

# Community Based Initiatives and Strategies for Adapting to Annual Floods along The Black and White and Volta Rivers in the Central Gonja District of Northern Region, Ghana

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## Abstract

Climate change induced floods have become a regular phenomenon in many parts of the world including Ghana, causing loss of human life and property. This paper investigated how communities along the Black and White Volta Rivers in the Central Gonja district of the Northern region of Ghana adapt to the phenomenon and to assist them with strategies to enhance their coping strategies and resilience levels. One hundred (100) respondents, 10 each from 5 communities along the White and Black Volta rivers were randomly selected and interviewed on their knowledge of and how they respond to the phenomenon. Key informant interviews were also held with key institutions of the district. The results revealed that the majority of the members of the communities rely on indigenous early warning systems for alerts on impending floods. Their coping strategies are varied and their resilience levels are very low. The paper therefore, recommends among other things that the capacity of communities be built on how to complement the indigenous knowledge system with scientific methods for early warning and preparedness in order to boost their resilience.

**Keywords:** Climate Change, Floods, White & Black Volta Rivers, Resilience.

## INTRODUCTION

Ghana is situated in one of the world's most complex Climate Change regions, affected by tropical storms and the climatic influence of the Sahel and the Atlantic Ocean. The models and projections used to measure the signs of the phenomenon vary enormously, but show clear signs of Climate Change, confirming Ghana's vulnerability, particularly the Northern parts of the country (UNDP, 2012). UNDP, (2012) warned that as a result of climate change, the country should expect unpredictable climate patterns and predicted that the country will face more intense weather events, such as torrential rains, excessive heat and severe dry winds. Floods, for example, have become a recurrent phenomenon in Ghana, for example, in 2007; floods affected more than 300,000 people in the country, resulting in loss of life and property. These floods were believed to have cost the country more than \$25 million for emergency response, and resulted in more than \$130 million worth of direct damage (UNDP, 2012).

Climate Change has been recognized as developmental challenge to Ghana's Middle Income status. The 2008 national sectoral Climate Change vulnerability and adaptation assessments revealed the substantial impact of Climate Change on the national economy, with clear evidence that many of key economic assets – the coastal zone, the savannah zone, agriculture and water resources – are affected, as well as social development in terms of poverty reduction, health and women's livelihoods (NCAP, 2008). Ghana has made major progress on poverty in recent decades. This notwithstanding, poverty persists in the north and in urban pockets and the poorest people are those who bear the brunt of Climate Change. A north-south poverty divide is exacerbated by climatic stress in the northern regions where temperatures are already relatively high. Lower agricultural productivity, flooding and rainstorms are only increasing the pressure to migrate to the south of Ghana (MEST, 2010, UNDP, 2012).

The signs of climate change are evident in the northern region of Ghana and manifested in the annual

floods and storm disasters, particularly in riverine communities. The floods in particular, come between August and September every year and usually cause a lot of damage to life and property. In 2010, 369 communities in sixteen (16) out of the twenty (20) districts in the northern region at the time were affected by floods with the resultant destruction of 21, 550 hectares of farm lands, 2,586 houses and claimed 5 human lives.

Majority of the people in these communities are unable to move away from these lands to higher grounds due to social, cultural and historical links the place call “home” or buy lands on the safer areas for habitation due to their financial inability to afford such lands and so are affected yearly by floods.

Rural communities are rarely able to access modern early warning alerts because they are located far from urban localities where these early warning systems are cited, they do not have access to electricity so are unable to listen to the radio or television, which usually broadcast or telecast the weather news. Where there is electricity, the people are unable to own particularly a television set. The only option left therefore, is to rely on the adaptation measures that they learnt from their forefathers i.e. the indigenous early warning systems for preparedness and resilience.

The paper therefore, sought to investigate how communities along the Black and White Volta Rivers of the Northern region of Ghana adapt to floods and proffer recommendations on how the indigenous knowledge systems could be used to enhance their adaptation and resilience to climate change related disasters. This is based on the strong link between the environment and disasters and between human practices and the environment UNISRD, (2008).

#### **The objectives of this paper are**

1. To investigate the understanding and perception of the communities along the Black and White Rivers on climate change and its effects on their lives.
2. To explore how communities along the Black and White volta rivers adapt to the floods disasters.
3. Explore the indigenous systems available in the communities for adapting to floods.
4. To offer alternative and more workable early warning signs for floods and how to adapt to floods.

#### **Methodology**

##### **Study Area**

The Central Gonja District is located in the southern end of Northern region and lies within longitude 1°51 and 2°58 West and latitude 8°32 and 10°21 North with Buipe as its district capital. The district shares boundaries with the Kintampo North Municipality of the Brong Ahafo Region to the south, the West Gonja District to the west, the Tamale Metropolis to the north, the Tolon District to the Northwest and the East Gonja District to the east. It links the northern region with Southern Ghana. The district lies within the tropical continental zone with an unevenly distributed rainfall pattern from June to October and a dry season lasting from November to May and a mean annual rainfall of about 1,144mm. August and September normally record the heaviest rainfall and the highest number of rainy days. The rainfall is characterized by thunder and wind storms and or sharp showers. Erosion and flooding are common place due to the torrential nature of rains. The irregular distribution and short duration of the rainfall are a great limitation to crops and vegetative growth. This reduces food production to a single season and farming a risky business. The area is transverse by two major rivers, the White Volta and the Black Volta which also forms the southern boundary of the northern region of Ghana and usually overflows its boundaries causing flooding. A lot of streams crisscross the district and flow into the two rivers and eventually into the Volta River in the south of Ghana.

The district has a population of 87,877, according to projections made from the 2010 Population Census, with a male/ female ratio of 103 to 100 and a population density of 10.3inh/km<sup>2</sup>. The area covers a land size 8,544km<sup>2</sup>, which represents 12% of the land mass of the Northern region. The two major ethnic groups are the Gonjas and Dagombas but the district also has a large community of migrant groups made up of Ewes and Bators from the Volta region of Ghana who live along the White and Black Volta rivers. The district has 256 communities. Farming and fishing are the occupations for majority of the people and the fishing is done along the White and Black Volta rivers in Buipe and Yapei townships and the communities along the river banks.

The paper considered Ten (10) communities along the White Volta and the Black Volta rivers; five communities along the White Volta River and five along the Black Volta Rivers. These are; Amedzirovi, Junto, Yapei, Kantanga and Gbansah along the White Volta River and Bridge East, Bridge West, Dibriport, Peposu and Kikali No.4 along the Black Volta River. Kikali No. 4 is the point where the two Rivers meet (confluence) and flow into the Volta River. In each of the ten communities, 10 households were selected using a simple random design for interviews. For primary data, male or female household heads were interviewed and where there was no household head available, any person over 18 years was interviewed, giving a sample size of 100. One focused group discussion per community was also held and Key informant interviews were held with institutions such as the District Assembly, the Ministry of Food and Agriculture (MoFA), the National Disaster Management Organization (NADMO), the Environmental Protection Agency, (EPA), the Ghana Red Cross

Society, (GRS) and the Ghana Meteorological Agency (Gmet) on floods disasters and how people in the aforementioned communities are adapting and what the best methods or strategies for adaptation are. Secondary data was sourced from books, journals and reports on related research.

The data gathered from the field was analyzed using SPSS version 16 and MS Excel. A workshop was organized for representatives of the communities and stakeholder institutions where the results were validated.

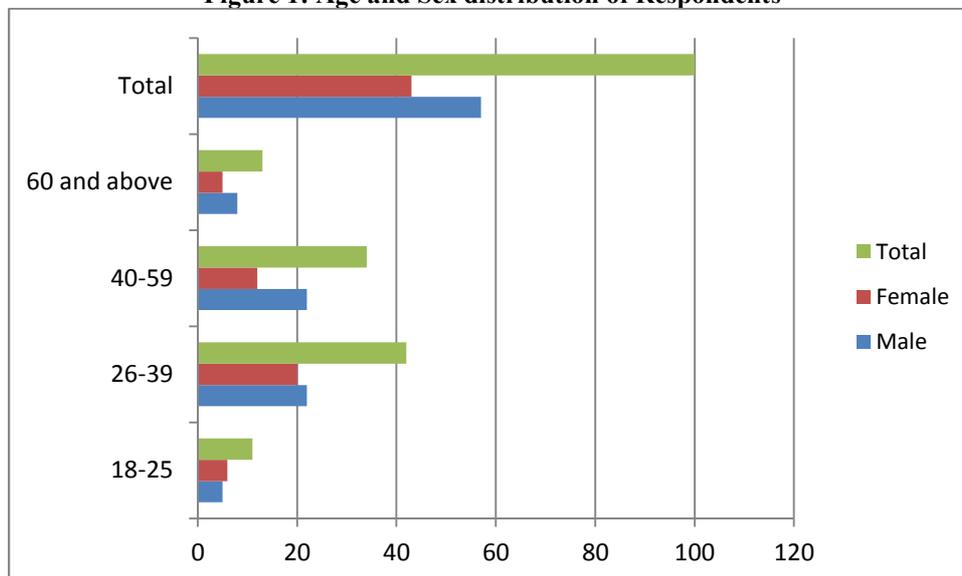
## Results and discussions

### Socio-demographic characteristics of respondents

#### Age and Sex Distribution

The Age and Sex distribution of respondents in the study is presented in figure 1. The majority of respondents both male and female fell within the ages of 26 and 39 i.e. 22 male and 20 female and representing 42%, followed by age bracket 40 to 59 which has 22 male and 12 female representing 34%. Age bracket 60 and above had 13% respondents representing 8 male and 5 female and ages 18 to 25 had the least respondents, i.e. 5 male and 6 female representing 11% of the respondents. The 26 to 39 age bracket recorded the highest numbers because they were available for the interviews and some of them had to be interviewed in place of household heads. The 40 and 50 age are regarded as the receptacles of indigenous knowledge, so their numbers helped to access that knowledge.

**Figure 1: Age and Sex distribution of Respondents**

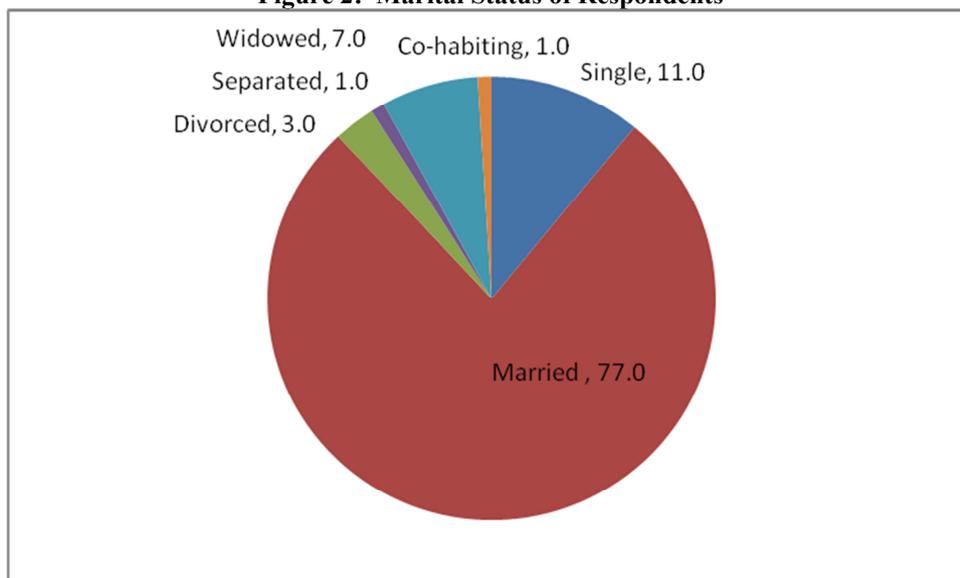


Source: Field data, 2014

#### Marital status

Figure 2 below represents the marital status of the respondents. Majority of the respondents i.e.77% were married, 11% were single, 7% were widowed and 3% were divorced. 1% of respondents were separated and another 1% was cohabiting. Marriage in the study area is a status symbol, indicating maturity and the authority to speak on serious issues on behalf of the family. The family unit is the most affected by the floods because in some cases houses and foodstuffs are lost and the survival of the family depends on the family head.

**Figure 2: Marital Status of Respondents**



Source: Field data, 2014

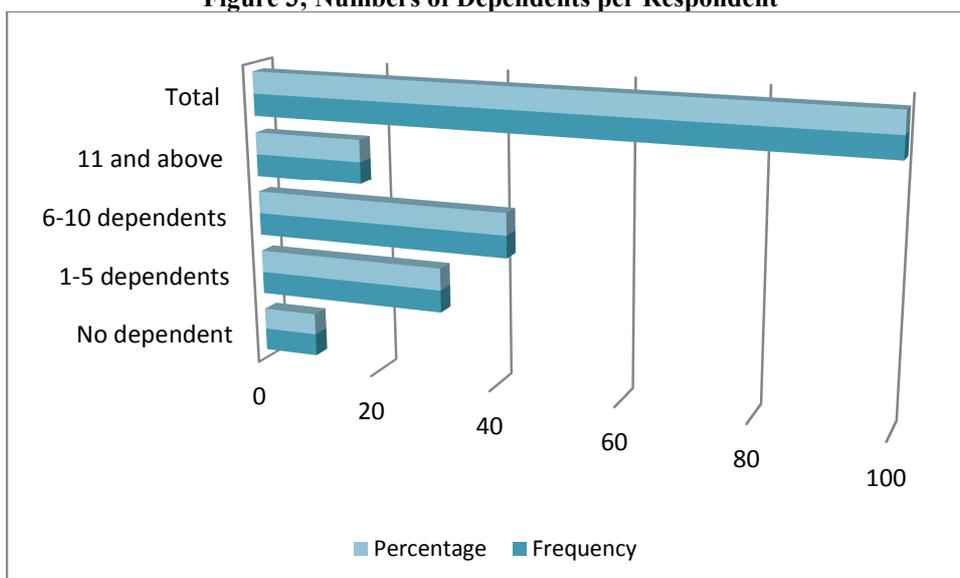
**Educational level**

Out of a total of 100 households interviewed 71 respondents representing 71.0% had no formal education, 16% had basic education, 8% had tertiary education and 5% had secondary or vocational education. These statistics certainly should be a worry to the district authorities as well as the development partners since this has implication for the community members understanding and appreciation of climate change issues and ultimately their preparedness and response to climate change related disasters.

**Number of Dependents per Respondent**

The paper observed that there is high dependency in communities fringing the Black and White Volta Rivers. As can be seen in figure 4 below, out of the total of 100 respondents interviewed, majority (42%) of them had between 6 and 10 dependents, 31% had between 1 and 5 dependents, 18% had 11 and above dependents and 9% had no dependent. This level of dependence coupled with the low level of education should be of a grave concern to communities who derive most of their livelihoods from weather/climate related activities such as farming and fishing.

**Figure 3; Numbers of Dependents per Respondent**



Source; Field data, 2014

### Occupation of respondents

The paper observes that fishing and farming are the dominant occupations in the area. Indeed, out of the 100 respondents interviewed, 46% of them indicated that fishing was their main occupation while 21% said farming was their main occupation. The next dominant occupation after farming and fishing in the area was trading, which attracted about 20% of the respondents. This is quite understandable, since after the catch or harvest, the people need to sell the produce for income. Farming and fishing are also “seasonal” activities, so the people need to trade in order to supplement the income from farming and fishing, which they claim is not able to meet their needs. The least occupations in the area as observed by the paper are government work and artisanship which attracted 5% and 4% of the respondents respectively. The above analysis agrees with the Central Gonja District Assembly’s decision to select/choose these communities as disaster prone and climate vulnerable communities.

### Community Members Knowledge and Understanding of Climate Change

The level of understanding of the people on climate change is very important for this paper because, when they know what the phenomenon is, they will have strategies by which they can overcome or minimize its negative effects, or to prepare adequately for it. Even though the knowledge and understanding of local people on contemporary and topical issues like climate change is sometimes under estimated, this paper revealed that a good proportion of the local people had a fair understanding of what climate change is. As can be seen in table 1 below, 56% of the respondents who claimed have ever heard about climate change understood the phenomenon to be the change in the weather over a period of time while 24% said indicated no understanding of climate change.

**Table 1: Respondents Understanding of Climate Change**

Definition	Percent
Change of weather over a period of time	56.0
Don't know	24.0
The change in temperature and rainfall	8.0
The changes in the rainfall pattern and occurrence of flood	4.5
The increase in heat and wind in town	4.5
The continuous change in weather which accompanied by diseases like CSM and others	.2.0
Change of the seasons as compared to previous years	.1.0
The loss of trees	1.0
<b>Total</b>	<b>100.0</b>

Source; Field data, 2014

On whether the climate is changing or not, the paper emphatically established that the change in the global climate was not in doubt, as 98% of respondents agreed that the local climate was changing with only 2% dissenting.

### Effects of Climate Change

The paper sought to find out respondent’s views about the general effects of climate change in the area and came out with very interesting revelations. Majority of the people (42.0% and 40.0%) respectively held the view that climate change results in droughts and floods, which fall in line what pertains in literature. 38.0% saw reducing crop yields also as an effect of climate change. The rest of the results are in table 2 below.

**Table 2: Effects of Climate Change**

Effect	Frequency	Percentage
Droughts	42	42.0
Floods	40	40.0
Poor crop yield	38	38.0
Destructive windstorms	34	34.0
High incidence of disease vectors/ diseases	8	8.0
Pest invasion	7	7.0

Source: Field survey, 2014

n = 100

### Adaptation to Climate Change by Communities

That fact that the climate has changed and continues to change, with negative effects on the livelihoods of millions of people across the world is no longer in doubt and has left communities with an unavoidable option of finding pragmatic and innovative strategies for adaptation in order for them to continuously meet their livelihoods aspirations. The paper revealed that climate change adaptation measures/strategies employed by the communities are mostly derived from their traditional way of doing things such as; early cropping (54.0%),

planting of early maturing varieties (41%), use of compost (19%) and mulching (14.0%). Others do valley farming and seasonal migration.

### **Occurrences of floods, their effects on Communities and Community Response**

#### ***Occurrences of floods***

Floods are widely recognized as one of the effects of climate change throughout the world. In this paper the incidence of floods in the communities along the two Volta Rivers (Black and White) was investigated and it was revealed that until a few years ago, flooding was an annual occurrence in the communities. Community members said the construction of the Bui hydroelectric dam has reduced the flow and the volume of water in the rivers. They indicated that, flooding occurs these days only when the Bagre Dam in Burkina Faso is opened to ease pressure on the river wall. 51% of the respondents indicated that they experience flooding every two years, a significant percent (17%) of the respondents stated with much emphasis that they experience every year while another 17% of them stated that they experience floods every three years. The varied responses on how frequently they experience flooding (table 3) notwithstanding, it is established that flooding is a problem in the area. The differences in responses could be attributed to the varied topography of the communities.

**Table 3: Frequency of floods**

<b>How often</b>	<b>Percentage</b>
Every year	17.0
Every 2years	51.0
Every 3years	17.0
Every 4years	5.0
Every 5years	10.0
<b>Total</b>	<b>100.0</b>

Source; field data, 2014

#### **Effects of Floods on lives and livelihoods of communities**

The paper revealed that whether the floods are an annual or biannual occurrence in Central Gonja District, has serious effects on the lives of the people of the area as 67% of the respondents said that they lose their farm produce as a result of floods, 64% indicated that their homes get destroyed, 26% reported of disease outbreaks, 16% said they suffer hunger and famine as a result of loss of food stuffs, 10% complained of loss of investments and livelihoods, 7% indicated their poverty situation is worsened, 8% indicated their drinking water sources are usually contaminated and 4% said their villages are usually cut off from the rest of the district as a result of flooding. These results as observed by this paper confirm results of previous studies (Etuonovbe, 2011 and Kamra, 2005).

In one of the focus group discussions, a community member had this to say *“every year during the rainy season we experience flood during which our community is disconnected from the rest of the district. During this time teachers do not come to teach our children and our wives are not able to go to the market. During that time the only way to get to the urban towns of Yapei and Buipe is by boat and not many people are comfortable using that means of transport especially around that season due to high risk involved”*

#### ***Communities’ Response to Floods***

The paper also sought to explore how communities along these two rivers usually respond to the floods when they occur and the responses given indicate that the resilience level of the communities is weak. As can be seen in table 4, 81% of the respondents indicated that they move away from their communities to live with families or friends when floods occur, 23% indicated that they borrow food stuff and building materials from friends to survive and rebuild their homes, 11% said they sought divine intervention, 4% indicated that sometimes they abandon their farms entirely and wait for the next season, 3% said they use sachet water for their water needs when the water get contaminated and 1% indicated that they try to hurriedly harvest which ever crop that is ready so as to avoid total loss to the floods

**Table 4: Community Response to Floods**

Response	Percent
We run away from our homes to live with family and friends	81
We try to harvest and run away with our farm produce if they are ready for harvesting	1
Sometimes we entirely abandon the farms and wait for the next season	4
Use of sachet water	3
Borrow food and building materials from friends	23
Create drains to contain and direct the water away	1
Seek God's intervention	11

Source: Field survey, 2014 n = 100

#### **Indigenous Knowledge Systems on Floods**

As reported in Kamara, (2005), the communities in the study area have some indigenous ways by which they are able to predict if there will be floods. Of the 100 respondents interviewed (table 5), 66% indicated that they have good indigenous knowledge systems for predicting floods while 34% said they were not aware of any indigenous knowledge systems.

Those who indicated that they had indigenous knowledge said that nature and intensity of the rains at the beginning of the rainy season could serve as signals for heavy rains with a possibility of floods (14% of the respondents). 12% indicated that the level of water in the river at the beginning of the rainy season can also signal the likelihood of floods, 8% said the peculiar cry of a bird known by the Ewe ethnic group as “Likelike” or “river bird” by the Gonja ethnic group also signals impending floods, 5% said the movement of an army of snails and the direction of movement also signals impending floods. 2% of the respondents indicated that when a python is seen climbing a tree it means there will be flood and so it tries to escape by climbing a tree. Another 2% of the respondents said they consult the gods for information at the beginning of the season on how the weather will be like. These confirm what the literature says on the subject as indicated in Gyampo *et al*, (2009) and UNISDR (2008).

**Table 5: Communities' indigenous systems (signs) for predicting floods**

Sign	Percent
Nature of the rain/ direction and movement of wind	14.0
Level of water in the river	12.0
The peculiar cry of the River Bird (Likelike)	8.0
Movement of a large number of a special kind of snails	5.0
When snake (python) is seen climbing a tree	2.0
Consulting gods / warning from spiritualists	2.0

Source: Field survey, 2014 n = 100

#### **Other Sources of Information on Floods**

The paper explored other sources of information that alerts communities of impending floods besides their indigenous knowledge. It was revealed that they get information on the radio, (80%), TV, (17%), Community Meetings (9%), through Town Criers *i.e.* local information dissemination system (6%) and 14% said they got the information from friends (14%). The radio (FM) and TV stations give the weather forecasts by the Ghana Meteorological Agency (Gmet) as part of the news bulletins, but they added that these are sometimes not very accurate. The challenge in accessing this information through these channels is that most of the communities have` access to electricity and so only few respondents had a television set, and that explains the high percentage of respondents who accessed the information through radio. Gmet admitted during the validation workshop that the points of data collection for analysis for information was previously limited and the equipment they had could only give limited data, but added that they have started expanding the data collection points and are upgrading their equipment to international standards to give multiple indicators and expanding their coverage for better accuracy.

#### **Community Response to Early Warning Signs of Floods**

In disaster management early warning signs are very critical enablers for effective preparation and for building resilience. This paper therefore, did not only explore community response strategies to floods when they occur, but how communities respond to the early warning signs of floods. As can be seen in table 6 below, communities make conscious preparations on getting the alerts. Majority of the respondents (26%) said they usually prepare for temporary relocation on observing the indigenous signs. The other preparedness measures mentioned include; trying to secure their property ahead of the floods (2%), investing less in the farm (2%), planting early in order to harvest before the floods come (2%) and praying to God for guidance (2%). The responses to the scientific and

modern early warning systems like the radio and TV announcements were similar to their response to the indigenous early warning signs. 79% of the respondents said they immediately start preparations for relocation by preparing temporary habitation in nearby higher grounds while waiting for the actual floods to move, 11% said they adopt a wait and see attitude and 7% relocate or move to a higher ground and return when the floods subside and another 7% said in such situations they pray for God's protection that is certainly a sign of helplessness. The 2% and 7% respectively of responses for indigenous and scientific alerts indicating seeking God can be interpreted in two ways, a sign of helplessness and resignation to their fate or shows the religiosity of the communities who believe that everything that happens has a divine purpose and will thus make it easy to appeal to this sense for the responsible use of God's gift of the environment since it has been established that climate change is the result of Mans actions and inaction (Entuonovbe, 2011).

**Table 6: Response to Early Warning Signs of Floods from indigenous and scientific sources**

Response	Indigenous Percent	Scientific Percent
We prepare for relocation in case it happens	26.0	79.0
Adopt a wait and see attitude		11.0
Relocate		7.0
We try to secure our property ahead of the flood	2.0	
Invest less in the farm	2.0	
Plant early in order to harvest before the flood	2.0	
Pray to God for guidance	2.0	7.0

Source: Field survey, 2014 n = 100

Given the frequent nature of floods the Central Gonja District and its attendant effects on the people, the paper sought to explore the willingness of communities to permanently relocate from the flood prone areas. This attracted very interesting responses from the respondents. About 89% of them said they would relocate if they the resources to do so but 11% of them said they would not relocate even if they had the opportunity. *The reason for the latter is that they migrated from their homeland to the area because of the water resource which is a source of livelihood to them as fisher folk. They also said that the lands along the river banks are very fertile for farming, but those on the higher grounds are not so fertile and since they are poor and are unable to buy fertilizers to boost their yields, they would stay close to the river bank so that they can farm.* Even though some of those who said they would consider relocation are migrants, they claimed that they find it difficult to access land due to the cost of land in the area and that is why they continue to live on the flood prone lands. If the lands on the higher ground are made easily accessible, they would relocate.

Since it became clear that relocating the residents is not option at least not in the nearest future, the paper sought to explore other options/strategies to build the resilience of communities against floods and these were the responses obtained. About 55% of the respondents suggested support with building materials that will make their buildings strong to withstand the floods or rebuild their homes after they have been ravaged by the floods, 39% suggested relocation. *This is interesting, but understandable because residents of rural communities see every person who visits their communities to talk about developmental issues as a government or NGO official who can help them deal with their problems and so make demands, instead of doing this on their own.* 17% of respondents asked for training on modern farming and adaptation methods to be able to minimize the effects of the disasters on the farming, 13% asked for training from the National Disaster Management Organization (NADMO) , 11% asked for tree seedlings to plant on their farms and building materials to rebuild their homes after they have been ravaged, 9%, 8% and 7% asked for engine boats to assist in transportation during floods, agricultural inputs and support with flood resistant varieties for their farming respectively. The other interventions as can be seen in table 8 include; training of the youth in construction (18%), capacity building for NADMO (8%), permanent resettlement of affected persons (8%) and support with resistant crop varieties (6%).

**Table 8: Recommended Interventions to boost Community Resilience**

Intervention	Percent
Support with special type of building materials that are resistant to floods	55
Relocation to a new settlement	39
Training on modern ways of farming and adaptation measures	17
Strong capacity for NADMO in order to predict and to respond to disasters	13
Tree plantations	11
Engine boat	9
Agric input support scheme to enable people move away from the flood prone farm lands	8
Support with crop varieties that are flood tolerant and early maturing	7

Source: Field survey, 2014 n = 100

In Ghana, it is a common practice that when disasters such as floods occur, philanthropists and

organizations offer relief assistance. Such assistance serves to bring them relief from the trauma and also to resettle them. The paper therefore, sought to find out from the communities the organizations that usually come to their aid during flood disasters. As can be seen from the table 9 below, the majority of the communities (53%) do not get any support from any such institution or organization. This explains the analysis in table 4 where respondents indicated that they usually relocate temporarily with support from family and friends as in a way to cope with the floods. About 42% said NADMO does come take data on the situation for assistance, but what they get is little. Others such as NGOs, District Assembly, WFP, UNICEF and the Red Cross also assist them in various ways. During the focus group discussions however, it was revealed that much of the aid that comes remain in the towns, e.g Buipe and Yapei, where the disasters do not occur, and does not get to the hinterlands, where the effects are felt most.

**Table 9: Supporting Organizations to Floods Victims**

Organization	Frequency	Percent
None	53	53
NADMO	42	42
NGOs,	18	18
UNICEF	3	3
Government	2	2
WFP	2	2
Red Cross	2	2
Assembly	1	1

Source: Field survey, 2014

n = 100

### **Type of aid offered**

The paper also sought to find out from the respondents the kind of aid offered by the institutions. It was revealed that the aid is usually material and in the form of building materials, bedding, clothing, cooking utensils, food, drugs and drinking water. This carries the message that very little is done by these organizations in terms of capacity building to boost the resilience of communities against future flood disasters.

## **CONCLUSIONS AND RECOMMENDATIONS**

### **Conclusions**

Climate change related disasters such as floods have been a frequent phenomenon in the communities along Black and White Volta Rivers in the Central Gonja district of the Northern region of Ghana in the last two decades rendering them vulnerable to their effects. Farming and fishing as major occupations and source of livelihoods for majority of the people in the area are under serious threat by the flood disasters. Although the people in the area are well aware of the disasters, their resilience to them is low. The paper revealed that communities along the two Volta rivers i.e. the Black and White suffer floods almost every two years and when they do occur, they bring untold hardships on the communities such as loss of domestic properties and farm produce with very minimal support from government and her development partners.

The communities rely on both indigenous and scientific ways to alert them on floods and have used these to adapt to the flood disasters over the years, but the indigenous system have become unreliable due to the changing climatic conditions. Their use is dying out as they are passed down orally from one generation to the other but due to modernity, the oral traditions are becoming less useful. The scientific systems of disaster alert are not very accurate due to obsolete equipment, whose data are unable to give accurate predictions.

### **Recommendation**

In order to boost the resilience of communities along the two Volta Rivers in the Central Gonja District to effectively address the impacts of climate change vis-à-vis floods this paper recommends the development and implementation of a district wide climate change action plan, training and capacity building for the district directorate of NADMO to effectively respond to disasters, mounting of programmes to restore confidence in the indigenous knowledge systems as viable alternatives in complementing the scientific alert systems for disaster preparedness and resilience, the rolling out interventions such as alternative livelihoods schemes and input support to entice the communities relocate from the current live threatening settlements they live in, Skills training for the youth of the area in climate resilient building and construction technologies and training farmers on and supporting them with climate resilient crop varieties and farming methods.

## **ACKNOWLEDGEMENT**

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