge the adequacy, timeliness and openness of financing, and whether these judgements are linked to drought mitigation outcomes. Mandera County is among the counties hardest hit by recent droughts, and this evidence is needed to guide budget decisions. Without it, institutions may continue to fund warnings without funding the actions that should follow. This study therefore assessed the influence of institutional financing in early warning systems on drought mitigation in Mandera County.

1.3 Purpose of the Study

The purpose of the study was to assess the influence of institutional financing in early warning systems on drought mitigation in Mandera County, Kenya.

1.4 Research Hypothesis

H01: Institutional financing in early warning systems does not significantly influence drought mitigation in Mandera County, Kenya.

2.0 LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Institutional Theory

Institutional theory explains how rules, norms and shared expectations shape what organisations do. It holds that organisations seek legitimacy, meaning that they want to be seen as acting in proper and accepted ways, and that this pressure often leads similar organisations to adopt similar structures and procedures (DiMaggio & Powell, 1983). The theory also describes three kinds of influence: formal rules, professional and social norms, and shared understanding of how things should be done. In drought management, institutions are expected to align their budgets, rules and coordination arrangements so that warnings lead to action.

The theory has strengths and limits. It explains why financing arrangements and coordination structures affect policy results, and it allows study at more than one level of government. However, it gives much attention to conformity and stability and less to power, creativity and local differences. In Kenya's ASALs, this means funding rules may be followed on paper even when money does not arrive in time. Kiptoo (2023) found that the Drought Contingency Fund exists to support pre-agreed county plans, yet money was not always available when needed. Mwangi et al. (2022) also stressed that reliable financing and enabling institutions are needed

for early action. In Niger, Parodi et al. (2024) showed that supportive policies and agreed funding triggers helped early action to be accepted and carried out.

The theory is relevant to this study because it explains why institutional financing matters. Funding that is adequate, timely, open and fairly shared gives an early warning system the legitimacy and capacity to act. The study therefore uses the theory to examine how formal financing arrangements influence drought mitigation in Mandera County.

2.2 Empirical Review

2.2.1 Institutional Financing and Drought Mitigation

Mwangi et al. (2022) analysed Kenya's drought management system to assess how climate forecasts could be used within it. They concluded that reliable financing and enabling institutions are essential if forecast information is to trigger early action consistently. Their study examined the national system, whereas the present study measures stakeholders' views of financing in Mandera County and tests its link with drought mitigation statistically.

Kiptoo (2023) reviewed drought response in Kenya's ASALs and found that the Drought Contingency Fund was not always available when needed and was sometimes released after conditions had worsened. The response to the 2021–2022 drought in several counties came after lives were lost, despite an early warning. The present study builds on this by measuring how respondents rate the timely release of funds.

Funk et al. (2023) showed that droughts in East Africa can now be predicted months ahead, and they identified limited funding as one barrier to using forecasts. They argued that investing in African-led early warning systems can reduce the need for costly emergency aid. The present study moves from forecasting to financing and examines the issue at county level.

Parodi et al. (2024) reviewed early action for drought in Burkina Faso, Chad and Niger. They found that triggers linked to forecasts brought funding forward by three to more than nine months, but that funding was still too small and preparation was hard to finance. Sharma (2023) found that drought spending in an Indian state was mainly for relief after the event and that payments were often delayed. Both studies concern other settings, which is why local evidence from Mandera County is needed.

2.2.2 Drought Mitigation

Drought mitigation covers actions taken before, during and after a dry spell to reduce harm to people, livestock and livelihoods. These include sharing accurate warnings, helping households to prepare, responding quickly, protecting livestock and water supplies, and supporting recovery. Funk et al. (2023) argued that forecasts can guide relief and farming decisions in advance, but only if barriers such as limited funding and slow decision-making are overcome. Kiptoo (2023) listed the main interventions in Kenya's ASALs, including early warning, water conservation, social protection, food aid and livestock insurance, and noted that households still suffered heavy losses. The study measured drought mitigation through the six indicators described in the Background.

2.3 Conceptual Framework

A conceptual framework shows how the independent variable is expected to influence the dependent variable. In this study, institutional financing in early warning systems is expected to influence drought mitigation. Better financing is expected to improve the quality of warnings, the speed of response, household preparedness and the recovery of communities. Figure 2.1 presents the relationship.

Figure 1

Conceptual Framework

Independent Variable: Institutional Financing	**Dependent Variable: Drought Mitigation**
• Adequacy of funds for early warning activities • Timely release of funds • Sufficiency of resources for preparedness • Transparency and accountability • Budgets that meet the needs of vulnerable communities	• Reduced drought impacts on livelihoods • Household preparedness • Prompt response to warnings • Community coping and recovery • Accurate and timely early warning information • Reduced food insecurity and displacement

Note. Note. Source: Researcher (2026)

3.0 RESEARCH METHODOLOGY

The study will adopt a descriptive research design using a mixed-methods approach to examine the influence of institutional financing, community engagement, institutional coordination and implementation capacity, and policy frameworks on drought mitigation in Mandera County, Kenya. The target population will comprise 210 stakeholders, including government officers, NGO representatives, community leaders, and drought committee members. Stratified random sampling will be used to select 136 respondents proportionately across the stakeholder categories.

Data will be collected using structured questionnaires, key informant interviews, and focus group discussions. A pilot study involving 14 respondents from Wajir County will assess the clarity and suitability of the research instruments. Content validity will be established through expert review, while questionnaire reliability will be assessed using Cronbach's alpha, with a coefficient of at least 0.70 considered acceptable.

The researcher will obtain the necessary university ethical approval, NACOSTI research permit, and relevant county authorisations before data collection. Quantitative data will be analysed using SPSS Version 27. Descriptive statistics, Pearson correlation, and multiple linear regression will examine relationships between the independent variables and drought mitigation, with statistical significance set at $p < 0.05$. Qualitative data will be analysed thematically to complement quantitative findings. Results will be presented using tables, graphs, and narrative explanations. Informed consent, voluntary participation, confidentiality, anonymity, and secure data storage will be maintained throughout the study.

4.0 RESEARCH FINDINGS AND DISCUSSION

4.1. Response Rate

The study targeted 136 respondents selected proportionately from four respondent categories using stratified random sampling. Questionnaires were administered using the drop-and-pick method. Of the 136 questionnaires distributed, 118 were fully completed and returned, representing an overall response rate of 86.8%. The response rates across the four categories ranged from 84.5% among community leaders and drought committee members to 92.3% among NDMA and county disaster officers, as presented in Table 2.

Table 2

Response Rate

Category	Sample Size	Questionnaires Returned	Response Rate (%)
NDMA and County Disaster Officers	26	24	92.3
County Department Officers	32	28	87.5
NGO Representatives	20	17	85.0
Community Leaders and Drought Committees	58	49	84.5
Total	**136**	**118**	**86.8**

Note. Source: Field data (2026)

The response rate was calculated by dividing the number of completed questionnaires returned by the total number administered and multiplying the result by 100. According to Mugenda and Mugenda (2003), a response rate of 50% is adequate for analysis and reporting, 60% is good, and 70% or above is very good. Based on these benchmarks, the response rate of 86.8% was considered very good for the study. It provided a substantial number of completed questionnaires for the planned quantitative analysis, although the response rate alone does not establish the absence of non-response bias.

The relatively high response rate may be associated with the use of the drop-and-pick method, which allowed respondents to complete the questionnaires at their convenience. Other possible contributing factors were the use of local enumerators familiar with the languages spoken in the study area and engagement with relevant county institutions before data collection. Non-response may have been due to respondents being away from their duty stations or at remote grazing areas.

In addition to the questionnaire survey, the study conducted 12 key informant interviews with officials drawn from NDMA, county disaster management offices, relevant county departments, and non-governmental organisations. Four focus group discussions were also conducted with community drought committee members and local leaders in four sub-counties, with each group comprising between eight and ten participants. The qualitative data provided additional perspectives on institutional financing, helping to explain and contextualise the quantitative findings.

4.2 Descriptive Analysis

4.2.1 Institutional Financing

The first objective sought to assess the influence of institutional financing on drought mitigation. Respondents rated five statements on the adequacy, timeliness, sufficiency, transparency and responsiveness of financing for EWS activities. The results are presented in Table 3.

Table 3
Descriptive Statistics on Institutional Financing (%)

Statement	SD	D	N	A	SA	Mean	Std. Dev.
Funds allocated for EWS activities are adequate.	21.2	38.1	31.4	7.6	1.7	2.31	0.95
Funds for EWS activities are disbursed in a timely manner.	22.9	43.2	23.7	10.2	0.0	2.21	0.91
Available resources are sufficient for drought preparedness activities.	11.0	34.7	43.2	11.0	0.0	2.54	0.83
Financial management of EWS funds is transparent and accountable.	4.2	20.3	42.4	25.4	7.6	3.12	0.96
Budget allocations adequately meet the needs of vulnerable communities.	11.9	25.4	38.1	22.0	2.5	2.78	1.01
Aggregate score						**2.59**	**0.69**

Note. SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, SA = Strongly Agree. n = 118.
Source: Field data (2026)

The aggregate mean score for institutional financing was 2.59 (SD = 0.69), below the neutral midpoint of 3.00 on the five-point scale, which indicates generally unfavourable views of financing for EWS activities. The weakest dimension was timely release of funds (mean = 2.21, SD = 0.91). About 66.1% of respondents disagreed or strongly disagreed that funds were released on time, while 10.2% agreed. Delays can hold back water trucking, livestock health services and community awareness at the time they are needed most. This agrees with Kiptoo (2023), who found that Drought Contingency Fund money was sometimes released after conditions had worsened, and with Parodi et al. (2024), who reported that emergency funds in the Sahel were usually released after an emergency was declared. Funding rules should therefore allow money to be released when agreed drought warning levels are reached.

Adequacy of funds recorded a mean of 2.31 (SD = 0.95). A combined 59.3% disagreed or strongly disagreed that funds were adequate, compared with 9.3% who agreed, and 31.4% were neutral, suggesting that some respondents lacked information on budgets. Inadequate funds limit drought monitoring, field assessments, community awareness and the sharing of

warnings. Funk et al. (2023) also identified limited funding as a barrier to using forecasts, and they recommended investment in African-led early warning systems.

Sufficiency of resources for preparedness recorded a mean of 2.54 (SD = 0.83). About 45.7% disagreed or strongly disagreed that resources were sufficient, 11.0% agreed, and 43.2% were neutral. Preparedness work, such as contingency planning, water point maintenance and community training, may therefore not receive steady funding. The cost of prevention is small compared with the benefits. WMO (2022) described the US$3.1 billion needed to extend early warnings to everyone by 2027 as a sum that would be dwarfed by the benefits. National and county institutions should therefore fund preparedness before drought reaches a critical stage.

Transparency and accountability received the highest rating among the five indicators (mean = 3.12, SD = 0.96). About 33.0% agreed or strongly agreed that financial management was open and accountable, 24.5% disagreed, and 42.4% were neutral. The result does not show that accountability is consistently strong, and it suggests that open reporting does not by itself bring adequate or timely funds. Institutions should publish clear information on how EWS funds are allocated and spent, so that stakeholders can follow the money and trust the process.

Budget allocations for vulnerable communities recorded a mean of 2.78 (SD = 1.01). About 37.3% disagreed or strongly disagreed that allocations met community needs, 24.5% agreed, and 38.1% were neutral. Parodi et al. (2024) noted that plans prepared only at national level weakened local ownership and the involvement of communities at risk. Allocation decisions in Mandera County should therefore use warning information, vulnerability assessments and community priorities.

Overall, institutional financing was seen as a possible constraint on EWS implementation, with timely release and adequacy of funds rated lowest. These results agree with Mwangi et al. (2022), who stressed that reliable financing is needed for warnings to lead to action. The descriptive results reflect perceptions and do not alone prove cause and effect, which is why the relationship is tested later through correlation and regression.

4.2.2 Drought Mitigation

The dependent variable, drought mitigation, was measured using six statements covering the indicators described in the Background. The results are presented in Table 4.

Table 4

Descriptive Statistics on Drought Mitigation (%)

Statement	SD	D	N	A	SA	Mean	Std. Dev.
Drought impacts on livelihoods (e.g. livestock losses) have reduced.	15.3	20.3	31.4	28.8	4.2	2.86	1.12
Households are adequately prepared before the onset of drought.	7.6	23.7	31.4	33.1	4.2	3.03	1.03

Response actions are taken promptly after early warnings are issued.	13.6	24.6	38.1	17.8	5.9	2.78	1.08
Communities are able to cope with and recover from drought shocks.	5.1	23.7	35.6	24.6	11.0	3.13	1.06
Early warning information is accurate and timely.	0.0	13.6	29.7	35.6	21.2	3.64	0.97
Food insecurity and drought-induced displacement have reduced.	9.3	22.0	41.5	22.9	4.2	2.91	1.00
Aggregate score						**3.06**	**0.80**

Note. SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, SA = Strongly Agree. n = 118.
Source: Field data (2026)

The aggregate mean for drought mitigation was 3.06 (SD = 0.80), indicating a moderate assessment of outcomes. Accurate and timely early warning information had the highest mean (3.64, SD = 0.97). About 56.8% agreed or strongly agreed with the statement, 13.6% disagreed and 29.7% were neutral. This suggests that early warning information is generally trusted, which fits the description of improving forecasts and several warning platforms in Kenya (Funk et al., 2023; Kiptoo, 2023). However, a warning is useful only when recipients understand it and have the means to respond.

Prompt response after warnings had the lowest mean (2.78, SD = 1.08). About 38.2% disagreed or strongly disagreed that action was prompt, 23.7% agreed and 38.1% were neutral. Delays reduce the time households have to protect livestock, secure water and obtain food assistance. Kiptoo (2023) similarly reported that the response to the 2021–2022 drought in several counties followed loss of life despite an early warning. The result shows the need to link warning levels to clear response procedures, named responsibilities and quick release of money.

Household preparedness recorded a mean of 3.03 (SD = 1.03). About 37.3% agreed or strongly agreed that households were adequately prepared, 31.3% disagreed and 31.4% were neutral. Preparedness includes securing water, keeping fodder, protecting livestock and planning movement to better pasture, which depends on household resources and access to information. In Zimbabwe, Lesotho, Madagascar and Mozambique, early action included cash transfers, drought-tolerant seeds and safe water support (WFP, 2024). Warnings in Mandera County should likewise be accompanied by practical guidance and support.

The reduction of drought impacts on livelihoods recorded a mean of 2.86 (SD = 1.12). About 35.6% disagreed or strongly disagreed that impacts had reduced, 33.0% agreed and 31.4% were neutral. Livestock provide income, food and savings to pastoral households, and Mandera was among the counties with above-normal livestock deaths in the 2020–2022 drought (Kiptoo, 2023). Mitigation should therefore go beyond warnings to include water provision, livestock health services and feed support.

Community coping and recovery recorded a mean of 3.13 (SD = 1.06), with 35.6% agreeing or strongly agreeing, 28.8% disagreeing and 35.6% neutral. Food insecurity and displacement recorded a mean of 2.91 (SD = 1.00), with 31.3% disagreeing or strongly disagreeing, 27.1% agreeing and 41.5% neutral. These views suggest moderate but uneven resilience. Movement among pastoral communities can also be a normal livelihood strategy, so displacement results should be read with care and compared with independent food security data where available.

Overall, respondents rated warning information more favourably than the practical outcomes that follow it. This gap matches the concern that warnings do not automatically lead to protective action unless institutions can release resources and act on them (Mwangi et al., 2022; Funk et al., 2023). The finding sets the stage for testing how institutional financing relates to drought mitigation.

4.3 Inferential Statistics

The Pearson correlation coefficient (r) varies between −1 and +1. A positive value shows that the variables move in the same direction, and a negative value shows that they move in opposite directions. The nearer the absolute value is to 1, the stronger the relationship. The significance value shows whether the relationship is statistically significant. Pearson's product-moment correlation was used to examine the strength and direction of the relationship between institutional financing and drought mitigation, as shown in Table 5.

Table 5

Correlation between Institutional Financing and Drought Mitigation

Variable	1	2
1. Drought Mitigation.	1	
2. Institutional Financing.	0.571**	1

*Note. ** Correlation is significant at the 0.01 level (2-tailed); N = 118. Source: Field data (2026)*

Table 4.16 shows a positive and statistically significant relationship between institutional financing and drought mitigation ($r = 0.571$, $p < 0.01$). This is a moderate to strong relationship. It means that where financing was rated more favourably, drought mitigation outcomes were also rated more favourably. The coefficient of determination ($r^2 = 0.326$) shows that the two variables share about 32.6% of their variation.

Model Summary

Table 6 presents the model summary showing how far institutional financing explains variation in drought mitigation.

Table 6

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.571	0.326	0.320	0.660

Note. Predictor: (Constant), Institutional Financing. Dependent variable: Drought Mitigation. Source: Field data (2026)

The R value of 0.571 indicates a moderate to strong positive relationship. The R square of 0.326 shows that institutional financing explains 32.6% of the variation in drought mitigation, and the adjusted R square of 0.320 confirms that the result holds after allowing for the sample size. The remaining variation is likely to be explained by other factors, such as community engagement, institutional coordination and policy frameworks, which were examined separately.

ANOVA of the Regression Model

Table 7 presents the analysis of variance used to test whether the regression model significantly predicts drought mitigation.

Table 7

ANOVA

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	24.414	1	24.414	56.11	<0.001
Residual	50.466	116	0.435		
Total	74.880	117			

Note. Predictor: (Constant), Institutional Financing. Dependent variable: Drought Mitigation. Source: Field data (2026)

The model was statistically significant, $F(1, 116) = 56.11$, $p < 0.001$. Because the p-value was below 0.05, the null hypothesis that institutional financing in early warning systems does not significantly influence drought mitigation in Mandera County was rejected. Institutional financing therefore significantly predicts drought mitigation.

Regression Coefficients

Table 8 presents the regression coefficients showing the direction and size of the relationship.

Table 8

Regression Coefficients

Variable	B	Std. Error	Beta (β)	t	Sig.
(Constant).	1.345	0.237		5.68	<0.001
Institutional Financing.	0.662	0.088	0.571	7.49	<0.001

Note. Dependent variable: Drought Mitigation. The 95% confidence interval for B is 0.487 to 0.837. Source: Field data (2026)

Institutional financing had a positive and statistically significant effect on drought mitigation ($\beta = 0.571$, $t = 7.49$, $p < 0.001$). A one-unit improvement in the institutional financing score was associated with a 0.662-unit increase in the drought mitigation score. The regression equation was: Drought Mitigation = 1.345 + 0.662 (Institutional Financing).

These results show that counties and institutions with adequate, timely and open financing are more likely to achieve better drought mitigation. The finding agrees with Mwangi et al. (2022) and Kiptoo (2023), who linked reliable financing to the ability to act early. Because the data

come from one survey, the results show association rather than proof of cause, but the qualitative interviews support the same conclusion.

5.0 SUMMARY OF THE STUDY

The study assessed the influence of institutional financing in early warning systems on drought mitigation in Mandera County. Of the 136 questionnaires distributed, 118 were completed, giving a response rate of 86.8%, which is very good. Respondents viewed institutional financing unfavourably (mean = 2.59, SD = 0.69). Timely release of funds (mean = 2.21) and adequacy of funds (mean = 2.31) were rated lowest, while transparency and accountability were rated highest (mean = 3.12).

Drought mitigation was rated moderately (mean = 3.06, SD = 0.80). Early warning information was the strongest indicator (mean = 3.64), while prompt response after warnings was the weakest (mean = 2.78). Institutional financing was positively and significantly related to drought mitigation ($r = 0.571$, $p < 0.01$) and explained 32.6% of its variation ($\beta = 0.571$, $p < 0.001$). The null hypothesis was therefore rejected.

6.0 CONCLUSION

The study concludes that institutional financing in early warning systems significantly influences drought mitigation in Mandera County. Stakeholders see financing as a weak point, mainly because money is not always released on time and is not always enough. Warning information is trusted, but the actions that should follow are slower and less effective, which shows that information alone does not protect livelihoods.

Open financial management was viewed more favourably than the other financing features, but it has not translated into adequate or timely funds. Dependable financing is therefore central to turning warnings into timely action in arid and semi-arid lands. Institutions that fund both the warning and the response are better placed to reduce livestock losses, food shortages and loss of income.

7.0 RECOMMENDATIONS

First, the National Treasury, NDMA and the county government should agree on drought warning levels that automatically trigger the release of money from the Drought Contingency Fund and county drought funds. This would reduce delays that were rated as the weakest feature of financing.

Second, the county government should set aside a clear and adequate budget line for early warning and preparedness activities in each annual budget, including monitoring, field assessments, water point maintenance and community awareness.

Third, institutions should publish regular and simple reports on how drought funds are allocated and used, so that stakeholders can follow spending. Fourth, budget allocations should be guided by warning information, vulnerability assessments and community views, so that resources

reach the households facing the greatest risk. Finally, county and national institutions should link each warning level to a written response plan that names responsible officers and the funds available.

8.0 AREAS FOR FURTHER RESEARCH

Future studies could repeat this research in other arid and semi-arid counties to check whether the findings hold elsewhere. Studies that follow the same institutions over several drought seasons would show how financing changes outcomes over time. Researchers could also compare the cost of early action with the cost of emergency response, and examine how community engagement, coordination and policy frameworks work together with financing to influence drought mitigation.

9. REFERENCES

ACAPS. (2022, December 7). *Horn of Africa: Impact of drought in Kenya* [Thematic report]. https://reliefweb.int/report/kenya/acaps-thematic-report-kenya-impact-drought-turkana-and-marsabit-counties-07-december-2022

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review, 48*(2), 147–160. https://doi.org/10.2307/2095101

European Commission, Joint Research Centre. (2022, July 18). *Droughts in Europe in July 2022: Almost half of the EU+UK territory at risk*. https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/droughts-europe-july-2022-almost-half-eu-uk-territory-risk-2022-07-18_en

Funk, C., Harrison, L., Segele, Z., Rosenstock, T. S., Steward, P. R., Anderson, C. L., Coughlan de Perez, E., Maxwell, D., Endris, H. S., Koch, E., Artan, G., Teshome, F., Aura, S. M., Galu, G., Korecha, D., Anderson, W., Hoell, A., Damerau, K., Williams, E., … Hughes, D. (2023). Tailored forecasts can predict extreme climate informing proactive interventions in East Africa. *Earth's Future, 11*(7), Article e2023EF003524. https://doi.org/10.1029/2023EF003524

Kiptoo, E. (2023, June 30). *Effectiveness of drought response interventions in arid and semi-arid lands in Kenya*. Kenya Institute for Public Policy Research and Analysis. https://kippra.or.ke/effectiveness-of-drought-response-interventions-in-arid-and-semi-arid-lands-in-kenya/

Mugenda, O. M., & Mugenda, A. G. (2003). *Research methods: Quantitative and qualitative approaches*. African Centre for Technology Studies Press. http://ir-library.ku.ac.ke/handle/123456789/8328

Mwangi, E., Taylor, O., Todd, M. C., Visman, E., Kniveton, D., Kilavi, M., Ndegwa, W., Otieno, G., Waruru, S., Mwangi, J., Ambani, M., Abdillahi, H., MacLeod, D., Rowhani, P., Graham, R., & Colman, A. (2022). Mainstreaming forecast based action into national disaster risk management systems: Experience from drought risk

management in Kenya. *Climate and Development, 14*(8), 741–756. https://doi.org/10.1080/17565529.2021.1984194

Parodi, L. S. I., Enenkel, M., Lombardi, N., & Ngaina, J. (2024). Anticipatory action for drought in the Sahel: An innovation for drought risk management or a buzzword? *Frontiers in Climate, 6*, Article 1347519. https://doi.org/10.3389/fclim.2024.1347519

Sharma, A. (2023). Drought risk management in Madhya Pradesh, India: A policy perspective. *International Journal of Emergency Management, 18*(1), 23–46. https://doi.org/10.1504/IJEM.2022.10050715

Toreti, A., Bavera, D., Acosta Navarro, J., Cammalleri, C., de Jager, A., Di Ciollo, C., Hrast Essenfelder, A., Maetens, W., Magni, D., Masante, D., Mazzeschi, M., Niemeyer, S., & Spinoni, J. (2022). *Drought in Europe August 2022* (GDO analytical report). Publications Office of the European Union. https://doi.org/10.2760/264241

World Food Programme. (2024). *Anticipating the impact of drought in southern African countries: Key findings from the 2023/2024 anticipatory action activations*. https://wfp.org/publications/2024-anticipating-impact-drought-southern-african-countries-key-findings-20232024

World Meteorological Organization. (2022, November 7). *Early Warnings for All action plan unveiled at COP27*. https://wmo.int/node/21136