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Research Paper

Impacts of Flooding on Residents of the Niger Delta Region of Nigeria: Deleterious and Beneficial Dimensions

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Abstract
The study examined thedeleterious and beneficial dimensions of flood impacts on residents of the Niger Delta Region. The cross sectional and descriptive designs were used in the study. Six states, namely; Bayelsa, Rivers, AkwaIbom, Cross Rivers, Edo and Delta were purposively selected out of the 9 states that constitute the region based on the Nigeria Hydrological Services Agency (NIHSA) 2020 Annual Flood Outlook (AFO) of highly probable and probable flood risk states.The multistage random sampling technique was used to select the sample frame.The procedure involved first selecting 3 highly probable and probable flood risk Local Government Areas in each of the 6 selected states using the simple random sampling technique, making a total of 18 LGAs. The second stage also involved using the simple random sampling technique to select 3 communities each from the 18 selected LGAs, making a total of 54 communities. The study sample size of 400 was determined with Taro Yamane (1967) formula which was the basis for issuing the survey questionnaire to the communities based on proportional allocation with respect to the population of the communities. Both primary and secondary data were used. The results shows that majority of the respondents across the states had been affected by flood (65.5%) and while the deleterious impacts varied across the communities; the benefits derived from flood cumulatively were increase in fish stock (50.1%), deposition/increase in soil nutrient (76.8%) and easy movements/navigation within and between coastal localities (84.0%).The study concludes that the impacts of floods in the Niger Delta are varied and on two dimensions of deleterious and beneficial; and hence recommends that agrarian communities should be supported to commence planting earlier to avoid been cut up by flood; governments and NGOs should focus on granting sustainable relief assistance such as soft loans; building materials; educational materials; agro aids in the nature of tools and machines, seedlings and fertilizers; and lastly,from state to the community levels, emergency management agency/committees should be established in the Niger Delta.

Keywords*: Deleterious, Beneficial, Impacts, Residents, Flooding.*

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I. INTRODUCTION

Flood is one of the leadingglobal ecological crises confronting people and societies, particularly in plenty wetlands of the world due among other factors to the rise in sea level world-over, global warming as well as the saturated nature of wetlands in the Delta (Abowei and Sikoki, 2005 in Bariweni et al., 2012). From ancient times people have always sited their communities in areas that are always flooded and near river sides because of the economic and agricultural advantages they derive from these sites (Adelekan and Asiyanbi, 2015; Nardi et al. 2019 in Ridolfi et al., 2019), as was the experience within the Tigris and Euphrates networks in old Mesopotamia (Ridolfi et al., 2019). This same orientation and practice could be found in this present time as well, and that is why 9 out of the 10 biggest cities in the globe are located in deltas or floodplains (Di Baldassarre et al. 2013a in Ridolfi et al., 2019).

Truly, as natural events, floods are not a problem but they become a threat and can lead to a tragedy only when people go to flood prone areas to execute physical development (NRC, 1989; Parker, 2000; Kumar et al., 2001 in Peter and Adeoti, 2018). However, when placed side by side with cities elsewhere, African cities are more prone to flooding (Adelekan, 2010 in Samuel et al., 2017) and this is why the mortality rate arising from floods in developed nations is ordinarily smaller than in their developing colleagues because these developed countries have in place flood control measures, zoning regulations that prohibit people from living in very

vulnerable zones and emergency preparedness (Ogahet al., 2013). These measures put in place in the developed nations are usually not available in the nations of African and other less developed and developing nations.

Flood types vary and so with their impacts on individual, communities and the ecosystem. For example, coastal floods, especially tsunamis, have been implicated in numerous deaths and other losses, as these are often characterised by large depths, high flow velocities and waves and often happen with a short warning time. Fluvial or riverine floods tend to affect many people as huge areas of land including land for crops cultivation can be flooded for a longer duration stretching from weeks to months (World Meteorological Organization (WMO) and Global Water Partnership (GWP), 2017). In urban areas, pluvial or rainfall floods may cause inundation of streets, basements, ground-level floors of buildings, etc. and due to its frequency may lead to human deaths including substantial disruption of economic and social activities (WMO and GWP, 2017). Flash floods have an incredible rapidity of occurrences, hence they are considered as the most momentous flood hazards as far as mortality is concern (Amangabara and Gobo, 2010). Flash floods are also associated with some environmental pollution issues such as carriage and transportation of debris mostly in urban settings (Barinewi et al., 2012).

Flood risk is a global occurrence and over the past few decades the world has experienced an increasing number of destructive and very upsetting floods (WMO and GWP, 2017), and the average number of humans that are exposed to floods every yearheightened by 114% ever since 1970 (WMO and GWP, 2016). Also, the number of fatalities is significantly different from flood-to-flood with the ratio of displaced against killed people not conclusive in the literature (Cirella and Iyalomhe, 2018). The magnitude of the impact of a flood event in terms of damage or injury is dependent on the level of exposure of individuals, communities, infrastructure, properties etc. to the flood hazard and their ability to resist and recover from losses associated with such (Vedika and Ravindra, 2012 in Samuel et al., 2017; WMO and GWP, 2017).

The rate of exposure is in turn a function of the rate of occurrence and scale of the flood hazard, locational contiguity to source of the hazard and other situational factors such as quality of building (Ologunorisa, 2006; Onwuka, 2015; Bello and Ogedegbe, 2015 in Samuel et al., 2017) in addition to certain socio-economic, cultural, political, and environmental factors as well as the geographical settings in which people reside (McEntire, 2001; Wisner et al., 2004 in Samuel et al., 2017).Hence, Kellens et al. (2011) suggested that population that reside near a hazard such as a river, dam, and on flood plain have greater exposure; while those who reside in homesteads built below par and with inferior materials incur greater losses when there is flooding than their colleagues staying afar off the hazard source and whose dwellings are built with long-lasting materials

The impact of flood in the domain of flood risk management is assessed based on direct and indirect losses incurred by the affected population (Jha et al., 2012 in Samuel et al., 2017). The direct impacts are varied and could include deaths, personal injuries, destruction of buildings, dislocation of population from their homes, loss of valuable properties, and interruption of socio-economic livelihoods of individuals and groups (Adelekan, 2010;Jha et al., 2012; IFRCS, 2012 in Samuel et al., 2017; WMO and GWP, 2017). For instance, more than 8,000 deaths were directly credited to flooding worldwide in 2010 (Jha et al., 2012 in Samuel et al., 2017), while the most vulnerable group to drowning are children and the elderly than their younger adult counterparts (Bartlett, 2008 in Samuel et al., 2017). Furthermore, direct impacts may also include loss of farmland, farm produce, income, structural and household properties, and the outbreak of epidemics that threaten the health of survivors (Bello and Ogedegbe, 2015 in Samuel et al., 2017); damage to environmental resources such as vegetation and soil (Jha et al., 2012 in Samuel et al., 2017); post- traumatic stress disorder (PTSD), depression, and anxiety (Mason et al., 2010 in Samuel et al., 2017).

With the Nigerian experience, Adelekan (2010) in Samuel et al. (2017) identified the impacts of flooding in coastal communities of Lagos to include lack of potable water, heightened occurrence of water borne diseases, and disruptions of social and economic life of the people; and in other places the problem steadily leads to death and displacement of communities (Cirella and Iyalomhe, 2018). Also, Gobo et al. (2013) recorded the major impacts of tidal flood on Bonny Island to include sickness, shoreline loss/erosion, loss of business hour, reduction of building strength/loss of aesthetics value on the macro scale; while on the micro scale, the most severe impact included loss of household equipment/electronics.Other impacts included loss of clothing/wears, damage/loss of books and documents, collapse of building and loss of life.

Result from a study by Samuel et al. (2017) in Lokoja, Nigeria, revealed that the impacts included disruption of movements; damage to roads; loss of valuable properties; loss of farm produce and farmlands; loss of lives; environmental pollution; and children prevented from going to school. Another study by Mmom and Aifesehi (2013) indicated in hierarchy that loss of dwellings; loss of agro-crops and animals; stress, emotional trauma and some health problems, loss of valuable properties and about 21 recorded deaths were the major consequences of flood disasters in the Niger Delta. The result yet showed that notwithstanding the impact of the past flood disaster on the people, majority (71.4%) of the respondents are not willing to relocate from their residence, while only 28.6% indicated willingness to change their residence (Mmom and Aifesehi, 2013).

It is discernible from the reviewed literature that numerous studies have been conducted on floods generally and on its impacts particularly. However, in the case of the Niger Delta, these studies are limited in terms of spatial coverage; and whereas some only looked at the adverse impacts of floods, none considered the beneficial impacts of flood. This is evidently an apparent gap in the literature of the subject matter which this study seek to fill. Hence, the objectives of this study are to:

i. Evaluate the perceived deleterious impacts of flooding in the selected communities across the Niger Delta.

ii. Assess the perceived beneficial impacts of flooding in the selected communities across the Niger Delta.

The study hypothesis is:

H_O: There is no statistically significant variation in the perceived impacts of floods among the residents of the selected communities across the Niger Delta.

H_1: There is statistically significant variation in the perceived impacts of floods among the residents of the selected communities across the Niger Delta.

II. MATERIALS AND METHODS

2.1 Study Area

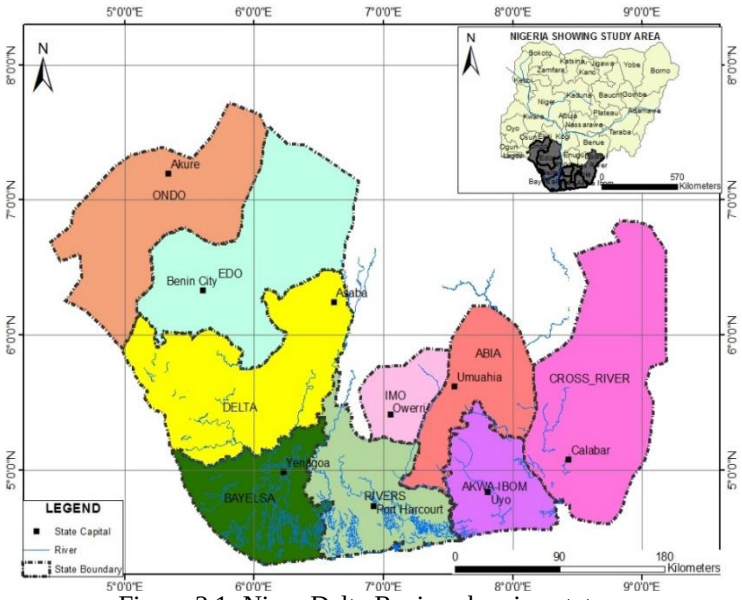

Figure 2.1: Niger Delta Region showing states

The study was carried out in the Niger Delta Region of Nigeria. Located between latitude 4º and 6º north of the equator and longitude 5º and 7º East of Greenwich (Mmom and Aifesehi, 2013), the region experiences abundant amount of yearly rainfall of between 3000mm to 4500mm. (Mmom and Aifesehi, 2013) and average temperature of 27°C to 28°C (Emielu, 2000 in Adejuwon, 2012). The region traverse nine states, namely Abia, AkwaIbom, Bayelsa, Cross Rivers, Edo, Delta, Imo, Ondo, and Rivers States and has about 40 ethnic nationalities speaking over 250 native languages. It is home of vast deposits of crude oil and natural gas reserves (NDDC, 2006; Mmom and Aifesehi, 2013) and it is ecologicallyendowed with varieties of plants and animals species, (NDDC, 2006; Mmom and Aifesehi, 2013) plus timber and non-timber forest products, agricultural resources, marine resources, wildlife, bitumen and other solid minerals (NDDC, 2006). The main sources of livelihood in the Niger Delta are construction, artisans, agriculture, fishing, farming, trading and traditional arts (NDDC, 2006).

2.2 Methods

This study employed the cross sectional and descriptive research designs. The multistage sampling technique was used in the study to establish the sample frame. Six states known as the BRACED states, namely;Bayelsa, Rivers, AkwaIbom, Cross Rivers, Edo and Delta were purposively selectedfor the study out of the 9 states that constitute theNiger Delta based on the Nigeria Hydrological Services Agency (NIHSA) 2020 Annual Flood Outlook (AFO) highly probable and probable flood risk states, and also because they are the states bordering the coastal in the region. The multistage random sampling technique was used to select the sample frame, in which the first stage involved the use of the simple random sampling techniqueto select 3 highly probable and probable flood risk Local Government Areas in each of the 6 selected states, making a total

of 18. Subsequently, the simple random sampling technique was again used to select 3 communities each from the 18 selected LGAs, making a total of 54 communities (Samuel et al., 2017; Week and Wizor, 2020).
The primary data was obtained with the aid of the study questionnaire that was administered to the respondents, while the secondary data originated from existing literature and institutional publications. The sample size of 400 was determined with Taro Yamane (1967) formula and the 400questionnaires were distributed to the selected communities based on proportional allocation with regard to the population of the communities. The formula is given as:

$$n = \frac{N}{1 + N(e)^2} \quad \text{..... Eqn. 2.1}$$

Where;
n is sample size required
N is total population
1 is constant
e is level of significance $(0.05)^2$ or level of tolerance.

Thus,

$$n = \frac{5{,}915{,}116}{1 + 5{,}915{,}116\,(0.05)^2}$$

$$n = \frac{5{,}915{,}116}{1 + 5{,}915{,}116\,(0.0025)}$$

n = 400

Table 2.1 shows the population of the sampled Local Government Areas and sample size distribution for each of them.

Table 2.1: Population and Sample Size Distributionfor Local Government Areas

S/N	States	LGAs Selected by Random Sampling	Population of States by 1991 Census	Population of LGAs by 2006 Census	Population of LGAs by 2021 Projected from 2006	Distribution of sample size by Proportional Allocation
		Eket	82,610	172,856	292,206	20
1	AkwaIbom	IbesikpoAsutan	-	137,127	231,808	16
		Uyo	244,762	305,961	512,214	35
AkwaIbom State Total						**71**
		Ogbia	-	179,606	280,000	19
2	Bayelsa	Southern Ijaw	-	321,808	501,676	34
		Yenagoa	-	352,285	549,188	37
Bayelsa State Total						**90**
		Abi	-	144,317	224,306	15
3	Cross	Calabar Municipal	-	183,681	285,488	19
	Rivers	Calabar South	-	191,515	297,664	20
Cross Rivers State Total						**54**
		Ndokwa East	75,578	103,224	168,578	11
4	Delta	Patani	-	67,391	110,058	8
		Ughelli North	166,029	320,687	523,724	35
Delta State Total						**54**
		Esan South-East	83,643	166,309	252,358	17
5	Edo	Etsako Central	-	94,228	142,982	10
		Ovia North-East	121,769	155,344	235,719	16
Edo State Total						**43**
		Abua/Odual	134,420	282,410	420,336	28
6	Rivers	Ahoada West	-	249,232	415,044	28
		Onelga	190,751	283,294	471,767	32
Rivers State Total						**88**
Grand Total	**6**	**18**	**1,099,562**	**3,711,275**	**5,915,116**	**400**

Source: Researcher's field work (2021)

NB: *The population figures are based on the National Population Commission 1991 census and 2006 national census final results, while 2021 population are based on the researcher's projections estimated from 2006 national census figures using individual state's growth rate.*

The descriptive statistics such as the arithmetic mean, percentages and frequency tables were used to analyse the data; while the Kruskal Wallis Test of Variation was used to test the study hypothesis, all with the aid of the Statistical Packages for Social Sciences (SPSS) version 22.

III. RESULTS AND DISCUSSIONS

3.1 Socio-economic and Demographic Characteristics

Table 3.1 represents the analysis of the socio-economic and demographic characteristics of the respondents in the Niger Delta. The result shows that majority of the respondents were males (62.0%), while the remaining 38.0% females. The dominant age bracket was 26 - 35 years (28.0%), then followed in ranking by36 - 45 years (26.3%), 18 - 25 years (18.3%), 46 - 55 years(16.8%) and 56 years and above (10.8%). On marital status, it was found that majority of the respondents representing 60.3% were married, while singles were 27.0%, separated/divorced 7.3% and the widowed 5.5%. The analysis further show that greater proportion of the respondentscovering 35.3% have WASC/SSC or its equivalents as their highest academic qualification, 20.0% have BSc,13.5% have HND, 11.8% have ND, 8.0% have FSLC, 5.3% have MSc; 5.0% have noacademic qualification,while 1.0% PhD; thus WASC/SSC and its equivalents are the highest educational qualification attained by the respondents the Niger Delta states.

It was yet discovered that respondents who engage in farming and fishingwere in majority (25.3%) in the Niger Delta, seconded by the student population (21.3%). Other occupation of the residents in hierarchy were civil/public service (17.7%), trading/business (16.7%), skilled/self-employed (9.7%) and the unemployed (9.3%). The reason for most of the people taking to fishing and farming may be connected with the fact that the Niger Delta region is endowed with enormous quantity of water bodies. Furthermore, the findings on annual income of respondents shows that those who earn ₦216,000 and below were in majority (31.3%), while those who earn ₦217,000 - ₦400,000 followed (18.5%), and then others in succession were those who earn₦401,000 - ₦600,000 (14.3%),those who earn₦601,000 - ₦800,000 (11.3%), those who earn₦801,000 - ₦100,000 (6.8%),those who earn₦1000,000and above (3.8%)and those who have no income (14.3%).

Table 3.1: Socio-economic and Demographic Characteristics

Variable		Frequency	Valid Percent
Gender of Respondents			
	Male	248	62.0
Female		152	38.0
	Total	**400**	**100.0**
Age of Respondents			
	18-25	73	18.3
	26-35	112	28.0
	36-45	105	26.3
	46-55	67	16.8
	56 and above	43	10.8
	Total	**400**	**100.0**
Marital Status of Respondents			
	Single	108	27.0
	Married	241	60.3
	Separated/Divorced	29	7.3
	Widowed	22	5.5
	Total	**400**	**100.0**
Highest Educational Qualification			
	FSLC	32	8.0
	WASC/SSC	141	35.3
	ND	47	11.8
	HND	54	13.5
	BSc	81	20.3
	MSc	21	5.3
	PhD	4	1.0
	None	20	5.0
	Total	**400**	**100.0**

Occupation			
	Student	85	21.3
	Farming/Fishing	101	25.3
	Civil/Public Service	71	17.7
	Trading/Business	67	16.7
	Skilled/Self Employed	39	9.7
	Unemployed	37	9.3
	Total	**400**	**100.0**
Annual Income of Respondents			
	216000 and below	125	31.3
	217000-400000	74	18.5
	401000-600000	57	14.3
	601000-800000	45	11.3
	801000-1000000	27	6.8
	1000000 and above	15	3.8
	None	57	14.3
	Total	**400**	**100.0**

Source: Researcher's field work, 2021.

3.2 Perceived Deleterious Impacts and Associated Problems of Flooding

Table 3.2 depicts the result on the perceived impacts and problems associated with flooding in the Niger Delta. It is revealed that the most recent flood affected 65.5% of the respondents which constitute the majority, while 33.0% were not affected, and the remaining 1.5% were neutral. The result also indicates that majority of the respondents representing 67.3% strongly agreedthat floods are implicative in the destruction of farmlands, crops and produce by flood, 32.0% of them agreed; while 0.8% was neutral. It was also discovered that greater percentage of the respondents constituting 67.8% agreed that trees/vegetation/green areas are lost to flood; while 23.8% strongly agree, 4.5% were neutral; and 4.0% disagreed. Similarly, it was shown from the analysis that majority representing 57.8% agreed that flood destroys homes,34.0% strongly agreed, 2.0% were neutral, 5.5% disagreed, while 0.8% strongly disagreed. The findings again reveals that 48.8% of the respondents representing the majority agreed that human lives are lost to flood,while 32.3% of them disagreed, 13.0% of them strongly agreed, 4.5% of them were neutral and 1.5% of them strongly disagreed.

The findings once again revealed that majority constituting 55.5% of the respondents strongly agreed that flood causes death of both domestic and wild animals, 42.8% of them agreed, 5.0% of them disagreed, while 1.3 were neutral. Also, greater proportionof the respondents agreed that properties are destroyed/lost to flood (54.8%),43.5% strongly agreed,3.0% were neutral, and 1.5% disagreed. It was further discovered that above two-thirds of the respondents covering 67.8% agreed that flood destroys infrastructure such as roads, bridges, dams, telecommunication and electrical installations etc.,while 29.8% of them strongly agreed, 1.3% were neutral and disagreed respectively. The result also revealed that majority of the respondents strongly agreed that flood causesenvironmental pollution (water contamination, poor air quality) (71.8%), while 28.3% of them agreed and none disagreed or strongly disagreed. Respondents who agreed that flood is connected with Sickness, disease and emotional disorder were in majority (64.3%), those who strongly agreed were 33.3%,and those neutral were 2.5%. Lastly, 47.3% agreed that school calendar is interrupted by flood, 28.3% strongly agreed,20.8% disagreed, 2.8% were neutral, and 1.0% strongly disagreed.

From the result, it is revealed that generally there exist significant variations in the perceived impacts and problems associated with floods among the residents of the Niger Delta. Though the result of the study hypothesis supports this, it ishowever revealedfrom the tested hypothesis that all impacts being felt due to flood in the study area are significantly varied among the selected communities except loss of trees/vegetation, destruction /loss of homes, destruction/loss of properties and sickness/disease and emotional disorder;implying that the significant variation in the perceived impacts of flood events among the residents of the selected communities in the Niger Delta in terms of being affected by the most recent flood exist only with destruction of farmlands, crops and produce; death of humans; death of animals (domestic and wild); destruction of infrastructure (roads, bridges etc.); environmental pollution (water contamination, poor air quality) and interruption of school calendar.

Altogether, approximately 2/3 majority of the sampled population in the communities had been impacted by flood in one way or the other(65.5%) while 33.0% were not impacted. This finding is similar to the findings of the Berezi et al. (2019) who surveyed the public perception of flood vulnerability and resilience among communities in Bayelsa State, as they found that more than 2/3 of the respondents (77.4%) were affected by flooding; whereas less than half of the population (47.8%) were prepared for floods.

By and large, the direct and indirect impacts and associated problems of flooding in the communities across the states were observed to be destruction of farmlands, crops and produce; loss of trees/vegetation/green areas; destruction/loss of homes; death of humans; death of animals (domestic and wild); destruction/loss of properties; destruction of infrastructure (roads, bridges etc.); environmental pollution (water contamination, poor air quality); sickness/disease and emotional disorder; loss of income, and interruption of school calendar. Some of these findings agrees with the position of WMO and GWP (2017) and the earlier findings of Gobo et al. (2013), Mmom and Aifesehi (2013) and Samuel et al. (2017).

Table 3.2: Perceived Deleterious Impacts and Associated Problems of Flooding

Variables		Valid Frequency	Percent	Cumulative Percent
Affected by the most recent flood				
	Yes	262	65.5	**65.5**
	No	132	33.0	**98.5**
	Neutral	6	1.5	**100.0**
	Total	**400**	**100.0**	
Destruction of Farmlands, Crops and Produce				
	Strongly agree	269	67.3	67.3
	Agree	128	32.0	99.3
	Neutral	3	.8	**100.0**
	Total	**400**	**100.0**	
Loss of Trees/Vegetation/Green Areas				
	Strongly agree	95	23.8	23.8
	Agree	271	67.8	91.5
	Neutral	18	4.5	96.0
	Disagree	16	4.0	**100.0**
	Total	**400**	**100.0**	
Destruction/Loss of Homes				
	Strongly agree	136	34.0	34.0
	Agree	231	57.8	91.8
	Neutral	8	2.0	93.8
	Disagree	22	5.5	99.3
	Strongly disagree	3	0.8	**100.0**
	Total	**400**	**100.0**	
Death of humans				
	Strongly agree	52	13.0	13.0
	Agree	195	48.8	61.8
	Neutral	18	4.5	66.3
	Disagree	129	32.3	98.5
	Strongly disagree	6	1.5	**100.0**
	Total	**400**	**100.0**	

Source: Researcher's field work, 2021.

Perceived Deleterious Impacts and Associated Problems of Flooding Continued

Variables		Valid Frequency	Percent	Cumulative Percent
Death of animals (domestic and wild)				
	Strongly agree	222	55.5	55.5
	Agree	171	42.8	98.3
	Neutral	5	1.3	99.5
	Disagree	2	5.0	**100.0**
	Total	**400**	**100.0**	
Destruction/Loss of properties				
	Strongly agree	174	43.5	43.5
	Agree	219	54.8	98.3
	Neutral	1	3	98.5
	Disagree	6	1.5	**100.0**
	Total	**400**	**100.0**	
Destruction of Infrastructure (roads, bridges etc.)				
	Strongly agree	119	29.8	29.8
	Agree	271	67.8	97.5
	Neutral	5	1.3	98.8
	Disagree	5	1.3	**100.0**
	Total	**400**	**100.0**	
Environmental pollution (water contamination, poor air quality)				
	Strongly agree	287	71.8	71.8
	Agree	113	28.3	**100.0**
	Neutral	0	0	**0.00**
	Total	**400**	**100.0**	
Sickness/disease and emotional disorder				
	Strongly agree	133	33.3	33.3
	Agree	257	64.3	97.5
	Neutral	10	2.5	**100.0**
	Total	**400**	**100.0**	
Interruption of school calendar				
Valid	Strongly agree	113	28.3	28.3
	Agree	189	47.3	75.5
	Neutral	11	2.8	78.3
	Disagree	83	20.8	99.0
	Strongly disagree	4	1.0	**100.0**
	Total	**400**	**100.0**	

Source: Researcher's field work, 2021.

*3.3 **Beneficial Impacts of Flooding***

The result in Table 3.3 reveals that majority of the respondents constituting 43.8% agreed that flood leads to increase in fish stock, 32.3% strongly agreed; 17.8% were neutral, 6.0% disagreed; and 3.0% strongly disagreed. Similarly, 56.5% representing majority of the respondents agreed that flood deposits and increasesthe amount of soil nutrients, 20.3% strongly agreed,12.5% were neutral; while 10.8% disagreed and none strongly disagreed. Again, majority of the respondents representing 39.0% disagreed that flood increases sand deposit, while 30.8% agreed; 18.0% were neutral; and 12.3% strongly agreed and none strongly disagreed. It is further discovered that 50.0% agreed that flood creates easy movements within and betweencoastal

neighbourhoods,34.0% strongly agreed, and 12.3% were neutral, while 3.8% disagreed, and none strongly disagreed.

From this findings, it is inferred that increase in fish stock, deposition/increasein soil nutrients, and easy movements/navigation within and between coastal neighbourhoods are the major benefits of floodsto the residents of the Niger Delta. These benefits imply more economic undertakings, more produce and free flow of products from one point to another and thus, more revenue for the people. In this wise, flooding can be said to be beneficial to agro-businesses and wealth creation.

Table 3.3: Beneficial Impacts of Flood

variables		Frequency	Valid Percent
Increase in fish stock			
	Strongly agree	129	32.3
	Agree	175	43.8
	Neutral	71	17.8
	Disagree	24	6.0
	Strongly disagree	1	3.0
	Total	**400**	**100.0**
Increase/deposition of soil nutrient			
	Strongly agree	81	20.3
	Agree	226	56.5
	Neutral	50	12.5
	Disagree	43	10.8
	Strongly disagree	0	**0.00**
	Total	**400**	**100.0**
Increase in sand deposit			
	Strongly agree	49	12.3
	Agree	123	30.8
	Neutral	72	18.0
	Disagree	156	39.0
	Strongly disagree	0	0.00
	Total	**400**	**100.0**
Easy movements within coastal neighbourhoods			
	Strongly agree	136	34.0
	Agree	200	50.0
	Neutral	49	12.3
	Disagree	15	3.8
	Strongly disagree	0	0.00
	Total	**400**	**100.0**

Source: Researcher's field work, 2021.

Hypothesis Testing

H_O: There is no statistically significant variation in the perceived impacts of floods events among the residents of the selected communities across the Niger Delta.

H_1: There is statistically significant variation in the perceived impacts of floods events among the residents of the selected communities across the Niger Delta.

Table 3.4 was used to test the study hypothesis. The analysis from the table reveals that all impacts being felt due to flood in the study area are significantly varied among the selected communities except loss of trees/vegetation, destruction/loss of homes, destruction/loss of properties and sickness/disease and emotional disorder. As a result, the alternative hypothesis is retained for all impacts except loss of trees/vegetation, destruction/loss of homes, destruction/loss of properties and sickness/disease and emotional disorder at $p<0.05$. This implies that there is statistically significant variation in the perceived impacts of floods events among the residents of the selected communities across the Niger Delta in terms of being affected by the most recent floods: (destruction of farmlands, crops and produce; death of humans; death of animals (domestic and wild); destruction of infrastructure (roads, bridges etc.); environmental pollution (water contamination, poor air quality) and interruption of school calendar). Some of these findings on the adverse impacts of floods agree with those of Mmom and Aifesehi (2013), Gobo *et al*. (2013) and Samuel et al. (2017); while also some of the

findings on benefits of floods where hypothesised, but not empirically measured, in the expository literature of Abowei and Sikoki (2005) in Bariweni et al. (2012) and Bariweni et al. (2012).

Table 3.4: Kruskal Wallis Analysis for Hypothesis

Test Statistics[a,b]

	A	B	C	D	E	F	G	H	I	J	K
Kruskal Wallis (H)	178.533	134.846	56.541	62.239	126.358	118.445	42.077	87.173	128.670	63.104	219.824
Df	53	53	53	53	53	53	53	53	53	53	53
Asymp. Sig.	.000	.000	.344	.180	.000	.000	.860	.002	.000	.161	.000

a. Kruskal Wallis Test

b. Grouping Variable: Communities

Key:
A. Affected by the most recent flood
B. Destruction of Farmlands, Crops and Produce
C. Loss of Trees/Vegetation/Green Areas
D. Destruction/Loss of Homes
E. Death of Humans
F. Death of animals (Domestic and Wild
G. Destruction/Loss of Properties
H. Destruction of infrastructure (Roads, Bridges etc.)
I. Environmental pollution (Water contamination, poor air quality)
J. Sickness/Disease and emotional disorder
K. Interruption of School Calendar

IV. CONCLUSION AND RECOMMENDATIONS

The deleterious and beneficial dimensions of the impacts of flooding on residents of the Nigerian Niger Delta Region was examined by this study. The findings revealedthat majority of the respondents were males, the dominant age bracket was 26 - 35 years, married people were more in number than others; while WASC/SSC or its equivalents was the prevalent highest academic qualification attained by the respondents.Also, farming and fishing were predominant occupation among the people, while ₦216,000 and below was the dominant annual income bracket which is below the national minimum wage and indicative of high poverty rate in the region.Approximately two-thirds of the residents across the states had been affected by flood in one way or the other and while the deleterious impacts varied across the communities; collectively the significant impacts and associated problems of flooding in the communities were destruction of farmlands, crops and produce; destruction/loss of properties; death of humans; death of animals (domestic and wild); destruction of infrastructure (roads, bridges etc.); environmentalpollution (water contamination, poor air quality) and interruption of school calendar. The benefits derived from flood among the residents were increase in fish stock, deposition/increasein soil nutrients, and easy movements/navigation within and between coastal localities;suggestingboostto socio-economic undertakings, agro-businesses and wealth creation. The study concludes that the impacts of flood in the Niger Delta are varied and on two dimensions of deleterious and beneficial, however, the beneficial aspect is quite a succour to the people. On the premise of the findings, this study recommends that:

i. Agrarian communities should be encouraged and supported to commence their planting regime earlier to avoid been cut up by flood, since majority of their flood experience is seasonal.

ii. Governments, their agencies and donor organisations (NGOs) should focus on granting relief items and assistance that would in the long-term be sustainable after any flood event such as soft loans; agro aid in the nature of tools and machines, seedlings and fertilizers; building materials; financial grants and educational materials,

iii. More canals should be created and rivers and streams should be regularly dredged to increase their water holding capacity. This would help to reduce the rate of overflows into communities.

iv. In line with the agenda of the National Emergency Management Agency (NEMA), State Emergency Management Agency (SEMA) and Local Emergency Response Committees (LERC) should be established and made operational in all the states and Local Government Areas of the Niger Delta where they are presently not existing. In addition, Emergency Preparedness and Action Committees (EPAC) that will constantly interface with the federal, state and local government agencies, should be established in all flood vulnerable communities as a proactive tool for communities' preparedness, communication and actions.

v. All stakeholder (individuals, communities, governments and NGOs) should henceforth concede to adopting proactive measures in which case actions required to prevent and/or mitigate deleterious flood impacts should be put in place prior to the flood and not being reactionary during or after the flood.

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