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ASSESSMENT OF THE HOUSEHOLD AND COMMUNITY COPING/ADAPTATION MECHANISMS TO HAZARDS OF THE INFORMAL WATERFRONT SETTLEMENTS IN RIVERS STATE

*[1]Victor Bull, [1]Arokoyu S.B. and [2]Ogoro, M.
Department of Geography and Environmental Management, University of Port Harcourt, Port Harcourt, Rivers State
* Corresponding Author: lebull2002@yahoo.com,+234 803 3390979

Abstract: This research assesses the household and community coping/adaptation Mechanisms to hazards of the informal waterfront settlements in Rivers State. A questionnaire survey was administered and analysed from the data retrieved. From the analysis, living close to family or friends, proximity to work, livelihood opportunities, nearness to children school, low rents and low costs of living, commuting cost and Nearness to market were found to be significantly related with residential location choices in waterfront settlement. Also, the coping and adaptation mechanisms to hazards of informal settlements include, raising of building at foundation, construction of wooden bridges and construction of levees by the river banks among others. It is therefore recommended that redevelopment of waterfront informal settlements in the study area should be done in phases; Relevant authorities should develop and implement effective disaster preparedness plan, which should be regularly practiced; establish a dedicated disaster response organization at local levels, furnished with state-of-the art emergency response equipment; tackle poverty and create jobs, enhance local warning and communication systems for predictable hazardous events/disaster.

Keywords*: Residential choice, Coping/adaptation mechanisms, Hazards, Vulnerability reduction, informal, Household.*

Introduction

Over the years in Rivers State, the provision of affordable housing to lower-income groups have not matched with the rapid growth of the population; this has contributed to the development of waterfront settlements in urban and rural areas. Waterfront settlements are often located in marginalized, low-lying and environmentally fragile areas such as wetlands and floodplains that are

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unsuitable for residential purposes. (Turok, 2012). The living conditions in these settlements are often horrendous and pose significant risks to the inhabitants, as a wide range of hazards are present that poses threat to the inhabitants, including fires, floods, poor health, crime and severe weather events (Swanepoel and De Beer, 2014). In addition, water supply, sewage and drainage, paved roads, and electricity supply, public transport and garbage disposal are often not available, which creates health and safety hazards (Nguluma & Lupala, 2000).

Factors increasing the vulnerability in these areas are; high settlement density, poorly constructed dwellings, inadequate infrastructure and basic service delivery. All combined, makes waterfront settlements in Rivers State extremely prone to disasters.

Emergency response in waterfront informal settlements continues to be a daunting task. This is largely due to the inadequacy of publicly provided disaster management system including response equipment, access roads, public health facilities etc. If the conditions remain the same, people living in these areas will continue to be at risk of loss of life and property. Therefore, the study assessed the household and community coping/adaptation mechanisms to hazards of the informal waterfront settlements in Rivers State looking at the household residential choice of informal waterfront settlements, assesses the household and community coping/adaptation mechanisms to hazards in Rivers State waterfront informal settlements and the processes of vulnerability reduction in the study area.

The Study Area

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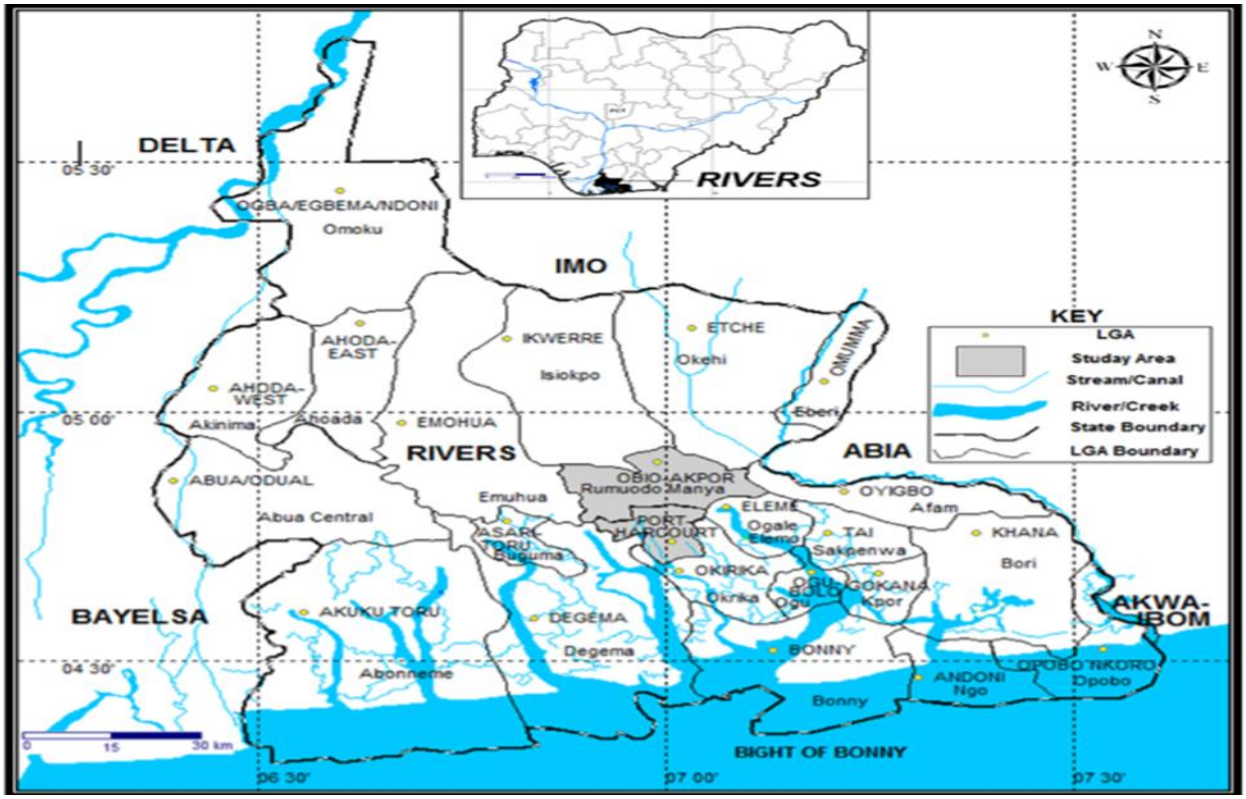

Figure 1: Administration map of Rivers State

Rivers State occupies an area of about 37,000 square kilometers they lie between latitude 4^0 40`38`North and longitude 6^0 25`42` East. It is bounded in the south by the Atlantic Ocean, to the north by Imo and the Abia States, to the east by Akwa Ibom State, and the west by Bayelsa and Delta States. Its shores form part of the West African coastline (Uche, 2016). Over one-third of the State is occupied by water with a low land stretching from Bonny in the South to Ndoni in the north. A network of creeks spans the riverine south, emptying into the Atlantic Ocean through numerous tributaries of Rivers state

Methodology

The study employed a descriptive research design to assessed the household and community coping/adaptation mechanisms to hazards of the informal waterfront settlements in Rivers State. Both primary and secondary data sources were used. Primary data was obtained from household survey, interviews and field observation. Secondary data were obtained from the River State Ministry of housing and Urban Development; 2009 Port Harcourt Waterfront Urban Regeneration Scoping Study, the 1991 Census as published by the National population commission (NPC). The population of study comprised of all the 451572 households representing 496 waterfront settlements in Rivers State. This was determined using 6 persons per household composition figure as stipulated by NDHS report (2013).

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Structured questionnaires were designed with open and close ended questions. The questionnaire was administered to 400 respondents in the study area. Thus, 10% of the communities were randomly selected from the 496 sampled waterfront informal settlements and 451572 households from the 12 LGAs making a total of 45157 households and 50 communities which represents 10% of the entire population of the waterfront communities in the State as sample size

Furthermore, to determine appropriate sample size based on the number of Households, Taro Yamane method was adopted.

Below is the mathematical illustration for the Taro Yamane formula:

$$n = \frac{N}{\left(1 + N\left(e^2\right)\right)}$$

Where:

n-signifies the sample size

N-signifies the population under study

e-signifies the margin error = 0.05

$$n = \frac{451572}{\left(1 + 451572\ (0.0025)\right)}$$

$$n = \frac{451572}{1129.30} \approx 400$$

The data obtained was analyzed using descriptive statistics such as mean and standard deviation and simple percentages distribution tables. The results of the data analyses are presented below.

Results

Table 1: Household residential choice of waterfront Settlement

Choice of waterfront Settlement	Response Categories		
	Mean	SD	Rank
Livelihood opportunities	3.95	0.99	3
Low rents and low costs of living	3.74	0.94	5
Living close to family or friends	3.98	0.99	1
Nearness to Children school	3.92	0.98	4
Availability of Health facilities	1.74	0.43	11
Proximity to work	3.96	0.99	2
Street cleanliness	1.91	0.48	9
Commuting cost	3.63	0.91	6
Neighbourhood character	1.87	0.47	10
Nearness to market	2.63	0.66	7

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Natural features	1.94	0.48	8
Grand Mean	3.02	0.76	

Source: Researcher's Fieldwork, 2022

Eleven (11) items which were expected to play a significant role in residential location decision was identified and used in the investigation. The study presents the relative importance of each of the factors in the residential choice location of households amongst waterfront settlers in Rivers State. As presented in Table 1 for waterfront respondents, living close to family or friends (3.98), Proximity to work (3.96), livelihood opportunities (3.95), nearness to children school (3.92), low rents and low costs of living (3.74), commuting cost (3.63) and Nearness to market (2,63) are found to be significantly related with residential location choices in waterfront settlement.

Table 2 Coping and Adaptation Mechanisms to Hazards of informal settlements

S/N	**Effectiveness of Hazards Control/Coping Capacity**	**Response Categories**		
		Mean	**SD**	**Rank**
1	Road reclamation using sandbags and sawn dust	3.74	0.94	2
2	Construction of wooden bridges	3.92	0.98	1
3	Clearing blocked drainages channels	2.98	0.89	5
4	Periodic environmental sanitation measures	2.98	0.89	5
5	Relief distributions/Support from Government, NGOs, churches and other private organization	1.74	0.43	13
6	Raising of building foundation	2.63	0.66	7
7	Construction of levees by the River Bans	1.94	0.51	8
8	Street gating system in place	1.91	0.48	9
9	Prayers	1.82	0.44	11
10	Community volunteers assist in firefighting using local measures and take up search and rescue	3.72	0.92	3
11	Maintenance of house, Elimination of haphazard electric connection and Proper storage of gas cylinders and flammable materials	1.87	0.47	10
12	Local Vigilante group take up security control in my community	1.74	0.43	13
13	Wearing of nose masks indoor and out door	2.66	0.69	6

Source: Researcher's Fieldwork, 2022

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Table 2 results revealed the coping and adaptation mechanisms to hazards of informal settlements with the highest mean of 3.92 while the least is 1.74. However, the average mean is 2.49. The control measure with high mean above the criterion mean of 2.5 include; Construction of wooden bridges (3.92), Road reclamation using sandbags and sawn dust (3.74), Community volunteers assist in firefighting using local measures and take up search and rescue (3.72), Clearing blocked drainages channels and Periodic environmental sanitation measures (2.98), raising of building foundation (2.66), and construction of levees by the river bans (2.63) among others. These factors are considered to be effective in the study area.

Response strategies of residents to hazards

Table 3: Response strategies

S/N	Response strategies	Weighting/Response Frequency		
		Mean	**SD**	**Rank**
1	There is a dedicated community firefighting response team	1.11	0.28	11
2	Untrained volunteers are always available to assist in firefighting using local measures such as soapy water, sand etc.	2.58	0.75	6
3	Community volunteer take up search and rescue during emergency situations	3.38	0.84	2
4	Family/community members are evacuated to a safer place during hazardous events	2.98	0.74	3
5	Forced migration	2.92	0.73	5
6	Local Vigilante group take up security control in my community	3.44	0.86	1
7	In my community, we have street gating system in place.	1.12	0.28	10
8	Rely on Government family/friends for response support	1.35	0.34	8
9	Rely on Prayers	2.95	0.74	4
10	My area usually gets relief distributions from Government, NGOs, private person, Private organization, and Church groups during flood, fire or other events	1.86	0.46	7
11	Easy access to medical facility in my community	1.05	0.26	12
12	Prompt response from medical personnel during hazardous event or emergency situation	1.19	0.30	9
Grand Mean		**2.13**	**0.53**	

Source: Researcher's Fieldwork, 2022

The findings in table 3 revealed that there is no dedicated community firefighting response team with decision mean of 1.11 (0.28). Untrained volunteers are always available to assist in firefighting using local measures such as soapy water, sand etc. this could be seen from the responses of the

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respondents with the mean of 2.10 (0.55); Community volunteer take up search and rescue during emergency situations with the mean rating of 3.38 (0.84); Family/community members are evacuated to a safer place during hazardous events with agreement responses of 2.98 (0.74); Forced migration attracting 2.92 (0.73).

Local Vigilante group take up security control within the community got agreement responses with a mean of 3.44 (0.86); Community Street gating system attracted disagreement from the respondents with mean rating of 1.12 (0.28). Respondents disagreed relying on Government family/friends for response support, this could be seen from the responses of the respondents with the mean of 1.35 (0.34). From the responses of the respondents all agreed that they rely on prayers with the mean score of 2.95 (0.74).

Distribution of relief items from Government, NGOs, private person, Private organization, and Church groups during flood, fire or other events attracted disagreement from the respondents with the mean score of 1.86 (0.46). Responses from the respondents shows that they don't have easy access to medical facility in their community with the mean rating of 1.05 (0.26). Prompt response from medical personnel during hazardous event or emergency situation attracted disagreement from the respondents with the mean rating of 1.19 (0.30) respectively.

Table 4: Vulnerability reduction measures of Waterfront informal settlers

Reduction Measures	Weighting/Response Frequency		
	Mean	SD	Rank
Government has put in place a structured development program to reduce poverty rate and unemployment in my community	1.43	0.36	9
Community personnel are involved in disaster management/ Reduction planning	1.59	0.40	6
Locals engage in Farming, fishing and others economic diversity which has contributed in alleviating poverty in my community	3.05	0.76	1
Construction/Reconstruction of houses with reinforced and quality material	1.85	0.46	4
The vulnerable groups like the older people, children, less privilege/ handicap are giving support regularly by the government	1.18	0.29	10
Building of dikes in front of house using sand bags	1.87	0.47	3
Frequent removal of sand blocked drainages and creating of water channels	1.65	0.41	5
Regular Fumigation exercise is carried out	1.44	0.36	8

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Hazards are reported to community leaders when they are first observed for corrective actions	1.54	0.39	7
Implementation of building codes/ regulation are given priorities in my community	1.87	0.47	3
There is adequate Insurance and social protection for the people in my community	1.00	0.25	11
Grand Mean	**1.68**	**0.42**	

Source: Researcher's Fieldwork, 2022

Respondents' opinion on the Vulnerability reduction in table 4 revealed thus:

Item 1 shows that Government has not put in place any structured development program to reduce poverty rate and unemployment in the community, this could be seen from the responses of the respondents with the mean of 1.43 (0.36). The responses of the respondents all disagreed that Community personnel are involved in disaster management/reduction planning with the mean score of 1.59 (0.40). Locals are engaged in Farming and fishing which has contributed in alleviating poverty in the community attracted respondents' agreement with the mean score of as 3.05 (0.76). Respondents disagreed to Construction/Reconstruction of houses with reinforced and quality material with the mean rating of 1.85 (0.46). The vulnerable groups like the older people, children, less privilege/ handicap are giving support regularly by the government which attracted respondents' disagreement with the mean decision of 1.18 (0.29). There is general disagreement from the respondents that building of dikes are done in front of house using sand bags with the mean score of 1.87 (0.47). Respondents' responses show their disagreement to frequent removal of sand from blocked drainages and creating of water channels with decision mean of 1.65 (0.41). Respondents also disagreed to the statement that regular fumigation exercise is carried out with the mean rating of 1.44 (0.36).

In addition, respondents also disagreed that hazards are reported to community leaders when they are first observed for corrective actions with the mean of 1.54 (0.39). Further, implementation of building codes/ regulation is given priorities in my community and Insurance and social protection for the people in my community attracted general disagreement from the respondents across the study locations. This is an indication of inadequate reduction measures in the study area with a grand mean and standard deviation of 1.68 (0.42) less than the weighted mean of 2.50.

Conclusion and Recommendations

The conclusion was drawn on the basis of the objectives in the study.

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The study presents the relative importance of each of the factors in the residential choice location of households amongst waterfront settlers in Rivers State. Living close to family or friends, Proximity to work, livelihood opportunities, nearness to children school, low rents and low costs of living, commuting cost and Nearness to market are found to be significantly related with residential location choices in waterfront settlement. The result of coping and adaptation mechanisms to hazards of informal settlements revealed the raising of building foundation, construction of wooden bridges and construction of levees by the river banks among others as factors considered to be effective in the study area. The study finds out that there is no dedicated community firefighting response team, untrained volunteers are always available to assist in firefighting using local measures such as soapy water, sand etc. community volunteer take up search and rescue during emergency situations, family/community members are evacuated to a safer place during hazardous events, local vigilante group take up security control within the community.

The study also revealed that government has not put in place any structured development program to reduce poverty rate and unemployment in the community. Similarly, it was also established that most of the communities in the area of study, either have no or insufficient Disaster Evacuation Facilities, thus, increasing the vulnerability of residents within the communities. This consequently led to their inability to contain the effect of hazards at the event of such occurrence.

Based on the findings of this research, the following recommendations were made:

1. Government should device and implement frequent public enlightenment education programme on community safety, personal safety and security and an effective feedback system for prompt reporting of hazard and hazardous conditions within the community. This can go a long way in alleviating live threatening conditions and perturbation. Review the need to introduce basic compulsory courses on disaster management in Primary and Secondary schools. Government and Communities agencies should ensure that adequate resources are allocated for disaster management while beefing up Security network within waterfront and coastal communities.
2. Government and relevant agencies to carry out phase redevelopment of informal waterfront settlements in Rivers State. A better housing policy needs to be planned and implemented. Housing policy that combines affordability, improved technology, the use of local materials and guarantees quality should be introduced. Provision and functionality of infrastructure such as access road, hospitals, electricity, water supply, adequate waste management system etc.
3. Government to establish a dedicated disaster response organization at local levels, furnished with state-of-the art emergency response equipment and apparatus. This will ensure prompt Reponses during hazardous/disaster events and reduce the effects. Also, Community volunteers

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should be trained and retrained on basic emergency response techniques. This team would constitute Community Watch and may serve as responders during emergency situation. In addition, the provisions of local warning and communication systems for predictable hazardous events/disaster would significantly reduce the response time.

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