Inter-ministerial Collaborations in the Management of Flood Disasters in Southern Nigeria (2012-2023)

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Abstract

This study focused on Inter-ministerial Collaborations with the National Emergency Management Agency (NEMA) in the Management of Flood Disasters in Southern Nigeria (2012-2023). The Research design adopted the empirical survey. The states of Anambra, Bayelsa, Edo, Delta, Kogi and Rivers states making up the study area were purposively selected, as they are regularly flooded. The Theoretical Framework anchored on System theory and Structural-Functional theory. A population of 13,200 persons and a sample size of 1,320 federal workers were used. They were selected through the simple random sampling method. States and government establishments were purposively selected. Two hypotheses were tested using the Chi Square. The study found out that: (i) NEMA has made a significant impact on the management of flood disasters in the study area; and (ii) there is a positive relationship between Inter-ministerial Collaborations with NEMA and the effective management of flood disasters in the study area. The study therefore recommended: (i) NEMA should be strengthened by the Federal Government to do a proper enforcement of environmental laws; and (ii) Environmental education should be promoted in study area.

Keywords: **disaster, emergency, flood, management**

Introduction

Flood disasters have wreaked havoc globally and in Nigeria. Devastating floods affected Southern Nigeria in 2012, 2018 and 2022 with disastrous consequences. The Federal Government of Nigeria has reacted to the increasing rates of flood disasters in Nigeria by

setting up the National Emergency Management Agency (NEMA). There are institutional collaborations with the National Emergency Management Agency, and yet flood disasters have continued to ravage the study area. Floods have wreaked havoc on this study area unabated, which calls for this study that focuses on the National Emergency Management Agency (NEMA). Flood disasters affected nearly all the states in Nigeria in 2022. Public policies aim at solving social problems (Cochran et al., 2014)

The flood disasters of 2012, 2014, 2018 and 2022 cast serious doubt on the efficiency and capability of the National Emergency Management Agency (NEMA) in managing the flood disasters in Nigeria. Institutional linkages appear to be weak especially inter-ministerial collaborations that are not well coordinated. Irrespective of the Legal and Institutional Frameworks and huge funds from Ecological Funds Office (EFO), there are deadly flood reoccurrences in Southern Nigeria comprising of Edo, Delta, Kogi, Anambra, Rivers and Bayelsa states. These affected states form the study area for this study. Existing Literature on Inter-ministerial collaborations on the effective management of flood disasters in the study area are few and shallow, which calls for this study. This study intends to fill this yawning gap in literature. A number of questions are raised by this study: Has NEMA impacted positively on the effective management of flood disasters in the study area? What is the degree of inter-ministerial collaborations in the effective management of flood disasters in the study area? What are the solutions to the problems of flood disasters in the study area? The objectives of this study include: to determine the extent to which the National Emergency Management Agency (NEMA) has impacted on the effective management of Flood Disasters in the study area (2012-2023), to appraise the degree of inter-ministerial collaborations with NEMA in the effective management of flood disasters in the study area (Edo, Delta, Kogi, Anambra, Rivers and Bayelsa states), and to make recommendations to solve the problems of flood disasters in the study area.

Hypotheses

The following hypotheses guide this study:

HR1: NEMA has made a significant impact on the management of flood disasters in the study area.

H_O1: NEMA has not made a significant impact on the management of flood disasters in the study area.

HR2: There is a significant relationship between inter-ministerial collaborations and the effective management of flood disasters in the study area.

H_O2: There is no significant relationship between inter-ministerial collaborations and the effective management of flood disasters in the study area.

Theoretical Framework

This study is anchored on two theories in the midst of several other theories. The two theories used in this study are: (i) Structural – Functional theory, and (ii) System theory. These are further explained below:

(i) Structural-Functional Theory

The entire units that constitute the sum of a system, according to Fred Riggs, are structures. These structures perform specific functions to ensure the smooth delivery of services to the public. Major proponents of Structural-Functional theory are Almond and Genco (1977). Structural-Functionalism or simply called Functionalism comprises the relations among government institutions (such as NEMA) and subsystems such as intergovernmental relations, with the goal of achieving desired targets through an institutional arrangement that perform certain functions in order to operate efficiently. It tries to explain how structures operate in a

society, the various parts, and the institutions that combine to create a stable society over time. According to Hardgrave et al. (1973), the premises of structural-functional are (i) emphasis on the whole system as the unit of analysis, (ii) postulation of particular functions as requisite for the maintenance of the whole system, and (iii) demonstration of the functional interdependence of diverse structures in the whole system.

(ii) System Theory

Easton (1953), cited in Paki et al, (2020), defined the political system as "that system of interaction in any society through which binding or authoritative allocation of value are made". A system is a whole which is made of many parts. The political system, according to Easton (1953), takes inputs from society (environment), which consists of demands and supports that are converted in the political system ("Black Box") as outputs in the form of policies such as the National Emergency Management Agency's Act No.12, (1999). The feedback mechanisms return outputs to the system as inputs. It is thus cyclical. An example of such policies is the flood policy in Nigeria meant to tackle flood disasters. Due to the flood disasters in Nigeria 2022, the Federal House of Representatives mandated former President Muhammadu Buhari to release ₦100 billion to mitigate flood disasters nationwide and another N200 billion through Ecological Funds Office in 2023 to manage flood disasters (Silverbird FM News, 15th November, 2022).

In addition, the system theory was enunciated by David Easton, who believed that different people in different units or levels play complementary roles to form a system. Different units and their associated functions merge together to form a political system as a whole body.

Literature Review

Madugu et al. (2015) did an appraisal of the National Emergency Management Agency (NEMA) in disaster management in Nigeria. The study, using secondary data, examined the roles of NEMA as a key agency of the Federal Government of Nigeria in managing flood disasters. They classified disasters into three: (1) Level 1 (minor) which entails the disasters that can be handled using the available resources in the immediate community, (2) Level 2 (major) which entails disasters whose impacts overwhelm the local community hence needs external help, and (3) Level 3 (catastrophic) which entails disasters that occur without warning or whose magnitude is so large and call for a national emergency such as flood disasters. They also describe disaster management as the process of dealing with disasters whether before, during or after they might have occurred, involving the combined efforts of various organizations towards preventing them, preparing for them, responding to them and recovering from their effects. Madugu et al. (2015) recommended the following structures to be put in place: Planning and forecasting hazards, disaster alerting or early warning mechanism, disaster prevention and control measures, disaster mitigation activities, post-disaster damage assessment, rehabilitation; reconstruction, and recovery efforts. According to them, Disaster recovery management may be initiated when anything threatens or disrupts normal activities or put lives in danger or at risk, which is done after defining the catastrophe and putting a disaster management in place. The disaster plan includes evacuating people from impacted region, and arranging for temporary housing, food, and medicare (Ojo, 2004). Conclusively, Madugu et al. (2015) outlined the main achievements of the National Emergency Management Agency (NEMA) as follows:

1. Development of the Geographic Information System (GIS) to detect and analyze flooded sites; and help in the search and rescue operations.

2. Establishment of the COSPAS-SARSAT, and international programme for search and rescue using satellite images and satellite-aided tracking devices. The COSPAS-SARSAT provides information for distress alert and location. The operational capability of the equipment has been upgraded to Initial Operational Capability (IOC) and Final Operational Capability (FOC). The Nigerian Mission Control Centre (NMCC) helps to detect alert radio beacon signals from distress aircrafts and ships for search and rescue of flood victims.
3. Development of multidisciplinary Early warning System on July 23, 2009.
4. Establishment of Grassroots Emergency Management Volunteer Corps (GEVC) in 2008 in 23 states with 6408 registered members. This GEVC is made up of trained volunteers who assist in disaster management at local government level.
5. Establishment of NEMA/NYSC Emergency Management Vanguard in 2006 to help raise awareness on flood disaster in schools and communities.
6. Regional Cooperation for disaster preparedness, mitigation and response. NEMA coordinates a multinational collaboration on disaster assessment, risk mitigation, forecasting, early warning generation, early warning communication and response.
7. Establishment of National Nuclear and Radiological Emergency plan to cope with emergencies from nuclear activities. Nuclear Research Reactor (NRR-I), Radiotherapy using Linear Accelerator (LINAC), co-60 and c5-137 brachy therapy were installed.
8. Establishment of Disaster Response Unit (DRUs) in the armed forces.
9. Establishment of seven NEMA Zonal Offices in 2006.
10. Provision of Relief and Rehabilitation materials.
11. Establishment of NEMA/World Bank Collaboration on disaster management.

Materials and Methods

The study area is made up of Anambra, Bayelsa, Edo, Delta, Kogi and Rivers states that are regularly flooded. The Research design is empirical survey. The Quantitative research method was complemented by in-depth interviews. A population of 13,200 federal staff was used for this study. NEMA, NESREA, Ministry of Works and Ministry of Environment were used as federal establishments. See table 1.

Table 1: Federal Workers

Federal Establishment	Edo	Delta	Anambra	Kogi	Rivers	Bayelsa
NEMA	601	599	620	580	420	610
NESREA	520	505	672	551	491	602
Ministry of Environment	412	458	452	562	430	520
Ministry of Works	740	671	528	402	602	652
Total	2273	2233	2272	2095	1943	2384

(Source: Fieldwork, 2023). Grand total = 13,200

Furthermore, a sample of 388 persons obtained through Yamani's formula population was too small. 10% of the total population was then used which is 1320. This was based on (i) The law of Statistical Regularity, and (ii) the Law of Large numbers (Oaikhenan et al., 2004). The sample was selected through the Simple random sampling method. The federal establishments and states were selected through the purposive method. Data was collected with the use of questionnaires (see table 2) supported by in-depth interviews. Heads of federal establishments were purposively selected for interview. Secondary data was obtained from

books, journals, bulletins, newspapers, and so on. Two hypotheses were tested using the Chi Square in the data analysis. Data were analysed using Chi Square.

Table 2: Distribution of Questionnaires

S/N	State	Questionnaire
1.	Anambra	221
2.	Bayelsa	201
3.	Edo	232
4.	Delta	228
5.	Kogi	197
6.	Rivers	241
	Total	1320

(Source: Fieldwork, 2023)

Analysis of Substantive Data

Research Question 1: Has NEMA made any positive impact on the management of flood disasters in the study area?

State	Response Agree	% of Respondents	Response Disagree	% of Respondents
Anambra	191	20.69	30	7.55
Bayelsa	141	15.27	60	15.11
Edo	149	16.14	83	20.90
Delta	163	17.65	65	16.37
Kogi	126	13.65	71	17.88
Rivers	153	16.57	88	22.16

Total	923	100	397	100

Source: (Fieldwork, 2023)

Research Question 2: What is the degree of inter-ministerial collaborations in the effective management of flood disasters in the study area?

State	Response Agree	% of Respondents	Response Disagree	% of Respondents
Anambra	112	18.39	109	15.33
Bayelsa	95	15.59	106	14.90
Edo	146	23.97	86	12.09
Delta	56	9.19	172	24.19
Kogi	121	19.86	76	10.68
Rivers	79	12.97	162	22.78
Total	609	100	711	100

Source: (Fieldwork, 2023)

Hypothesis Testing

Hypothesis 1

HR1: NEMA has made positive impact on management of flood disasters in the study area.

Ho1: NEMA has not made a positive impact on the management of flood disasters in the study area.

Table 3: Contingency Table

Step 1

State	Agree	Disagree	Total
Anambra	191 [(a)] (Fe = 154.53)	30 [(g)] (Fe = 66.46)	221

Bayelsa	141 (b) (Fe = 140.54)	60 (h) (Fe = 60.45)	201
Edo	149 (c) (Fe = 162.22)	83 (i) (Fe = 69.77)	232
Delta	163 (d) (Fe = 159.42)	65 (j) (Fe = 68.57)	228
Kogi	126 (e) (Fe = 137.75)	71 (k) (Fe = 59.24)	197
Rivers	153 (f) (Fe = 168.51)	88 (l) (Fe = 72.48)	241
Total	923	397	1,320

(Source: Fieldwork, 2023)

Step 2: Seeding

$$X^2 = \left(\frac{F_o - F_e}{F_e}\right)^2$$ Formula

Fo = observed frequency (from field)

Fe = expected frequency

X^2 = Chi square

fe = $\frac{rt \times ct}{ot}$

rt = row total

ct = column total

ot = overall total

(See step 1 table 3 for expected values)

Table 4: Step 3: Chi Square (X^2) Computation

	Fo	**Fe**	**fo – fe**	$(f_o - f_e)^2$	$\left(\frac{f_o - f_e}{f_e}\right)^2$
(a)	191	154.53	36.47	1330	8.6
(b)	141	140.54	0.46	0.21	0.002
(c)	149	162.22	-13.22	174.77	1.077
(d)	163	159.42	3.58	12.82	0.08
(e)	126	137.75	-11.75	138.06	1.002
(f)	153	168.51	-15.51	240.56	1.43
(g)	30	66.46	13.54	183.33	2.76
(h)	60	60.45	-0.45	0.2	0.003
(i)	83	69.77	13.23	175.03	2.51
(j)	65	68.57	-3.57	12.74	0.19
(k)	71	59.24	11.76	138.30	2.33
(l)	88	72.48	15.52	240.87	3.32
					Σ = 23.304 X^2 = 23.3

(Source: Fieldwork, 2023)

Step 4: Add all values obtained in step 3 to obtain X^2. See table 4.

Step 5:

Computed values for X^2 = 23.3 (empirical value)

Table value = 20.52 (theoretical X^2 value)

α = 0.05 (5%)

(r-1) (c-1) =

(2-1) (6-1) = 1 x 5 = 5 degrees of freedom

STEP 6: Use the tabulated X^2 values to evaluate the significance of X^2 value obtained empirically.

Pearson's Contingency Coefficient (C) = $\sqrt{\frac{X^2}{N+X^2}}$

N = 1320

X^2 = 23.3

$= \sqrt{\frac{23.3}{1320+23.3}} = \sqrt{\frac{23.3}{1343.3}} = \sqrt{0.01735} = \underline{\underline{+0.13}}$

Calculated X^2 = 23.3

α = 0.001

The calculated X^2 of 23.3 is greater than the critical value of df 5 @ alpha 0.001 which is 20.52.

The Pearson's Contingency Coefficient (C) value of +0.13 shows positive direction of relationship though the intensity is relatively low.

The Alternate hypothesis is consequently accepted and the Null hypothesis rejected.

Cramer's V = $\sqrt{\frac{X^2}{nt}}$ n = total sample, t = smaller of (r-1), (c-1)

$\sqrt{\frac{23.3}{1 \times 1320}} = \sqrt{\frac{23.3}{1320}} = \underline{\underline{+0.133}}$

Cramer's V value of +0.133 shows a positive direction of relationship though the intensity is relatively low.

Decision rule/interpretation

Table shows rejection of the null hypothesis (Ho1) that NEMA has made no positive impact on the management of flood disasters in the study area. The alternate hypothesis is accepted meaning that NEMA has made positive impact on the management of flood disasters in the study area.

Hypothesis 2

HR2: There is significant relationship between inter-ministerial collaborations and effective management of flood disasters in the study area.

Ho2: There is no significant relationship between inter-ministerial collaborations and effective management of flood disasters in the study area.

Table 5: Contingency table

State	**Agree**	**Disagree**	**Total**
Anambra	112 (a) (Fe = 101.96)	109 (g) (Fe = 119.03)	221
Bayelsa	95 (b) (Fe = 92.73)	106 (h) (Fe = 108.26)	201
Edo	146 (c) (Fe = 107.03)	86 (i) (Fe = 124.96)	232
Delta	56 (d) (Fe = 105.19)	172 (j) (Fe = 122.80)	228
Kogi	121 (e) (Fe = 90.88)	76 (k) (Fe = 106.11)	197

Rivers	79 (f) (Fe = 111.18)	162 (l) (Fe = 129.81)	241
Total	609	711	1,320

(Source: Fieldwork, 2023)

Follow steps as in the Test of Hypothesis 1. See tables 5 and 6.

Table 6: Chi Square (X^2) Computation

	fo	**Fe**	**fo – fe**	$(f_o - f_e)^2$	$\left(\frac{f_o - f_e}{f_e}\right)^2$
(a)	112	101.96	10.04	100.8016	0.989
(b)	95	92.73	2.27	5.1529	0.0556
(c)	146	107.03	38.97	1518.6609	14.189
(d)	56	105.19	-49.19	2419.6561	23.003
(e)	121	90.88	30.12	907.2144	9.983
(f)	79	111.18	-32.18	1035.5524	9.314
(g)	109	119.03	-10.03	100.6009	0.845
(h)	106	108.26	-2.26	5.1076	0.047
(i)	86	124.96	-38.96	1517.8816	12.147
(j)	172	122.80	65.89	4341.4921	35.354
(k)	76	106.11	-30.11	906.6121	8.544
(l)	162	129.81	32.19	1036.1961	7.989
					Σ = 122.4599 X^2 = 122.5

(Source: Fieldwork, 2023)

Computed value for $X^2 = 122.5$ (See table 6).

Table value = 20.52

$\alpha = 0.05$

Degree of freedom = 5

Pearson's Contingency Coefficient (C) = $\sqrt{\frac{X^2}{N+X^2}}$

$X^2 = 122.5$,

N = 1,320

$$= \sqrt{\frac{122.5}{1320+122.4599}} = \sqrt{\frac{122.5}{1442.5}} = \sqrt{0.084922} = +0.2914 = +0.3$$

Calculated $X^2 = 122.5$

$\alpha = 0.001$

The calculated X^2 of 122.5 is greater than the critical value of df 5 @ alpha 0.001 which is 20.52.

The Pearson's Contingency Coefficient (C) value of +0.3 shows positive direction of relationship.

The Alternate hypothesis is consequently accepted and the Null hypothesis rejected.

Cramer's V = $\sqrt{\frac{X^2}{nt}}$

$$= \sqrt{\frac{122.5}{1 \times 1320}} = \sqrt{\frac{122.5}{1320}} = \sqrt{0.092803} = +0.30464 = +0.3$$

Cramer's V value of +0.3 shows a positive direction of relationship.

Decision rule/interpretation

Calculated value of X^2 of 122.5 is greater than the tabulated value of 20.52. We therefore reject the Null hypothesis and accept the Alternate hypothesis.

This means that there is significant relationship between inter-ministerial collaborations and effective management of flood disasters in the study area.

Discussion of Findings

The following findings emerge from this study:

(1) Tables 3 and 4 showed an acceptance of the Alternate hypothesis (HR1) that NEMA has made positive impacts on the management of flood disasters in the study area. The calculated X^2 gave a higher value of 23.3 (empirical value) as against the tabulated value of 20.52 (theoretical value) at 0.001 level of significance using Chi Square (X^2). The Pearson's contingency coefficient (c) value of +0.13 shows positive direction of relationship though the intensity is relatively low. This shows that the NEMA has made a good impact on the management of flood disasters in the study area. This is corroborated by 100% of the interviewed victims of flood disasters living in the study area. Igwabor (2023) also provided a basis for this conclusion.

Tangibly, the System theory lends support to the above findings that the NEMA has made positive impacts on the management of flood disasters in the study area. Easton (1953) believes that a political system is a system of interaction whereby inputs from the society or environment which consist of demands and requests are converted in a "black box" into functional policies and good solutions for the people. In this case, the requests or demands from the people in the flooded areas are (i) early warning and preparation, (ii) mitigation of flood disasters to lessen harm and loss of lives and

properties, (iii) response to do quick search and rescue to save people from dying, and (iv) recovery by helping to distribute relief materials and rehabilitate the flood victims in the study area (Agbama, 2022).

NEMA has equally recorded other successes by impacting positively on the management of flood disasters in the study area. This is corroborated by Madugu et al. (2015) who listed the achievements of NEMA so far in the study area as: (i) Search and rescue, (ii) development of GIS and Early Warning System, (iii) provision of relief materials, and (iv) establishment of Disaster Response Units and Seven Zonal NEMA Offices in Nigeria. Extracts from indepth Interview with Agbama (2023) – Director, Relief and Rehabilitation, Edo State SEMA is given below. In the words of Agbama (2023):

> NEMA has been promoting disaster management in all sectors. NEMA as a coordinating agency has been coordinating stakeholders to tackle the problems of flood disasters in Nigeria in a multi-sectorial manner. NEMA has done well in the management of flood disasters in Nigeria but needs improvement.

Finally, the Structural-Functional theory by Almond et al. (1977) postulates that the system is composed of structures and that these interacting structures perform different functions. Similarly, in this study, the society is made up of structures in the form of government ministries and agencies which work together for the smooth management of flood disasters in Nigeria. Tangentially, these ministries and agencies synergize to implement flood management policies in the study area – Edo, Delta, Anambra, Kogi, Bayelsa and Rivers states.

(2) Tables 5 and 6 revealed an acceptance of Alternate hypothesis (HR2) that there is significant relationship between inter-ministerial collaborations and effective management of flood disasters in Nigeria. The calculated X^2 gave a higher value of

122.4599 (empirical value) as against the tabulated value of 20.52 (theoretical value) at 0.001 level of significance using the Chi Square (X^2). The Pearson's contingency coefficient (c) value of +0.3 shows positive direction of relationship.

In a nutshell, there is a synergy among the various ministries in managing flood disasters in the study area. In the words of Akpofabe (2023) (during an in-depth interview):

> There is a robust interaction and collaboration among the various ministries in Nigeria regarding the management of flood disasters. Such ministries include Environment, Health, Works, Agriculture, and the Ministry of Humanitarian Affairs, Disaster Management and Social Development. NEMA is the principal coordinator of these ministries for effective response to management of flood disasters in Nigeria. They have all done well.

Summary of Findings

There is a significant positive relationship between inter-ministerial collaborations and effective management of flood disasters in the study area. NEMA has done well in the management of flood disasters in the study area. In addition, environmental ethics are poor among the people.

Conclusion

Disasters are unexpected occurrences in form of flooding, soil erosion, earthquakes, and more. Flood reoccurrences are on a global increased. Nigeria is not spared as disastrous floods came in 2012, 2018 and 2022. The Federal Government has responded by setting up the National Emergency Management Agency (NEMA). Despite the legal and institutional framework, flood have continuously wreaked havoc on the study area (Anambra, Bayelsa, Edo, Delta, Kogi, and Rivers States). These States are regularly flooded. The Research design is the empirical survey. In-depth interviews complemented the use of questionnaires. The main aim

of the study is to examine Inter-ministerial collaborations with NEMA in the Management of Flood Disasters in Southern Nigeria (2012-2023). The Theoretical Framework rests on the System theory, and the Structural-Functional theory. A population of 13,200 and a sample size of 1320 federal workers were selected using the Simple Random sampling method. States and government establishments were purposively selected. Two hypotheses were tested using the Chi Square. The study found out that: (i) Inter-ministerial collaborations with NEMA impacted positively with the effective management of flood disasters in the study area; and (ii) NEMA has also impacted positively on the effective management of flood disasters in the study area. The study made useful suggestions to solve the associated problems of flood disasters in the study area.

Recommendations

NEMA should be strengthened by government to do proper enforcement of environmental laws. Similarly, environmental education should be done regularly from village to village for the local residents by the government, community leaders, opinion leaders, religious leaders and royal fathers, while environmental offenders should be well punished by NEMA.

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