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Research Paper

Evaluating resilience to flood disasters in selected communities within Nigeria's Niger-Delta, Region

[1*]Olunwa, F. J., [1]Mmom, P.C., [1]Lawal O. and [2]Ekiyor, T. H.
[1]*Department of Geography and Environmental Management, University of Port-Harcourt, Choba, P.M.B 5323 Rivers State, Nigeria.*
[2]*Department of Science Laboratory Technology, Ken Saro-wiwa Polytechnic, Rivers State, Nigeria.*

ABSTRACT
The present study estimated resilience to flood disasters and risk reduction measures in selected communities within Nigeria's Niger-Delta. The level of transformative capacity of households policies set for fundamental changes across the selected states includes, members of my household come together from time to time to review our finances for a sustainable flood hazard reduction, household meet with community leaders and other stakeholders that deliberate on sanitation processes, household has a clear and stable partnerships with other households, local authorities, NGOs and businesses to help during flooding, both men and women in my household participate in decision making and management of flood risks, building is high and the right building materials were used, there is always a proper disposal of refuse to avoid blockage of drains, household abides to the no building along flood plains and drainages are properly built, household takes a leading role in response and recovery actions prioritized according to needs, household has a good emergency response strategy for reliable and timely intervention in case of an emergency, household has a good storage for early harvest in the event of a flood, community leaders presents the household needs to the government, town criers are engaged to use local dialect to inform households on early flood warning signals, including youths and women in flood committee enhance effective delivery of relief materials, and conditional cash is given to women to help them provide for their family. The strength of the resilience of households (via high, average, and low socioeconomic status) significantly influenced the adaptive, absorptive, and transformative capacities towards flood incidents across the study location. The difference in capacities (via adaptive, absorptive, and transformative capacities) did not influence the resilience of the different states towards flood incidents. There are variations in the adaptive capacities among households (via high, average, and low socioeconomic status). There is an association between household socioeconomic status and adaptive and transformative capacities. However, no association between household socioeconomic status and absorptive capacities. The difference in capacities (via adaptive, absorptive, and transformative capacities) did not influence the resilience of the different states towards flood incidents.

KEYWORDS: *evaluating; resilience; flood disasters; communities*

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I. INTRODUCTION

Resilience is a term that is very important in Disaster Risk Management. It is a known fact that humans have successfully been modifying the planet to meet the demands of the rapidly growing and insatiable population. Flood threats in the Niger Delta region are a risk that cannot be overlooked. Floods cause about one third of most deaths, injuries and damage due to human and natural disasters (Askew, 1999) especially in the Niger Delta Region of Nigeria which is surrounded by water and characterized by heavy rainfall. Action Aid International (2006) states that flood hazards are natural phenomena, but damage and losses caused by floods are a consequence of human actions. Flood disaster is always associated with loss of lives, destruction of properties, disruption of livelihood, damage to the environment, financial loss, epidemics, migration, food shortage etc. The most common way of quantifying resilience is to use indicators. The resilience of a household with respect to potential threat/hazard is determined by the extent to which the household, community or organization has the necessary resources and is capable of bouncing back before and during times of disasters. Béné et al. (2012) proposed that resilience emerges as the result of three capacities - absorptive, adaptive and transformative capacities. This work hopes to estimate resilience in the Niger Delta Area of Nigeria by

evaluating the absorptive, adaptive and transformative capacities of households and communities. There are many substantial differences between national and community-level disaster resilience and associated measurement frameworks. Not much work has been done on estimating resilience using the adaptive, absorptive and transformative capacities in Nigeria. Berkes and Ross, (2013) identify lack of attention to power and agency as key accounts of resilience in DRM. This means that if the focus is on existing community capacities, it might trigger resilience thinking to miss out on important institutional arrangements that limit community capacity. Resilience has swiftly risen to the top of development agenda (Burnard and Bhamra, 2011; Frankenberger, 2014), hence is now seen as a valuable conceptual tool to further the knowledge of how people respond and adapt to the countless changing shocks and stresses that affect lives and livelihoods (Manyena, 2006; Nelson et al., 2007; Miller et al., 2008b). Systems that are resilient are way less vulnerable disasters than less resilient places. To be able to validate this assumption, knowledge of how resilience is determined and measured is vital (Klein *et a*l., 2003). Published articles and non-academic publications had several similarities in measuring resilience. Resilience measures are a function of different components, characteristics or aspects of a community. Authors in many publications had arrived at similar or comparable components. Some authors termed them 'capitals' such as social, economic, health, political, physical (Cocklin and Dibden, 2005; Mayunga, 2007; Callaghan and Colton, 2008). Others termed them 'aspects', 'resources', 'enablers', or 'outcomes.

Based on this, the study will estimate resilience to flooding, which is the major disaster of Niger Delta of Nigeria, with a view at attempting to provide usable data and models/frameworks for use in DRM across households and communities in the Niger Delta.

1.2. **Research Questions**

The following questions will guide this research:

1. How do households absorb and cope with hazards (absorptive capacity)?
2. Is there an association amongst the absorptive, adaptive and transformative capacities of households in the study area?
3. What is the strength and weakness of the resilient capacities across the study area?

1.3. **Research Hypothesis**

The following hypotheses are formulated for the study:

H_1: There are statistically significant variations in adaptive capacity across the households.
H_2: There are statistically significant associations amongst the resilience capacities.
H_3: There are statistically significant variations in resilience across the States of the Niger Delta.

The aim of this study is to estimate resilience to flood hazards and Risk Reduction measures in selected communities of Niger Delta, Nigeria. This will be achieved following the objectives:

1. Determine the ability of the households to adjust to changes due to hazards (adaptive capacity).
2. Assess the associations amongst the absorptive, adaptive and transformative capacities.
3. Identify the strengths as well as weaknesses across the resilient capacities.

The present study would provide a resilience framework and guideline to flooding in the Niger Delta area which would; prepare individuals as well as households in this flood prone areas to see the need to measure their resilience capacity in terms of access to information that will enable them improve their alertness and responsiveness to capacity building/preparedness. Households and by extension communities within the Niger Delta of Nigeria would also be able to measure/estimate resilience at every point in time and put measures in place to reduce risks by assessing their own state of resilience and establishing priorities for strengthening it. Also, it will provide a set of resources by means of which individuals, households and communities can identify their vulnerabilities and strengthen their ability to respond to, and influence the course of social and economic change.

II. METHODOLOGY

2.1. Research Design

The study adopted the cross-sectional design. This method allows an in-depth analysis of several variables at a time. It also gives an insight of various factors that deals will the subject of research "resilience measurement over time. The study will employ a mixed method approach that includes qualitative and quantitative inquiry to measure resilience at various scales. The flood prone communities and coastal communities within the three selected states of the Niger Delta will be used for this research.

1.4. Sources of Data

The data for this study was collected through both primary and secondary sources. The primary data was generated from the information obtained from the respondents through the administration of questionnaire during the fieldwork in the communities of the study area. The secondary information was obtained from published and unpublished works, journals, textbooks, local government areas (LGAs) documents and maps.

1.5. *Description of Study Area*

The study area was the three major states of the Niger Delta (i.e., the core Niger Delta) comprising Bayelsa, Delta and Rivers States (Figure 1) with an estimated population of about 1,319,056 households (Mmom, 2003). Geographically, the Niger Delta of Nigeria is a unique ecological zone by virtue of its size and geophysical configuration (Mmom, 2003). It is one of the world's largest wetlands covering an area of approximately 70,000 km^2, 0f the south-south geopolitical region of Nigeria. Along the coast, the Niger Delta states stretch from the Benin River in the West to Bonny River in East, while in land, it begins at a point where River Niger bifurcates into River Nun and Forcados into the Atlantic West at the South, stretching over 160 miles (Iyalla, 2001). The relief of the area is low-lying and the rivers are influenced by tidal fluctuation. Substantial part of the Niger Delta lies at an average altitude of about 12m above mean sea level. In terms of general surface features the area falls within the coastal belt dominated by Low-Lying (Umeuduji, 2015). The Niger Delta region is drained by many rivers such as Bonny River, New Calaber, etc. However, in recent times, developments (building, commercial, industrial etc.) are threatening the size and flow of these rivers in the region. Flooding has always been a menace in Bayelsa state which can be attributed to the poor knowledge and design of drainage system as against the putting up of illegal structure on floodplains.

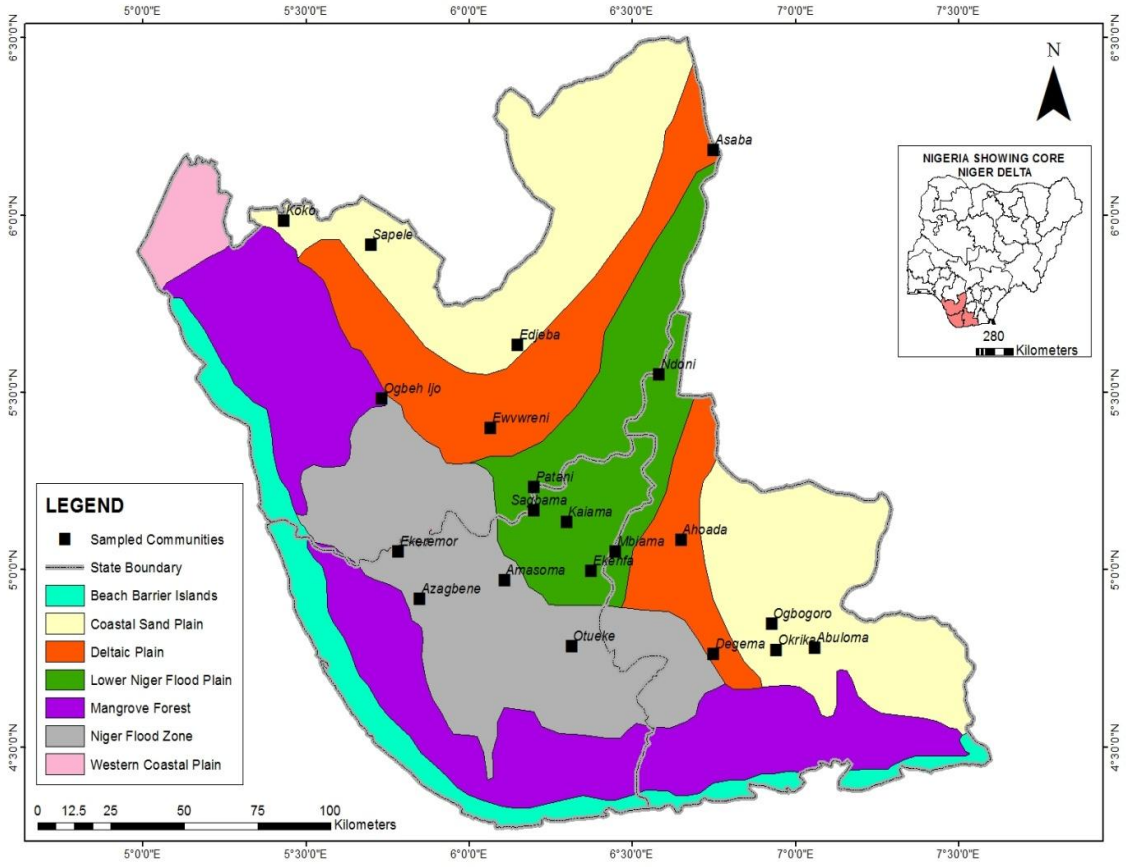

Figure 1. Map of the study area in the ecological zones

1.6. Sampling Technique

The study adopted a two-phase multistage sample technique. In the first phase, purposive sampling technique was utilized to select the 4 communities each that was used for the study. The communities selected are those most affected by flood in the region and only four were selected due large sea area and high cost of the work. In the second phase, random sampling technique was used in the selection of respondents from households in each of 4 selected communities spread across each of the chosen Niger Delta States.

A Total of 600 (i.e., 200 respondents from each State) was used for the study. Household survey was used to collect data on recipient communities. Also, Community consultations or discussions was carried out.

1.7. Data Collection and Analysis

The instrument for data collection for this study was a questionnaire. The statements are designed to explore resilience characteristics under each component, based on a ranking scale. Each of the five potential answers relates to a resilience characteristic, which ranges from 1 to 5, where 1= Neither Agree nor Disagree (NAD), 2 = Strongly Disagree (SD), 3= Disagree (D), 4=Agree (A), and 5= Strongly Agree (SA). The answers recorded illustrated the community's resilience for each component (i.e., adaptive, absorptive and transformative capacities), which are verified using specific means of verification.

Data Entry Screens developed in Statistical Package for Social Science (SPSS) version 20.0 and Microsoft Excel 2019 version was used for this study. Descriptive statistics was used to describe the distribution of variable. To derive indices, multiple correspondence analyses was used. Tables and charts shall also be adopted to present the data collected. In addition, the analysis of interrelationships among selected variables was also carried out through descriptive statistics because it removed the complexities from large amounts of data and enable data presentation in a manageable form. Three hypotheses were also tested in this work at 0.05 level of significance. The Spearman rank correlation or Spearman rho is a non-parametric test that measures associations between two varying entities. It measures the power and course of relation between variables (Udofai, 2006).

$$r^3 = \frac{6\sum d^2}{N^2 - N} \quad \ldots\ldots 1$$

where r^3 = Spearman's ranked correlation

D = differences between the ranks

N = Sample size

III. RESULTS AND DISCUSSION

Research Question 1: How do households absorb and cope with hazards (absorptive capacity) across the selected states of Niger Delta?

Table 1: Summary of Spearman's Correlations on how households of high socioeconomic status absorb and cope with hazards (absorptive capacity) across the selected states of Niger Delta (sample size N=94)

Household of high socioeconomic status absorptive capacity entails	**Correlation Coefficient**	**Sig. (2-tailed)**	**Decision**
The cultural attitudes and values (like religious/ideological views) enables my household to withstand and absorb shocks and stresses	.165*	.020	S
My household have a good feeding and storage plan in case of flooding	-.464**	.000	S
My household has a good sanitation system of not throwing things into the gutters	.425**	.000	S
My household uses a designated dumping site to avoid blockage of drains that can lead to flooding	.001	.990	NS
My household gets a reliable early warning before a flood	.279**	.007	S
My household has a good and nearby health center that takes care of everyone in times of emergencies	-.382**	.000	S
My household has a good relationship within themselves and neighbours to help each other during a flood hazard	.034	.744	NS
My household get help and assistants from neighbor communities in the event flood	-.226*	.028	S
Members of my household come together to mobilize and raise funds that help lessen the burden of a flood hazard	.096	.356	NS
State government and other NGOs always give assistance to my household through the community head	-.482**	.000	S
The community provides sandbags along flood channels to reduce the rate of flooding on houses and farmlands	.180	.082	NS
Emergency bridge or walk paths are constructed to help people access flooded areas	.683**	.000	S
Trenches are dug to contain the level of flood waters	.201	.052	NS
Makeshift's buildings are built in high elevations to resettle flood victims	-.216*	.037	S

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Table 1 shows the Spearman's Correlations on how households of high socioeconomic status absorb and cope with hazards (absorptive capacity) across the selected states of Niger Delta includes: the cultural attitudes and values (like religious/ideological views) enables my household to withstand and absorb shocks and stresses (in item 1) with Correlation Coefficient of .165 and p-value of .020, my household have a good feeding and storage plan in case of flooding (in item 2) with Correlation Coefficient of -.464 and p-value of .000, my household has a good sanitation system of not throwing things into the gutters (in item 3) with Correlation Coefficient of .425 and p-value of .000, my household uses a designated dumping site to avoid blockage of drains that can lead to flooding (in item 4) with Correlation Coefficient of .001 and p-value of .990, my household gets a reliable early warning before a flood (in item 5) with Correlation Coefficient of .279 and p-value of .007, my household has a good and nearby health center that takes care of everyone in times of emergencies (in item 6) with Correlation Coefficient of -.382 and p-value of .000, and my household has a good relationship within themselves and neighbours to help each other during a flood hazard (in item 7) with Correlation Coefficient of .034 and p-value of .744.

Table 2: Summary of Spearman's Correlations on how households of average socioeconomic status absorb and cope with hazards (absorptive capacity) across the selected states of Niger Delta (sample size N=238)

Household of average socioeconomic status absorptive capacity entails	Correlation Coefficient	Sig. (2-tailed)	Decision
The cultural attitudes and values (like religious/ideological views) enables my household to withstand and absorb shocks and stresses	.455**	.004	S
My household have a good feeding and storage plan in case of flooding	.185**	.004	S
My household has a good sanitation system of not throwing things into the gutters	-.070	.280	NS
My household uses a designated dumping site to avoid blockage of drains that can lead to flooding	.236**	.031	S
My household gets a reliable early warning before a flood	-.140*	.007	S
My household has a good and nearby health center that takes care of everyone in times of emergencies	-.073	.261	NS
My household has a good relationship within themselves and neighbors to help each other during a flood hazard	-.162*	.013	S
My household get help and assistants from neighbor communities in the event flood	.050	.445	NS
Members of my household come together to mobilize and raise funds that help lessen the burden of a flood hazard	.141*	.029	S
State government and other NGOs always give assistance to my household through the community head	-.069	.291	NS
The community provides sandbags along flood channels to reduce the rate of flooding on houses and farmlands	.165*	.011	S
Emergency bridge or walk paths are constructed to help people access flooded areas	.283**	.000	S
Trenches are dug to contain the level of flood waters	.218**	.001	S
Makeshift's buildings are built in high elevations to resettle flood victims	-.027	.678	NS

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Table 2 shows the Spearman's Correlations on how households of average socioeconomic status absorb and cope with hazards (absorptive capacity) across the selected states of Niger Delta includes: the cultural attitudes and values (like religious/ideological views) enables my household to withstand and absorb shocks and stresses (in item 1) with Correlation Coefficient of .455 and p-value of .004, my household have a good feeding and storage plan in case of flooding (in item 2) with Correlation Coefficient of .185 and p-value of .004, my household has a good sanitation system of not throwing things into the gutters (in item 3) with Correlation Coefficient of -.070 and p-value of .280, my household uses a designated dumping site to avoid blockage of drains that can lead to flooding (in item 4) with Correlation Coefficient of .236 and p-value of .031, my household gets a reliable early warning before a flood (in item 5) with Correlation Coefficient of -.140 and p-value of .007, my household has a good and nearby health center that takes care of everyone in times of emergencies (in item 6) with Correlation Coefficient of -.073 and p-value of .261, and my household has a good relationship within themselves and neighbors to help each other during a flood hazard (in item 7) with Correlation Coefficient of -.162 and p-value of .013. Correlations on how households of average socioeconomic status absorb and cope with hazards (absorptive capacity) across the selected states of Niger Delta includes: my household get help and assistants from neighbor communities in the event flood (in item 8) with Correlation Coefficient of .050 and p-value of .445, members of my household come together to mobilize and raise funds

that help lessen the burden of a flood hazard (in item 9) with Correlation Coefficient of .141 and p-value of .029, State government and other NGOs always give assistance to my household through the community head (in item 10) with Correlation Coefficient of -.069 and p-value of .291, the community provides sandbags along flood channels to reduce the rate of flooding on houses and farmlands (in item 11) with Correlation Coefficient of .165 and p-value of .011, emergency bridge or walk paths are constructed to help people access flooded areas (in item 12) with Correlation Coefficient of .283 and p-value of .000, trenches are dug to contain the level of flood waters (in item 13) with Correlation Coefficient of .218 and p-value of .001, and makeshifts buildings are built in high elevations to resettle flood victims (in item 14) with Correlation Coefficient of -.027 and p-value of .678.

Table 3: Summary of Spearman's Correlations on how households of low socioeconomic status absorb and cope with hazards (absorptive capacity) across the selected states of Niger Delta (N=251)

Household of low socioeconomic status absorptive capacity entails:	**Correlation Coefficient**	**Sig. (2-tailed)**	**Decision**
The cultural attitudes and values (like religious/ideological views) enables my household to withstand and absorb shocks and stresses	.285**	.000	S
My household have a good feeding and storage plan in case of flooding	.065	.303	NS
My household has a good sanitation system of not throwing things into the gutters	.310**	.000	S
My household uses a designated dumping site to avoid blockage of drains that can lead to flooding	-.236**	.000	S
My household gets a reliable early warning before a flood	.083	.190	NS
My household has a good and nearby health center that takes care of everyone in times of emergencies	-.300**	.000	S
My household has a good relationship within themselves and neighbors to help each other during a flood hazard	-.030	.642	NS
My household get help and assistants from neighbor communities in the event flood	-.214**	.001	S
Members of my household come together to mobilize and raise funds that help lessen the burden of a flood hazard	.274**	.000	S
State government and other NGOs always give assistance to my household through the community head	-.105	.098	NS
The community provides sandbags along flood channels to reduce the rate of flooding on houses and farmlands	.007	.917	NS
Emergency bridge or walk paths are constructed to help people access flooded areas	-.179**	.004	S
Trenches are dug to contain the level of flood waters	-.207**	.001	S
Makeshift's buildings are built in high elevations to resettle flood victims	-.217**	.001	S

**. Correlation is significant at the 0.01 level (2-tailed)., *. Correlation is significant at the 0.05 level (2-tailed).

Table 3 shows the Spearman's Correlations on how households of low socioeconomic status absorb and cope with hazards (absorptive capacity) across the selected states of Niger Delta includes: the cultural attitudes and values (like religious/ideological views) enables my household to withstand and absorb shocks and stresses (in item 1) with Correlation Coefficient of .285 and p-value of .000, my household have a good feeding and storage plan in case of flooding (in item 2) with Correlation Coefficient of .065 and p-value of .303, my household has a good sanitation system of not throwing things into the gutters (in item 3) with Correlation Coefficient of .310 and p-value of .000, my household uses a designated dumping site to avoid blockage of drains that can lead to flooding (in item 4) with Correlation Coefficient of -.236 and p-value of .000, my household gets a reliable early warning before a flood (in item 5) with Correlation Coefficient of .083 and p-value of .190, my household has a good and nearby health center that takes care of everyone in times of emergencies (in item 6) with Correlation Coefficient of -.300 and p-value of .000, and my household has a good relationship within themselves and neighbors to help each other during a flood hazard (in item 7) with Correlation Coefficient of -.030 and p-value of .642.

Research Question 2: Is there an association, strength and weakness amongst the different dimensions of resilience across the households?

Table 4: Summary of Kruskal-Wallis Test on the association, strength and weakness amongst the different dimensions of resilience across the households

Socioeconomic Status	Adaptive Capacity					Decision
	N	Mean Rank	Chi-square	df	Asymp. Sig.	
High	94	341.82	13.480	2	.001	S
Average	238	297.16				
Low	251	268.44				
Total	583					
Socioeconomic Status	**Absorptive Capacity**					**Decision**
	N	**Mean Rank**	**Chi-square**	**df**	**Asymp. Sig.**	
High	94	273.28	11.205	2	.004	S
Average	238	319.91				
Low	251	272.55				
Total	583					
Socioeconomic Status	**Transformative Capacity**					**Decision**
	N	**Mean Rank**	**Chi-square**	**df**	**Asymp. Sig.**	
High	94	341.68	86.071	2	.000	S
Average	238	350.50				
Low	251	217.93				
Total	583					

Decision rule: S= cal-X2 > p-value, then NS= cal-X2 < p-value

Table 4 shows the summary of Kruskal-Wallis Test on the association, strength and weakness amongst the different dimensions of resilience across the households. It further shows under the adaptive capacity that the highest mean rank of 341.82 for resilience was in the high socioeconomic status households. However, the cal-X2 of 13.480 which is greater than the p-value of 0.01 at .05 level of significance revealed that household's resilience influenced the strength of their adaptive capacity across selected states of the Niger Delta. Also, under the absorptive capacity that the highest mean rank of 319.91 for resilience was in the average socioeconomic status households. However, the cal-X2 of 11.205 which is greater than the p-value of 0.04 at .05 level of significance revealed that household's resilience influenced the strength of their absorptive capacity across selected states of the Niger Delta. While under the transformative capacity that the highest mean rank of 350.50 for resilience was in the average socioeconomic status households. However, the cal-X2 of 86.071 which is greater than the p-value of 0.00 at .05 level of significance revealed that household's resilience influenced the strength of their transformative capacity across selected states of the Niger Delta. This implies that the strength of the resilience of households (via high, average, and low socioeconomic status) significantly influenced the adaptive, absorptive, and transformative capacities towards flood incidents across selected states of the Niger Delta.

Test of Hypotheses

H_{o1}: There are statistically significant variations in adaptive capacity across the households.

Table 5: Summary of Spearman's Correlations on socioeconomic status influence household adaptive capacity across the selected states of Niger Delta

			Adaptive Capacity	Socioeconomic Status
Spearman's rho	Adaptive Capacity	Correlation Coefficient	1.000	-.147**
		Sig. (2-tailed)		.000
		N	583	583
	Socioeconomic Status	Correlation Coefficient	-.147**	1.000
		Sig. (2-tailed)	.000	
		N	**583**	**583**

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Table 5 shows Spearman's Correlations (rho) of 0.000 which indicates that household socioeconomic status influenced their adaptive capacity across the selected states of Niger Delta. This implies that socioeconomic status will tend to increase household adaptive capacity in Bayelsa, Delta and Rivers States. Similarly, the result also shows that the correlation between the influence of socioeconomic status and

household adaptive capacity is statistically significant at 0.05 level. This means that there are variations in the adaptive capacities among households (via high, average, and low socioeconomic status) across the different states (via Bayelsa, Delta and Rivers) of the Niger Delta.

H_{o2}: There are statistically significant associations amongst the resilience capacities.

Table 6: Summary of Spearman's Correlations on the associations amongst the resilience capacities

		Adaptive Capacity	**Household Socioeconomic Status**
Adaptive Capacity	Spearman's rho Correlation Coefficient	1.000	-.147**
	Sig. (2-tailed)		.000
	N	583	583
Household Socioeconomic Status	Spearman's rho Correlation Coefficient	-.147**	1.000
	Sig. (2-tailed)	.000	
	N	583	583
		Absorptive Capacity	**Household Socioeconomic Status**
Absorptive Capacity	Spearman's rho Correlation Coefficient	1.000**	-.060
	Sig. (2-tailed)		.150
	N	583	583
Household Socioeconomic Status	Spearman's rho Correlation Coefficient	-.060	1.000
	Sig. (2-tailed)	.150	
	N	583	583
		Transformative Capacity	**Household Socioeconomic Status**
Transformative Capacity	Spearman's rho Correlation Coefficient	1.000	-.351**
	Sig. (2-tailed)		.000
	N	583	583
Household Socioeconomic Status	Spearman's rho Correlation Coefficient	-.351**	1.000
	Sig. (2-tailed)	.000	
	N	583	583

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Table 6 shows Spearman's Correlations (rho) of 0.000 which indicates that household socioeconomic status influenced their adaptive capacity across the selected states on Niger Delta. This implies that household socioeconomic status will tend to increase the adaptive capacity in Bayelsa, Delta and Rivers States. Similarly, the result also shows that the correlation between the influence of household socioeconomic status and adaptive capacity is statistically significant at 0.05 level. This means that there is an association between household socioeconomic status and adaptive capacities across the selected states of the Niger Delta. Similarly, Table 4.8 shows Spearman's Correlations (rho) of 0.150 which indicates that household socioeconomic status did not influence their absorptive capacity across the selected states on Niger Delta. This implies that household socioeconomic status will tend to reduce their absorptive capacity in Bayelsa, Delta and Rivers States. Similarly, the result also shows that the correlation between the influence of household socioeconomic status and absorptive capacity is statistically not significant at 0.05 level. This means that there is no association between household socioeconomic status and absorptive capacities across the selected states of the Niger Delta.

Correlations (rho) of 0.000 which indicates that household socioeconomic status influenced their transformative capacity across the selected states on Niger Delta. This implies that household socioeconomic status will tend to increase the transformative capacity in Bayelsa, Delta and Rivers States. Similarly, the result also shows that the correlation between the influence of household socioeconomic status and transformative capacity is statistically significant at 0.05 level. This means that there is an association between household socioeconomic status and transformative capacities across the selected states of the Niger Delta.

H_{o3}: There are statistically significant difference in resilience across the States of the Niger Delta.

Table 7: Summary of Kruskal-Wallis Test on the difference in resilience across the States of the Niger Delta

State	Resilience					Decision
	N	Mean Rank	Chi-square	df	Asymp. Sig.	
Bayelsa	190	294.34	.065	2	.968	NS
Delta	195	290.00				
Rivers	198	291.72				
Total	**583**					

Decision rule: S= cal-X2 > p-value, then NS= cal-X2 < p-value

Table 7 shows the summary of Kruskal-Wallis Test on difference in resilience across the States of the Niger Delta. It further shows that Bayelsa State has the highest mean rank of 294.34 in resilience. Also, the cal-X2 of 0.065 which is less than the p-value of 0.968 at .05 level of significance revealed that the difference in state did not influence their resilience capacities towards flooding incident. This implies that the difference in capacities (via adaptive, absorptive, and transformative capacities) did not influence the resilience of the different States (like Bayelsa, Delta and Rivers State) towards flood incidents in the Niger Delta.

IV. DISCUSSION OF FINDINGS

Table 1 shows how households of low socioeconomic status absorb and cope with hazards (absorptive capacity) across the selected states of Niger Delta includes: the cultural attitudes and values (like religious/ideological views) enables my household to withstand and absorb shocks and stresses, household have a good feeding and storage plan in case of flooding, household has a good sanitation system of not throwing things into the gutters, household uses a designated dumping site to avoid blockage of drains that can lead to flooding, household gets a reliable early warning before a flood, household has a good and nearby health center that takes care of everyone in times of emergencies, household has a good relationship within themselves and neighbours to help each other during a flood hazard, household get help and assistants from neighbor communities in the event flood, members of my household come together to mobilize and raise funds that help lessen the burden of a flood hazard, State government and other NGOs always give assistance to my household through the community head, the community provides sandbags along flood channels to reduce the rate of flooding on houses and farmlands, emergency bridge or walk paths are constructed to help people access flooded areas, trenches are dug to contain the level of flood waters, and makeshifts buildings are built in high elevations to resettle flood victims. This finding aligns with Levine *et al*. (2014) that absorptive capacity centers on individuals, households and communities building their resilience and skillfully undertaking actions (like providing sandbags, digging/cleaning gutters, etc.) to cope with an incident like flooding alongside its vulnerabilities and disruptions to human health, livelihood, community sustenance, and environment. Thus, the researcher affirms that coping with the stresses induced by disasters like flooding is indeed dependent on the availability and utilization of resources integrated to bring about the amelioration of the possible stresses or shocks to human and environmental health, livelihood and wellbeing.

Table 2 shows the level of adaptive capacity of households policies set for fundamental changes across the selected states of Niger Delta includes: household has an operating guideline for disaster preparedness that assist in response before, during and after a flood disaster, household uses an emergency plan that takes into account the needs of the weak and everyone participates very well, household dug gutter around the house to channel water out, household adopted local practices like cleaning of gutters to reduce flood risk, household uses local experiences to assess time of flood to reduce flood hazard, people in my household can afford to raise huge capital during an emergency, household gets support from each other and neighboring households in cases of emergencies, household has savings that is used during emergencies only, people in my household have various sources of livelihood, household avoids indiscriminate bush burning especially during the dry season which can lead to leaching of the soil, household make plans to repair or rebuild our home or house after the flood, household plant crops like groundnut that can be harvested before the flood, community sensitizes and provides information to enable households learn how to handle imminent flooding, and household uses local scale like stick to mark or measure the level of the flood waters. This finding is consistent with Alayande, et al. (2012) that effective assessment and analysis of flood disaster enables individuals, households and communities to strategically and technically adopt measures like planting crops that can be harvested before the flood, sensitizing residents on the relevant information necessary for predicting and handling imminent flooding, and using cost effective and/or local materials (like sticks) to measure or scale or mark the level of the flood waters. In line with this paradigm which is emphasized by Oladokun and Proverbs (2016) could facilitate individuals, households and communities building and improving their capacities towards effectively preparing and handling an emergence (like flooding) before, during and after the occurrence of the disaster, including making actionable and proactive plans towards repairing or rebuilding the houses affected by the flood menace.

Also, Table3 revealed that the level of absorptive capacity of households policies set for fundamental changes across the selected states of Niger Delta includes: the cultural attitudes and values (like religious/ideological views) enables my household to withstand and absorb shocks and stresses, household have a good feeding and storage plan in case of flooding, household has a good sanitation system of not throwing things into the gutters, household uses a designated dumping site to avoid blockage of drains that can lead to flooding, household gets a reliable early warning before a flood, household has a good and nearby health center that takes care of everyone in times of emergencies, household has a good relationship within themselves and neighbours to help each other during a flood hazard, household get help and assistants from neighbor communities in the event flood, members of my household come together to mobilize and raise funds that help lessen the burden of a flood hazard, State government and other NGOs always give assistance to my household through the community head, the community provides sandbags along flood channels to reduce the rate of flooding on houses and farmlands, emergency bridge or walk paths are constructed to help people access flooded areas, trenches are dug to contain the level of flood waters, and makeshifts buildings are built in high elevations to resettle flood.

This finding is in agreement with Bene et al. (2012) that absorptive capacities hinges on individuals and households enhancing their ability to tolerate and endure the impacts of a disaster like flooding with the propensity to cause damages to property, deaths, dislocation of livelihood, and destruction of livelihoods. Thus, the importance of building absorptive capacity is predicated at forestalling what Mmom and Aifesehi (2013) term as the occurrence of unrecoverable devastations and increased vulnerability in communities that suffer great losses leading to unprecedented hunger, famine, diseases and epidemics outbreak as the resultant impact of flood events or incidents in an area (like Niger Delta). In view of this, the researchers stress that enhancing adsorptive capacity stems on individuals, households and community members coming together from time to time to review plans, strategies and resources (like finances, materials, knowledge, and techniques) relevant towards sustainable flood hazard reduction and mitigation in an area (like the Niger Delta).

Table 4 revealed that the level of transformative capacity of households policies set for fundamental changes across the selected states of Niger Delta includes: members of my household come together from time to time to review our finances for a sustainable flood hazard reduction, household meet with community leaders and other stakeholders that deliberate on sanitation processes, household has a clear and stable partnerships with other households, local authorities, NGOs and businesses to help during flooding, both men and women in my household participate in decision making and management of flood risks, building is high and the right building materials were used, there is always a proper disposal of refuse to avoid blockage of drains, household abides to the no building along flood plains and drainages are properly built, household takes a leading role in response and recovery actions prioritized according to needs, household has a good emergency response strategy for reliable and timely intervention in case of an emergency, household has a good storage for early harvest in the event of a flood, community leaders presents the household needs to the government, town criers are engaged to use local dialect to inform households on early flood warning signals, including youths and women in flood committee enhance effective delivery of relief materials, and conditional cash is given to women to help them provide for their family. This finding aligns with the position of O'Brien (2012) that transformative capacity entails the cautious efforts integrated to bring about the change's requisite in the accomplishment of the desired goals like mitigating the effect of a disaster like flooding. Corroborating this view, Béné et al. (2012) stated that the ability of individuals, households and communities to anticipate, adapt, and absorb disasters influences their establishments and observance respectively of the policies and rules that strengthens stable partnerships with other households, local authorities, NGOs and businesses in adopting measures to help mitigate the menace of flooding. Theses flood mitigation measures according to Béné *et al.* (2012) includes: proper disposal of refuse to avoid blockage of drains, good emergency response strategy for reliable and timely intervention in emergencies, heeding early flood warning signals, and effective delivery of relief materials, including conditional cash transfers to especially vulnerable groups likes women. In line with the foregoing finding, the researchers affirm that interagency linkage and collaborations is vital in the combination of the techniques of both absorptive and adaptive capacities in order to produce a transformative capacity, which completely increases individuals, households and community's enhanced resilience which could accentuate the promotion of sustainability in the environment.

The result in Table 4.5 revealed that the strength of the resilience of households (via high, average, and low socioeconomic status) significantly influenced the adaptive, absorptive, and transformative capacities towards flood incidents across selected states of the Niger Delta. This finding is consistent with Obeta (2014) who stated that the strength and capacities of interventions by local communities is expected to reinforce the strategies for efficiently, robustly and satisfactorily dealing with the challenges of flood hazard situations in the country. Table 6 revealed that the difference in capacities (via adaptive, absorptive, and transformative capacities) did not influence the resilience of the different States (like Bayelsa, Delta and Rivers State) towards flood incidents in the Niger Delta. This finding is consistent with Prince and Aifesehi (2013) that the coping

mechanisms did not necessarily enhance the adaptive strategies and capacities employed by households and communities in mitigating the impact of flooding on their income and livelihood.

The result in Table 4.7 revealed that there is an association between household socioeconomic status and adaptive capacities across the selected states of the Niger Delta. This finding aligns with Oladokun and Proverbs (2016) that household's socioeconomic status is concomitant to the level of adaptive capacity adopted in flood scenes.

V. CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The study concludes that the disagreement of the respondents on household operating on guideline for disaster preparedness for swift response before, during and after a flood disaster, is suggestive of the existence of non-functional structures and weak emergency response plans especially at community levels. The magnitude and intensity of impact of an almost inevitable hazard in the Niger Delta like flood event is dependent on the individual's, households and community's level of resilience. This resilience in the form of: capacity-building for flood-prone communities, organizing evacuation drills, heeding flood warning notices, measuring water level at different points along a river can indicate when a flood will arrive at a certain point and how high it will rise, etc. Hence developing or building resilience becomes the main issue that would reduce the devastation of flood menace across communities in the core Niger Delta area.

5.2 Recommendations

Based on the findings of the study the following recommendations were made:

1. Individuals, households and communities are encouraged to jettison any cultural, religious and ideological views that makes them to resist relocation to temporary residences when their native homes become inundated or submerged by flood waters.
2. Governments (via federal, state and local) should assist flood prone communities in the planning, evacuation and erection of temporary or makeshift camps at areas of high elevation for the eventual relocation of flood victims during the yearly flood cycle.
3. Flood prone communities should be encouraged to adopt smart agriculture through the planting of short duration or cycle crops (like groundnut) that could be harvested before the flood sets in across the communities in the Niger Delta.

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