

## **Assessment of Local Community Awareness and Response to Flood Hazard Along River Taraba Catchment, Taraba State**

<sup>1</sup>Adelalu Temitope Gabriel, <sup>2</sup>Anita Humshe Philip and <sup>3</sup>Ezekiel Alade Joseph

<sup>1&2</sup> Department of Geography, Taraba State University, Jalingo, Taraba State.

<sup>3</sup>Department of Geography, College of Education, Zing, Taraba State.

### **Abstract**

Flooding is a common and on-going environmental problem in the Middle and South-western Taraba especially the peripheral of all the major tributaries of River Benue in Taraba State. This problem has persisted and often affects the agricultural sector and socio-economic activities of the inhabitants of these areas. Focus group discussion and questionnaire was employed to illicit information on the perception to flood incidence in the study area. Regarding the incessant flooding in the catchment area, general perception of the respondents who have lived more than 20 years and above in the locality affirmed that excess of water from the Lagdo dam is responsible for the yearly flooding of the area. About 51% of the respondents are attestants to this. Floodplain encroachment accounts for 39% while about 4% of the respondents support the fact that the low land terrain is the cause of the flooding. Majority in the study area observed that flooding is intensifying in the area. 97% indicated that they are aware of change in climate resulting to change in course of nature. 82% of the respondents confirm reduction in farm yield as a result of farmland overflow. Other effect as depicted by the respondents include; destruction of properties/infrastructures, hike in food crops and increase erosion. The common response of the inhabitants to the incessant flooding is temporal abandonment of location. The study concluded that flooding in the state is mainly caused by excess water accumulation from the upper catchments of the study area as a result of increased rainfall due to climate change. The study therefore recommend for the need for government institution on Climate Change and Land Reform, that is saddled with responsibility of not only to disseminate but also to create more awareness on effect of climate change and danger of settlement encroachment on floodplain.

**Keywords:** Catchment area, Climate change, Flood hazard, River Taraba and Taraba State

### **Introduction**

Historically, floodplains have always attracted settlements especially in the Northern part of Nigeria where population is mostly agrarian (Anunobi, 2013). However, as the climate changes there are frequent increase in flooding which renders floodplain dwellers vulnerable. Continuous reduction in rainfall pushes local farmers to floodplain thereby increasing the competition on the plain and consequently increasing their vulnerability to flooding. Those involve in the agrarian sector normally settle along river banks and tributaries which are normally flood prone. Where livelihood and support are sustained, the ease to move when better allocation are provided for such, somehow fall on deaf ear. For instance, Opara (2013) observed that settlers in Gbako LGA of Niger State, where yearly flooding of the bank result in increased loss of properties, were reluctant to abandon their ancestral homes for other permanent places.

It has been deduced that floods can be caused by anthropogenic activities and human interventions in the natural processes. Increase in settlement areas, population growth and economic assets over low-lying plains may cause alterations in the natural drainage and river basin patterns. Other intervention which can cause change in hydrological system leading to

flooding is deforestation. Deforestation has positive correlation with climate change. Climate variability appears to have a very marked effect on many hydrological systems (Kundzewick, Mata, Arnell, Doll, Kabat, Jimenez, Miller, Oki, Sen and Shiklomanov, 2007). It is worth noting that among all the climatic variables, variability in rainfall is a critical factor in determining the spatio-temporal influence of the climate system on hydrology.

Rainfall is one of the most frequently discussed of all climatic variables in the tropics. This is because in conditions of reasonable uniform high temperature, it is rainfall that, by its presence or absence, scarcity or extremity, reliability or variability, determines the seasons, production or failure of crops and directly or indirectly vulnerability of the populace (Adelalu, 2020). Below or above normal rainfall, both have implications on agricultural sector and the stakeholders. Ojigi, Abdulkadri and Aderoju (2013) asserted that flood hazards are natural phenomena. However, the damages and losses incur from floods are the consequences of human actions. Taraba State has especially of recent suffered continuous loss from this menace (Plate 1-3). For instance, the Mayogwoi River Basin, tributary to River Lamurde was affected by heavy rainfall culminating to flash floods on 7<sup>th</sup> August 2005 and again 11<sup>th</sup> August 2011 (Oruonye, 2012). These two August events had gross economic consequence on the people of the state. The former truncated interstate movement and paralyzed economic and social activities. Again in 2012 flood incidence, about 3,830 km<sup>2</sup> of the state land territory was submerged in 6 LGAs along the River Benue (Oruonye, 2014) About 111,255 people were affected with 28,511 internally displaced people (SEMA, 2012). More so, according to Oruonye and Adebayo (2013), 11,178 houses and 83,511 hectares of farmland were destroyed by this same flood. These scenarios of extreme events demonstrated the fragility of our socio-economic systems and the extent to which these systems depend on weather and climate.

In the study area, concerns with flood hazards are much. However the studies in this regard are not common. The increasing development of many catastrophic events in the last decades has attracted the attention of many scholars. River Taraba is one of the three major tributaries of River Benue in Taraba State. Despite its water resource potential vital for socio-economic development of the region and Taraba state at large (Adebayo and Bashir, 2005), there are few available literature regarding the environmental problem (flooding) and how it relates to increasing rainfall intensity especially along the catchment area. This study employed focus group discussion method and questionnaire to elicit information on the perception of inhabitants' to flood incidence in the study area.

### **Description of Study Area**

River Taraba catchment area lies diagonally across the state. It is located between latitude 6<sup>0</sup>55' N to 8<sup>0</sup>30' N and between longitude 10<sup>0</sup>25' E to 11<sup>0</sup>55' E. River Taraba Catchment Area is characterized by two minor catchment basins. These include Upper Selbe and Upper Kam (Adebayo and Bashir, 2005). The catchment with perimeter of about 920,379.7 hectares drained total area of about 1,435,938.3 hectares (Adelalu, 2020). The drainage encompasses seven major towns in the Central zone of the State before emptying into River Benue at the Western part of the State. The towns traverse by the river includes Serti-Baruwa, Sarki Ruwa, Karamti, Jamtari, Gangumi, Gayam and Bali (Fig 1). River Taraba with its tributary; River Kam both have their source from Wonka hills and part of Vogel divide. The Rivers take their source here and flow in different directions majorly North-west of the state.

The study area is characterized by tropical continental climate marked by dry and wet seasons. Dry seasons last for a minimum of five months (November-March) while the wet seasons spans from April to October. Rainfall usually starts around April-May and ends around September-October. Heavy thunder storms occur in major parts of the catchments around July and August, with attendant peak of rainfall at this period, causing major floods and inundation especially in

the lower catchments. Mean annual rainfall is less than 1000mm<sup>3</sup> in latitude 9<sup>o</sup> (Adebayo, 2012) and 1350mm<sup>3</sup> recorded in the Southern part of the State. Consequently, the climate of the study area exhibits a simple pattern of east-west climatic zones, distorted by the influence of Shebshi highlands. The temperature varies from months to months and from place to place reaching its peak at the end of the dry season (March). Maximum temperature ranges between 26<sup>o</sup>C to 39<sup>o</sup>C while minimum temperature ranges between 15<sup>o</sup>C to 18<sup>o</sup>C. The driest months are January and February when the relative humidity is 13%. The period of harmattan is a period when the dust-laden North-East trade winds from the Sahara desert have a major effect on the climate of the state. This period of the harmattan is generally cold and dry. At this period, rainfall and runoff is almost zero in most of the catchments area.

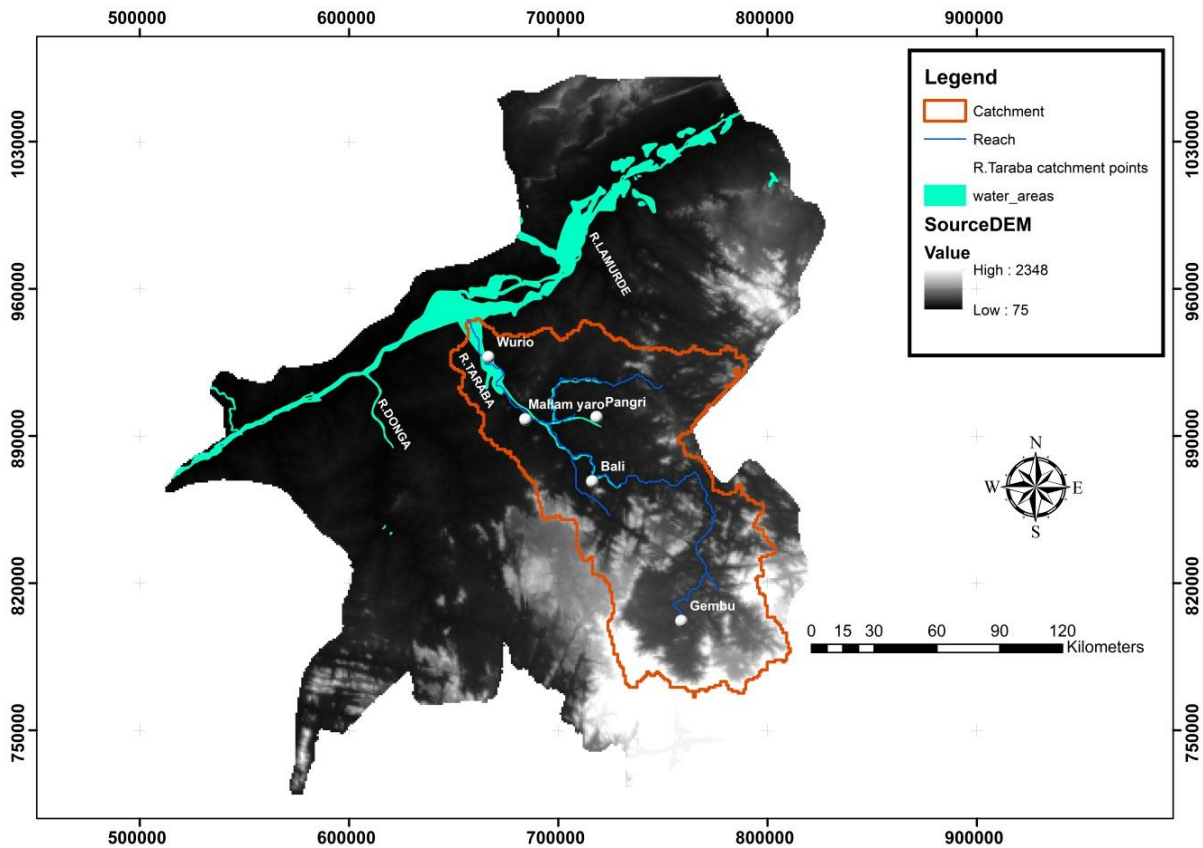


Figure 1: River Taraba Catchment Area

## Material and Methods

### Sampling Technique and Sample Size

Purposeful sampling method was used to select wards. The selection of wards was based on the consideration of the state of the devastation as a result of flooding. For instance Wibo, Natride, and Santride were selected because the three wards are more endemic in terms of flooding than any other wards. Random sampling was used in the administration of questionnaire: Thus:

**Table 1: Wards and Sample Size for the Study**

Catchment	Wards	Proportion	% Valid	% Invalid
River Taraba	Wibo	100	241 (80.3)	59 (19.7)
	Natirde	100		
	Sandirde	100		
	Santride	100		

Source: *Field work, 2017*

### Result of the Findings

The bio-data of the respondents in the study area are presented in Table 2.

Variables	Frequency	Percentage (%)
<b>Wards</b>		
Wibo	44	18
Natirde	70	29
Sandirde	127	53
<b>Age Group</b>		
Below 20	55	23
21-30	91	38
31-40	46	19
Above 40	49	20
<b>Occupation</b>		
Farming	123	51
Fishing	46	19
Trading/Business	33	14
Artisan	22	9
Civil Servant	6	2
Others	11	5
<b>Duration of Respondents stay</b>		
Below 10	21	9
11-20	59	25
21-30	49	20
31-40	71	29
Above 40	41	17
Total	241	100

Source: *Field work, 2017*

The demographic status of the respondents in the study area depicts that 74% of the sampled respondents are male while 27 % are female. Of this were 18% from Wibo, 29% from Natirde while we have 53% from Sandirde (Table 2). The demographic data reveals 23% of the respondents below age 20. 38% were between age 21 and 30. Between ages 31 to 40, we have 19% of the respondents in this category while 20% of the respondents are above age 40. Occupational status of the respondents reveals an agrarian region. It is obvious that majority in the chosen wards are into farming business. 70% are full time farmers. About 14% are engaged in Trading or Business. About 9% and 2% earn their livelihood through Artisan and white collar job respectively. It was also observed that there are ample numbers of respondents that engaged in two or more occupations. The researchers believed that those inhabitants especially long term residents could have a reasonable idea of the extent of flooding in the locality. Close to 70% of the respondents had been in the study area for more than 20 years. It is assumed that they have a better chance of relating the story better.

### Causes, level of awareness and coping strategy to flooding along the Catchment Area

The causes, level of awareness and coping strategy to flooding by the Respondent in the study Area is shown in Table 3

Table 3: Causes, level of awareness and coping strategy to flooding by the Respondent in the study Area (n= 241)

Variables	Frequency	Percentage (%)
<b>Causes of Flood</b>		
Floodplain Encroachment	39	16
Increase Rainfall intensity	44	18
Land use change( Deforestation, Constructions etc)	26	11
Low land area	10	4
Others	122	51
<b>Level of awareness</b>		
Not aware	-	-
Slightly aware	8	3
Strongly aware	233	97
<b>Adverse Effects</b>		
Loss of farm Land	206	85
Reduced Harvest	199	82
Hike in food crops	41	17
Destruction of Properties/ Infrastructures	72	30
Increase erosion	79	33
Water Born Diseases	101	42
Water Pollution	16	7
Albeit Social Vices	36	15
Temporal Famish	66	27
Pressure on Land	6	2
Death/Loss of relative/friends	-	-
<b>Coping Techniques</b>		
Use of sand bags	15	6
Evacuation/Temporal Abandonment	222	92
Erection of wall/fence	3	1.2
Others	1	0.8
Total	241	100

*Source: Field work, 2017*

Regarding the incessant flooding in the catchment area, majority are in the category of other causes different from the listed in the questionnaire. General perception of the respondents who have lived more than 20 years and above in locality affirmed that excess of water from the Lagdo Dam is responsible for the yearly flooding of the area. About 51% of the respondents are attestants to this (Table 3). Floodplain encroachment accounts for 39% while about 4% of the respondents support the fact that the low land terrain is the cause of the flooding. Only 18% associate increase in rainfall intensity to flooding. As regard the level of awareness, majority in the study catchment observed that weather phenomena are changing. 233 respondents amounting to 97% indicated that they are aware of change in climate resulting to change in course of nature. Considering flood impact on the populace loss of farm land dominates the effect of past flood on the populace. 85% are attestant to the fact that they had directly lost farm land or they know somebody in the area who loss farm land to flooding. 199 respondents confirm reduction in farm yield as a result of farm flush or overflow account for about 82%. Other areas of effect as depicted by the respondents include; destruction of properties/ Infrastructures, hike in food crops, Increase erosion etc. Relating mitigation measures to the incessant flooding, the notable response of the inhabitants is temporal shift from their homestead. This is done when the warnings are issued or they sense the stage of the water is getting higher than usual. 92% of the respondents affirmed that they or people around moved

away from the farms when instructions are given through the clan chief. According to the village head, Chief Kashimu Murtar who declared that they have been having flooding and that this event is largely due to excess release of water from Lagdo dam said that in as much that the release of the water comes with some benefits the excess also cause havoc. He admonished that gradual release of water with caution will help the populace especially at Natirde and the other adjacent hamlet Mala part of Ibi. While 6% of the inhabitants respond to flood events using sand bags, less than 2% of the respondents can afford erecting fence or block wall. Other local measure include logs/shrubs overlay among others.

### **Conclusion**

Since creation of the state in 1991, various anthropogenic activities such as agriculture, deforestation, irrigations, dam construction have taken place especially along the river banks of the major tributaries to river Benue in the state. The cumulative of these human activities (deforestation, encroachment, aggressive mining etc) together with natural factors in some parts of the study area has led to environmental degradation in the state which seems abetting incessant flooding. It is concluded that flooding in the state apart from the encroachment into the plain, excess water accumulation from the upper catchments of the study area as a result of increased rainfall due to climate change could be responsible. This suggests why there is always flooding when excess water is released from the Lagdo dam. To respond to this change temporal abandonment of the flood plain is the general coping technique of the respondents.

### **Recommendation**

There is need for a platform e.g office of Climate Change and Land Reform and the office saddled with responsibility not only to disseminate but also to create more awareness on climate change, danger of flood plain encroachment, etc. Stakeholders in Urban and regional planning should be carried along.

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## **Appendix**



Plate 1: Settlement pattern on the bank of River Taraba at Natride in Gassol





Plate 2: Bridge collapse at Maraban Gassol in Taraba State



Plate 3: Hijacked secondary school in Gassol in Taraba