



Strategies to Reduce Social Vulnerability of Rural Dwellers to Climate Variation in Akwa Ibom State, Nigeria

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Abstract

The study determined the strategies for reducing social vulnerability to climate variability in the rural areas of Akwa Ibom State. Specifically, the study focused on the socio – economic characteristics of rural dwellers and identified measures to reduce social vulnerability among rural dwellers. It was hypothesized that (1) there was no significant difference in the social vulnerability of men and women in the rural areas of Akwa Ibom State and (2) there was no difference in the social vulnerability of coastal and upland respondents. In order to achieve the above objectives, data were collected from 300 households and analyzed using both descriptive and inferential statistical tools. Result of data analysis revealed that 52.7% of the respondents were women, most of the respondents (80%) were between the ages of 60-80years and majority (64%) had no formal education. Construction of embankment, flood storage reservoirs, dams and bridges and opening of gutters were the most significant strategies to reduce flood from the respondents' perspective; and these were linked to location of building of respondents. The study revealed that there exist significant differences in social vulnerability between males and females at 5% level. This implies that gender, which is a socially constructed definition of masculinity and femininity with its attendant roles, expectations and privileges, is an important factor in determining the social vulnerability of individuals in the study area. Also, the test result of the difference in social vulnerability between coastal and upland areas in Akwa Ibom State shows that a significant difference exists at 5% level. The study recommends that, policy makers and development partners should collaborate with agricultural extension workers, meteorological officers and community – based agents to create

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awareness on climate information, forecast and dissemination through available and accessible communication methods such as radio using local dialect, town criers, community workshop/seminars, etc. to improve community understanding of climate variation and enhance their adaptive capacities.

Key words: Climate Variability, Social Vulnerability, Rural Dwellers

Introduction

Climate affects both natural and social systems through incidences of weather extremes and inter-annual variations. In some farming seasons the ability of rural households to grow enough to feed themselves is hampered to a large extent by short rainy seasons with torrential down-pour (FAO, 2010). These weather patterns have impacts on agricultural production, slashing crop yields and forcing farmers to modify agricultural practices in response to the altered conditions. In the work of Umoh, *et al*; (2013), it was confirmed that Akwa Ibom State and the entire Niger Delta region was vulnerable to adverse impact of climate variability and change. This is particularly so because of widespread poverty, inequitable land distribution, over dependence on rain-fed agriculture, low income and poor institutional capacity. Apart from inter-seasonal and inter-annual variations in climate, the State is also vulnerable to extreme weather events such as floods, severe storm and rising sea levels which translate into loss of food crops, household food insecurity, homelessness, starvation and exacerbating conditions that would lead to conflict, war and misery for millions of persons (Umoh, *etal* 2013). In some communities in Akwa Ibom State, heavy and continuous rainfall exceeding the absorptive capacity of the soil and flow capacity of rivers and streams are common, and inhabited areas situated adjacent to these

rivers and streams, are subject to recurring inundation rendering the area “flood prone” and exposing the population to risk. All these lead to social disruption and dislocation of rural populations thereby rendering them more vulnerable to climate variability.

As it is with most emerging phenomena and accompanying interventions, the social aspects are often given less attention and thus could explain why there are few social vulnerability studies either taken at national or state scale. Several studies examining spatial vulnerability of rural households relevant to climate variability focus mainly on the hydro-meteorological aspect of vulnerability but the relationship of people impacted to physical environment and their capacity to cope with and adjust to new situations is underestimated (Boer and Jones 2008.) Social vulnerability of humans has emerged as the least known element in the disaster literature and are largely ignored, that is why social losses are normally absent in after-disaster cost/loss estimation report (White and Howe, 2012). Not being able to assess all aspect of vulnerability to climate impact will have a negative effect on the ability of communities to

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adapt and on their resilience to climate related hazards. There is therefore an obvious gap in the knowledge of the strategies to use to reduce the social vulnerability of rural communities in the State. Specifically, the study focused on the socio – economic characteristics of rural dwellers and identified strategies to reduce social vulnerability among rural dwellers. It was hypothesized that (1) there was no significant difference in the social vulnerability of men and women in the rural areas of Akwa Ibom State and (2) there was no difference in the social vulnerability of coastal and upland respondents.

Research Methodology

Description of the study Area

The study was conducted in Akwa Ibom State, which is located in the Agro- Ecological Zone of Nigeria. The State is bordered by Abia State in the North, Rivers State in the West, Cross River State in the East and the, Atlantic Ocean in the South. The landscape of Akwa Ibom State is mostly flat and the land is arable from saline water swamp forest in the south, to the rainforest in the north and support extensive agriculture all year round. It occupies a total land area of 8,412sqm with an estimated population of about 4million people, (NPC, 2006). The climate of the state can be described as a tropical rainforest. It experiences abundant

rainfall with a very high temperature. It is marked by two distinct seasons: the wet or rainy seasons or dry seasons. The wet or rainy season lasts between eight to nine months starting from mid- March till end of November. The rain fall is heavy over 5400mm along the coastal areas and diminishing through the hinter land above 2000mm. The dry season has a short season of three to four months. It land mass is mostly arable and has numerous rivers and creeks as well as streams. For this reason, the people cultivate a wide variety of food and cash crops such as rice, yam, cassava, maize, cocoyam, plantain, banana, other fruits and vegetables such as pepper, fluted pumpkin and tomatoes. Cash crops like oil palm, rubber, raffia, gmelina, cocoa, coconut and citrus abound in the state. The abundance of rivers and tributaries encourage fishing all year round, livestock farming undertaken by the people includes, piggery, goat keeping, etc. (Akwa Ibom State year Book, 2001).

Sampling Size and Technique

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A multi- staged sampling procedure was used to select 300 households for the study. Data were collected with a well-structured questionnaire, with close and open-ended questions. Descriptive and inferential statistical tools such as frequency counts, percentages, mean, rank and Students' T-test were employed in data analysis.

Results and Discuss

1.1 Socio-Economic Characteristics of Rural Dwellers in Akwa Ibom State

Selected socio-economic characteristics of the respondents considered in the study (Table 1.1) include the following: sex, marital status, age, educational qualification, primary occupation, monthly income, household size, housing type, location of building and health status.

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Table 1.1: Distribution of rural dwellers based on their socio-economic characteristics

Item	Selected Variables	Frequency n=300	Percentage
1	Sex		
	Male	142	47.3
	Female	158	52.7
2	Marital Status		
	Single	33	11.0
	Married	150	50.0
	Separated	27	9.0
3	Age (years)		
	1-20	1	0.3
	21-40	3	1.0
	41-60	50	18.7
	60-80	240	80.0
4	Educational status (years of formal schooling)		
	0	194	64.7
	1-6	71	23.7
	7-12	33	11.0
	13-16	2	0.67
5	Primary Occupation		
	Farming	66	22.0
	Trading	88	29.3
	Artisan	120	40.0
	Salaried job	21	7.0
6	Income Level (N)		
	<1-20,000	289	95.3
	20,001-40,000	9	3.0
	40,001-60,000	4	
7	Household Size (No of persons)	4	1.3
	1-5	1	0.3
	6-10	27	9.0
	11-15	115	38.3
		158	52.7

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8	Housing Type		
	Thatch roof	239	79.7
	Zinc roof	25	8.3
	Mud with Zinc	17	6.3
9	Location of Building		
	Low lying land	15	5.0
	Flood plain	19	6.3
	Close to seashore	56	18.7
10	Health Status		
	Not physically challenged	240	80.0
	Hearing/speech impaired	12	4.0
	Visually impaired	19	6.3
	Amputated	8	2.6
	Hypertensive/diabetic patient	21	7.0

1) Sex of Respondents:

The sex distribution of the respondents as seen in Table 1.1 reveals that 52.7% were female while 47.3% were males. The dominance of female folk in the study area can be attributed to the migration of men to source for alternative employment opportunities in cities. It therefore implies that with variation in climate, more women are likely to be impacted because they outnumbered the men in the study area. The result as presented in Table 1.1 disagrees with the findings of Umoh *et al* (2013) who reported that both men and women are impacted upon

equally by the impact of climate variability in their communities.

2) Marital Status:

Table 1.1 shows that majority (50.0%) of the respondents were married while 11% were single, 9% and 30% were separated and widowed respectively. The high percentage of married respondents is consistent with Ekong (2003) who noted that getting married is highly cherished among ruralites in Nigeria

with intentions of using these women for unpaid family labour. The high percentage of

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‘married’ marital status places some limitations on majority of the respondents in the study because married women are directly or indirectly controlled by certain conditions placed by their husband. The effect of the male domination makes them look inferior and unable to participate in activities affecting their lives. A female respondent asserts that ‘when disaster strikes, we cannot relocate without the consent of our husbands.’

The percentage of widowed (30%) respondents in the study area is linked to a high mortality rate among men who get drowned in the high sea during fishing expedition in the coastal parts of the State.

The percentage of the separated according to the Focus Group Discussion is attributed to the loss of habitation during period of flood making couples to be completely helpless as they have to relocate to non-affected areas. One of the women has this to say ‘ in the course of economic hardship as migrant, our husbands move from rural areas to cities to exploit perceived economic opportunities and indirectly abandon us at home to take care of

children, the elderly or sick family members and sometimes remarry other women outside our community.’

3) Age of Respondents:

reveals that 80.0% of the respondents were aged between 61-80 years, 18.7% were aged between 41-60 years, 1.0% were less than/or equal to 40 years, while 0.3% were 20 years and below. Eighty percent of the respondents who were within the age range of 60-80 years were believed to be economically inactive because of their health challenges which made them reluctant to accept new knowledge or involve in adaptation planning in order to minimize their level of social vulnerability to climate variation.

4) Educational Status:

The level of education among rural dwellers constrains their ability to understand and react to climate information (HSCEE, 2010). The results from Table 1.1, Item 4 shows that 64.7% of the respondents had no formal education; 23.7% had primary education, 11.0% had secondary education while 0.67% of the

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respondents read up to tertiary education. This implies that majority (64.7%) of the respondents will be more vulnerable to climate variation because of their inability to access, read and understand literature on weather information, as posited by Martins (2010), who noted that the least educated members of the community cannot access or act upon different hazard information for preparation to recover.

5) Primary Occupation:

Item 1.1.5 on Table 1.1 shows that 22% of the respondents had farming as their primary occupation while, trading, artisan and salaried jobs constituted 29.3%, 40.0% and 7.0% of the primary occupation of the respondents respectively. Other occupations such as boat mending and water transportation constituted 1.7% of the respondents' primary occupation. The result reveals that 40.0% of the respondents were artisans engaging in multiple but low income generating activities. These activities are usually lost during disasters and thus increase their vulnerability while reducing their resilience.

6) Estimated Monthly Income:

Item 6 shows on Table 1.1 that 95% of the respondents had a monthly income ranging from N1,000-20,000, 3% earned monthly income ranging from N20,001-N40,000 while 1% of respondents earned monthly income ranging from N40,001-N60,000. The result suggests that 95% of the respondents with low income earnings (1,000-20,000) had less or no financial resources to reduce their social vulnerability. This agrees with Blaikeet *al* (2010) who opined that households with less access to resources are more economically vulnerable to immediate and subsequent climate variability impacts.

7) Household Size:

Data from Table 1.1 shows that most (52.2%) of the respondents had household size within the range of 11-15 persons. Respondents' with household of 6-10 members represented 38.3%, 9.3% of the respondents had small household sizes of 1-5 persons. Household size of the respondents is quite high. It can be deduced that household size increases because of constant flooding that destroys residential

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apartment resulting in population displacement. Some respondents especially the coastal dweller pointed out that ‘when disaster strikes we lost our houses and plead with neighbours to accommodate us.’

8) Housing Type:

The housing quality is closely tied to respondent’s personal wealth. That is the reason some rural dwellers live in poorly constructed houses that are susceptible to strong rainstorm and flooding (Cutter, 2009). Table 1.1 shows that 79.9% of the respondents lived in mud houses made of thatch roof while 8.3%, 5.7% and 6.3% of the respondents lived in zinc roof, mud with zinc and cement with zinc respectively. The findings implies that the respondents are mostly poor as noted by Bolin (2008) that the rural poor live in substandard and over-crowded houses prone to the spread of diseases and impact of disaster because of adverse economic situation.

9) Location of Building

Locations of building of respondents are extremely important in determining people’s exposure to social impacts of climate hazards.

Item 1.1.9 on Table 1.1 indicates that 68.6% of the respondents lived in the upland area while 31.7% lived in the coastal area.

10) Health Status:

Table 1.1 shows that 19.9% were people with disabilities. The result of the finding reveals that respondents with disabling impairments cannot access safe areas when water level increases because of the nature of the assistive devices as such their social vulnerability increases.

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Table 2 Shows strategies that will reduce social vulnerability to climate variation of respondents in the study area. The most significant measures to reduce social vulnerability to climate change from the perspective of respondents were: construction of embankment ($\bar{X}=3.62$), construction of flood storage reservoirs ($\bar{X}=3.57$) construction of dams and bridges ($\bar{X}=3.56$), and opening of gutters ($\bar{X}=3.54$) while the least measures were: awareness on income diversification ($\bar{X}=3.34$), construction of well-equipped hospitals ($\bar{X}=3.57$) and sharing of improved cultivars of flood and drought-resistant varieties ($\bar{X}=2.96$).

These measures agree with Eriken (2012) who observed that construction of protective outlets such as flood storage reservoirs, dams and channels to carry water out from the affected areas is one of the adaptation strategies commonly practiced by victims of flood. Blacken (2007) concurs that embankment serves as temporary shelter for uprooted families. The fifth strategy is working in groups to fill sand

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bags (\bar{X} =3.53, rank= 5). This agrees with Coleman (2008) who reported that communities with denser social support networks have greater cooperation among community members for mutual benefit. He further stressed that community's higher social and stronger social networks will better deal with hazard and its impacts as information and other forms of social support are more readily assessable. The sixth strategy is payment of fund (\bar{X} =3.52, rank 6). The findings confirm HSCEE (2010) who stressed that relief and support materials are particularly beneficial to those individuals who could not themselves afford to replace damaged properties. The seventh, eighth, ninth and tenth measures were: enforcement of environmental laws (\bar{X} =3.50, rank 7), flood prone areas should not be developed (\bar{X} =3.49; rank=8), and creating awareness on weather signal (\bar{X} =3.47;

rank 9). The result corroborates the opinion of Smith (2011) who stated that people should be discouraged from developing flood-prone areas and defaulters should be sanctioned. And the use of local dialect (\bar{X} =3.37; rank 10). The findings suggest that the combination of extension agent, radio and local institutions would be more effective for disseminating climate information using local dialect and support services to vulnerable people in unsafe areas. The least important measures were: creating awareness on income diversification (\bar{X} =3.34; rank=11), construction of well-equipped hospital (\bar{X} =3.30; rank 12), share of local cultivars (\bar{X} =3.02 rank 13), and lack of equal opportunity to access local resources (\bar{X} =2.96; rank 14).

Table 2: Strategies to reduce social vulnerability to climate variation by rural dwellers in Akwa Ibom State, Nigeria

S/N	STATEMENT	SD	D	A	SA	AN	ME	RA
1	People should be stopped from developing flood-prone areas	37*(12.3)**	3)	46(15.7)	104(34.)	113(37.7	3.49	8 th
2	We work in groups in our community to construct dams and bridges	16(5.3)	7)	38(12.)	75(25.0)	171(57.0	3.56	3 th
3	We construct flood storage reservoirs in our community	22(7.3)	)	19(6.3)	86(28.7)	173(57.7	3.56	2 th
4	In our neighbourhood government should help us to construct embankment	13(4.3)	)	16(5.3)	66(22.0)	205(68.3	3.62	1 st
5	Government should pay relief fund to replaced damaged properties in my community.	7(2.3)	)	9(3.0)	76(25.3)	208(69.3	3.52	6 th
6	Extension agents should create awareness to household for diversification income source in my community	12(4.0)	)	11(3.7 0	95(31.7)	182(60.7	3.34 _h	11 ^t
7	Extension agents should use local dialect to disseminate climate related information across all levels	3(1.0))	19(6.3 7)	113(37.)	165(55.0	3.37 _h	10 ^t

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8	We open gutters and maintain drainage channel to prevent our surrounding from flood and erosion	8(2.7)	8(2.7)	109(36.3)	175(58.3)	3.54	4 th
9	Our community should construct well-equipped hospital to check frequent disease outbreak in our neighbourhood	6(2.0)	11(3.7)	103(34.3)	180(60.0)	3.30 _h	12 ^t
10	Community based-agents should create awareness on climate early warming/signals in my community.	5(1.7)	12(4.0)	89(29.7)		3.47	9 th
11	Safe drinking should be provided for the people	6(2.0)	11(3.7)	93(31.0)	190(63.3)	3.53	5 th
12	Community leaders share local cultivars of flood and drought –resistant crops and improved livestock varieties to secure household food.	12(4.0)	15(5.0)	76(25.3)	197(65.7)	3.02 _h	13 ^t
13	Our leaders do not create equal opportunity to access resources in my community.	24(8.0)	21(7.0)	97(32.3)	159(52.7)	2.96 _h	14 ^t
14	Community leaders establish legal institution and enforces of environmental laws to protect flood-plain areas.	59(19.7)	20(6.7)	78(26.0)	143(47.7)	3.50	7 th

Note: * and ** = frequencies and %ages respectively; rank 1 is considered the most important m measures while rank 14 is the least important measure.

SD = Strongly Disagree, D = Disagree, SA = Strongly Agree, A = Agree

Hypotheses of the Study

Ho₁: There is no significant difference between the social vulnerability of males and females to climate variability in the study area.

Table 3 T-test analysis of the difference between the social vulnerability of males and females to climate variability in the study area.

Gro ups	n	Mean	Stand ard deviation	Calculat ed t	Critic al t	Decisio n
Male	142	79.19	17.04	2.56	1.96	Signific ant

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Fem 158 81.30 15.55

ales

Table 3: shows the T-test analysis of difference between the social vulnerability of males to climate variability and social vulnerability of females to climate variability in the study area. The study revealed that there exist significant differences in social vulnerability between the two groups (males and females) at 5% level since the calculated t-value (2.56) is greater than the critical t-value (1.96). This implies that gender, which is a socially constructed definition of masculinity and femininity with its attendant roles, expectations and privileges, is an important factor in determining the social vulnerability of

individuals in the study area. The result while agreeing with UNFPA, (2009) and Solomon (2015) that women suffer more from the impact of disasters and, severe weather events because of their distinct socially constructed roles as mothers and less access to education and information that would allow them to manage climate related risks to agriculture and livestock or their livelihood activities generally, disagrees with Umoh *et al* (2013), who asserts that there was no differences in the impacts of climate variation on male and female.

Ho There is no significant difference in social vulnerability between coastal and upland areas in the study area.

Table 4 T-test analysis of difference in social vulnerability between coastal and upland areas in Akwa Ibom State

Grou	n	Mea	Stand	Calculate	Critic	Decisio
ps		n	ard	d t	al t	n
			deviation			

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Coastal areas	90	88.8	11.08	7.43	1.96	Significant
Upland area	210	76.6	16.81			

The T-test analysis of the difference in social vulnerability between coastal and upland areas in Akwa Ibom State shows that a significant difference exists between the coastal and upland areas at 5% level since the calculate t-value (7.43) is greater than the critical t-value (1.96). The result proves that the location of the respondents contributes their social vulnerability, implying that, the nearer households and communities are to climate hazard prone site such as flood plain, seashore and erosion sites, the more vulnerable they are to the impacts of climate variation.

Conclusion

From the results obtained, the following conclusions can be drawn

(1) Construction of embankment, flood storage reservoirs, dams and bridges and opening of gutters were the most significant measures to reduce flood from the respondents’ perspective; and these were linked to location of building of respondents.

(2) Women suffer more from the impact of disasters and severe weather events because of their distinct socially constructed roles as mothers and less access to education and information that would allow them to manage climate related risks

(3) It is concluded that, location of the respondents contributes to their social vulnerability, implying that, the nearer households and communities are to climate hazard prone site such as flood plain,

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seashore and erosion sites, the more vulnerable they
are to the impacts of climate variation.

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Recommendations

Based on the findings and conclusions of the study, the following recommendations are made:

1. All relevant agencies, community organizations and public spirited individuals should join hands to provide the disadvantaged households with safety nets towards helping communities in any geographical context of their vulnerabilities. Effort must be made to enhance allocation of resources to maintain healthy safety nets. New modalities will have to be sought and developed so that vulnerable women and men can directly receive the benefit safety net practices to reduce household vulnerabilities to weather shocks and stresses.
2. Policy makers and development partners should collaborate with agricultural extension workers, meteorological office and community – based agent to create awareness on climate information forecast and dissemination through available and accessible communication methods such as radio using local dialect, town criers, drama, newsletters, community workshop/seminars and educational programmes to improve community understanding of climate variation and enhance their adaptive capacities.
3. Diversification of income is an effective means of reducing vulnerability by spreading risks. Less dependence on natural resources will help to reduce social vulnerability to severe flooding and drought. Rural dwellers need to be effectively sustained and engaged in some value-added economic activities that will reduce food insecurity, increase employment opportunities and income and permit people to accumulate assets, which will improve their ability to cope with future shocks without falling deeper into poverty.
4. Adaptive planning is needed to reduce the vulnerability of critical infrastructure in coastal areas (ferry routes), low-lying buildings and properties, transportation and market linkages as well as development of laws to safeguard hazard prone areas.
4. Local institutions should strengthen social capital that is, family bonds and friendly relationship should be revitalized among community members so that people will cooperate, team up to address the impact and challenges of climate variations for mutual benefit amongst themselves. Meanwhile cordial relationship should be maintained with relatives away from home for remittances to serve as cushion when exposed to extreme event and also for the provision of temporary accommodation during displacement.

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