

*Full Length Research Paper*

# Effects of flood disaster on rural livelihood and coping mechanism in Lau Local Government Area, Taraba State, Nigeria

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## Abstract

Lau is one of the Local Government Area (LGA) in Taraba State that is located along the bank of River Benue. This makes it vulnerable to annual flood. This study appraised the effects of flood on the livelihood of the rural dwellers and the coping mechanism to flood effects in the area. Five wards were purposefully selected (Lau 1, Kunini, Donadda, Garin Dogo, and Jimlari) from 10 wards in the LGA because of their vulnerability to flood in the area. Field observation, interviews and questionnaires were used to elicit information from the respondents. 110 questionnaires were administered in the area. 22 respondents were randomly selected from each sampled ward. Data obtained were analyzed using descriptive statistic. The finding of the study reveals that the low lying nature of the area and proximity to the river bank makes it vulnerable to seasonal flood. Some of the floods particularly the 2012 floods have been very devastating. These resulted in loss of crops and livestock which is the main source of livelihood of the people. The findings show that although the people have not recovered from the effects of past floods, they have become resilient to the flood hazard. Some of the coping mechanism includes; relocation from the flood plain, reconstruction of houses with reinforced materials (that is with bricks and blocks as against the predominant mud/thatch houses), raising of houses above annual flood levels, erection of temporary houses along river banks, creation of water channels for easy evacuation of floods, frequent dredging of drainage outlets, construction of dykes using sand bags and fumigation of stagnant flood water against mosquito parasites. The study recommends public enlightenment campaign, early warning system especially before release of water from Lagdo dam upstream in Republic of Cameroon, development of safety nets among others.

**Keywords:** Coping mechanism, Flood disaster, Lau, Rural Livelihood, Taraba State

## Introduction

Flood hazards are the most common and destructive of all natural disasters. Floods are defined as extremely high flows of river, whereby water inundates flood plains or terrains outside the river channel (Mwape, 2009). Floods occur when water particularly from rainfalls accumulates across an impermeable surface and cannot rapidly dissipate or evaporate (Efobi and Anierobi, 2013). Each year, flood disasters cause tremendous losses and social disruption worldwide (Vanneuville *et al.*, 2011 as cited in Oruonye, 2012b). When severe floods occur in areas occupied by humans, they can create natural disasters which involve the loss of human life and property as well as great disruption to day to day

socio-economic activities of large urban and rural communities (Smith and Ward, 1998).

The frequency of natural disasters especially those resulting from flood has been increasing over the years, resulting in loss of lives, damage to properties and destruction of the environment (Living with Risk, 2000). The rural dwellers are most affected by flood disaster because of their poor living condition.

Flood has been reported as one of the most frequent and devastating natural disasters that affect people and their livelihoods in Taraba State. The state has witnessed many devastating flood incidences since the beginning of the 21<sup>st</sup> century (Oruonye and Adebayo, 2013). Several parts of the state have experienced different degrees of flooding in the past which destroyed

people's houses and livelihoods. In 2011, flood destroyed over 2,068 farms, 363 houses and partially affected 1,562 houses in the state (Oruonye, 2012a). Over 6,213 persons were internally displaced and 1,420 families affected by the flood in 4 LGAs, Jalingo, Lau, Ardo Kola and Yorro (Timothy, 2011).

Lau Local Government Area (LGA) is one of the most affected by flood in the state. Flood is localized in the study area which consists mostly of informal settlements because of their close proximity to River Benue and low lying nature of the topography in the area. In 2012 flood affected 26 villages, 13,313 persons and displaced 2,332 persons who were camped in 4 internally displaced persons (IDPs) camps in the LGA (Oruonye and Adebayo, 2013). Also the 2012 flood results in the loss of 7 human lives, death of 280 livestock, destruction of 10,600ha of farmlands and 3,185 houses in the LGA (Oruonye and Adebayo, 2013). For several decades, there have been reported cases of flood in the area. However, the flood in recent times has taking different dimension as a result of frequent release of large volume of water from the Lagdo dam upstream in the Republic of Cameroun. This often results in unprecedented damage to the local economy and livelihoods as water submerge the surrounding communities and farmlands. This often led to evacuation and relocation of the people for several days or weeks depending on the magnitude. This has made livelihood sustainability difficult for the people. Although many studies have been carried out on flood in different parts of the state, not much has been done on the rural people's resilience and coping strategies to the effects of flood in the study area. This study attempts to fill this knowledge gap. The study therefore, intends to contribute to existing knowledge on impact of flooding and the coping mechanism of the local community in the study area being a flood prone river bank settlement.

## Description of Study area

Lau LGA is located between latitude 8°56'N to 9°40'N and longitude 11°15'E to 11°40'E. Lau LGA is bounded to the northeast by Demsa LGA of Adamawa state, to the north and west by Karim Lamido LGA, and to the south by Ardo Kola, Jalingo and Yorro LGAs (Fig. 1). Lau is a lowland area located on the flood plains of the River Benue. It is drained by river Mayodunga and several others which empty into river Benue. Most of the tributary rivers are silted. Sand deposits have almost leveled the river valleys in most places. Lau LGA has a tropical continental climate and Sudan savanna type vegetation which consists of grasses and scattered tall trees. The dominant vegetation consists of acacia plants and a type of palm called *giginya* in Hausa language. The palm is seen dotting the landscape on the flood plain of River Benue. The soil consists of alluvial soil rich in alluvial deposits and mostly of clay loamy soil and sandy loamy in some places. Lau is a river port along River Benue. Important ethnic groups in the LGA include the Yandang, Jenjo, Mumuye, Lauhabe, Kunini, Bandawa and Hausa-Fulani. Important cultural festival includes the Yandang annual cultural festival. Settlements in the area are highly dispersed. The compounds are fenced with live plants called *aduruku* in local language (Oruonye and Abbas, 2011). Most houses consist of round hut with conical roof of grass mating.

Politically, the LGA is divided into 10 wards, namely; Lau A, Lau 'B', Kunini, Garin Dogo, Abari 'A', Abari 'B' (Tana Baba), 'Yussa B' (Garin Magaji), Misheli (Mayo Lope), Donada, Appawa – Jimlari ward. Most of the people in the study area are farmers, fishermen and cattle rearers. Other economic activities include petty trading, water transport and working on rice mills. Important food crops produced in the area are rice, sugarcane, yam, maize and guinea corn.

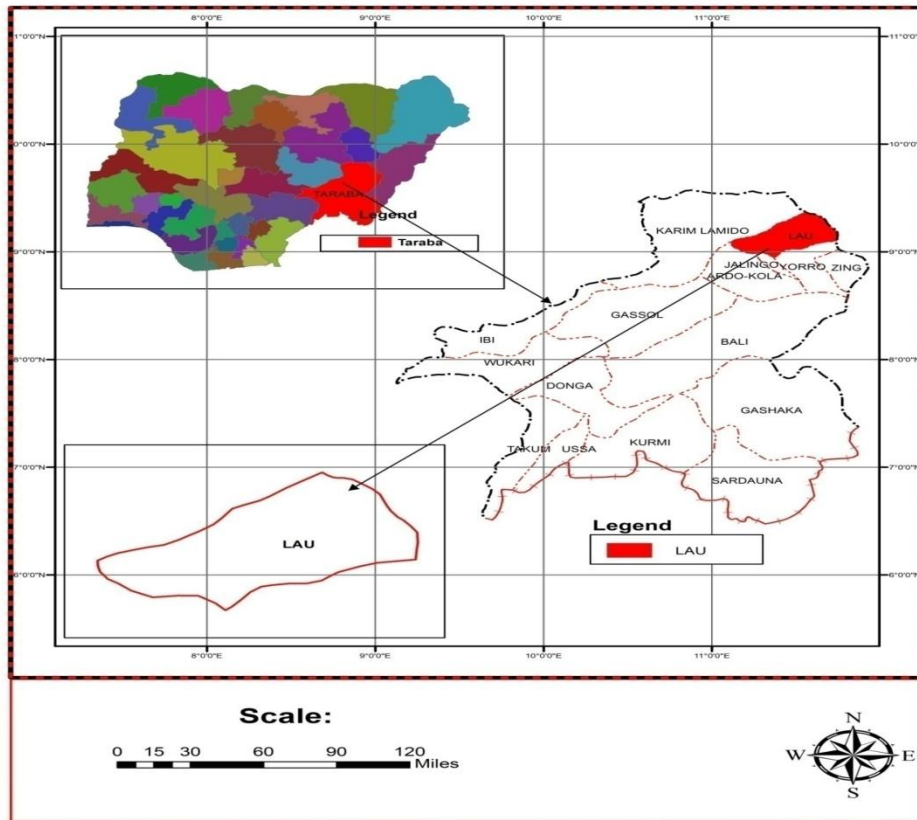


Fig. 1: Location Map Lau

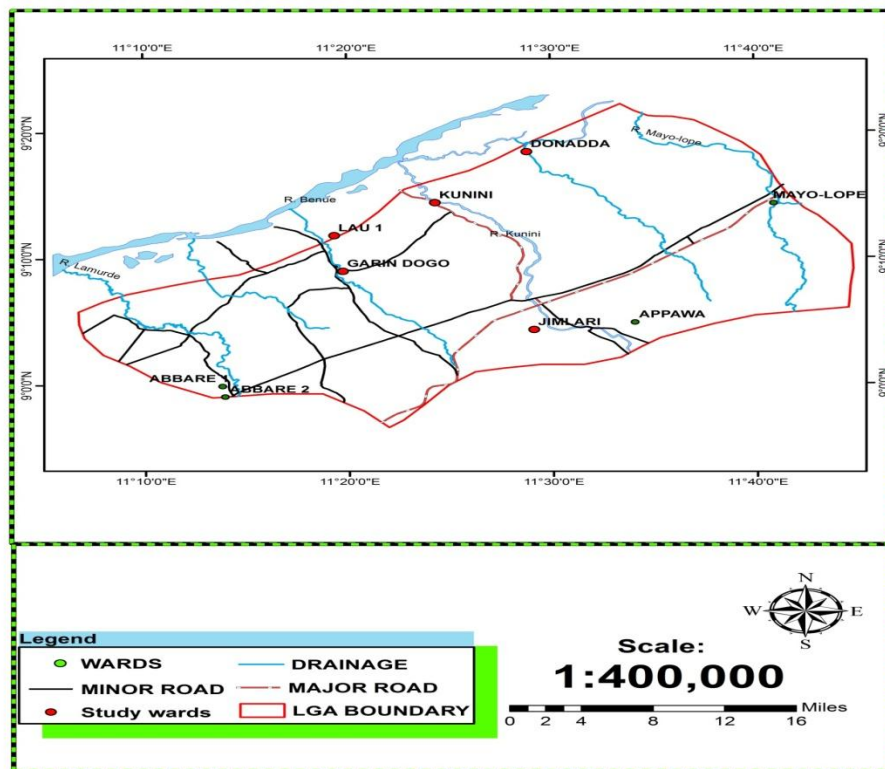


Fig. 2: Map of Lau Local Government Area (Study area)

## Methods

The study employed a descriptive research design to appraise the impact of flood and coping mechanism in Lau LGA. Both primary and secondary data sources were used. Primary data was obtained from household survey, interviews and field observation. Secondary data

was obtained through desktop review of available relevant literature and information from relevant government agencies and establishments in the state.

Structured questionnaires were designed with open and close ended questions. The questionnaire was administered to 110 respondents in the study area. 5 wards were purposively selected from the 10 political

wards in the study area because of their high vulnerability to flood. The five selected wards are: Lau 1, Kunini, Donadda, Jimlari and Garin Dogo. In each of the ward, 21 respondents were randomly selected. Oral interviews were conducted and photographs taken to compliment the data generated. Special attention was paid to submerged farm lands, destroyed houses, food stuff, and the coping mechanisms in place in the study area. This aided the assessment of flood effects on the lives and livelihoods of the people in the study area. The data obtained was analyzed using descriptive statistics such as percentages, frequency distribution tables.

The study is limited to Lau LGA and does not include other settlements or LGA along the river banks of River Benue that also suffers from periodic flooding. The study is also limited to the impacts of flood and the coping mechanism employed by households in the study area. The instruments used which is questionnaire, despite its usefulness in generating required information, limited the diversity of narratives about the people's perceptions and experiences with flood hazards in the study area. Experience has shown that perception data often times do not agree with official data from statutory organizations. This therefore constitutes a limitation to the study.

## **Result**

### **Demographic characteristics of the Respondents**

The demographic characteristics of the respondents reveal that 66% of the respondents are male while 34% are female (Table 1). In terms of age of the respondents, 21% are between the ages of 20-29years, 44% between 30-39years, 11% between 40-49years, and 24% are 50 years and above. This implies that the respondents are matured and can give details of the flood event in the area. The Table also shows that 39% of the respondents are married, 33% single, 17% divorced/separated and 11% are widow/widower. Table 1 shows that 45% of the respondents engage in crop farming, 25% engage in fishing, 10% are involved in petty trade, 12% are civil servants and 8% are students. This show that crop farming and fishing activities are the major sources of livelihood of the rural dwellers in the study area. The Table also shows that 21% of the respondents have primary school certificate, 28% have Senior Secondary Certificate of Education, 17% OND/NCE, 9% have First Degree/HND, while 25% have no formal education. This shows that many people in the study area can at least read and write. This by implication means that they can at least understand some of the early warning signs and mitigative measures occasionally communicated through the mass media.

**Table 1: Demographic Characteristics of Respondents**

<b>Sex</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Male	73	66
Female	37	34
Total	110	100
<b>Age</b>		
20-29	23	21
30-39	48	44
40-49	12	11
50-above	27	24
Total	110	100
<b>Marital Status</b>		
Single	36	33
Married	43	39
Separated/Divorced	19	17
Widow/Widower	12	11
Total	110	100
<b>Occupation</b>		
Farming	49	45
Fishing	27	25
Business Man/Woman	12	10
Civil servant	13	12
Student	9	8
Total	110	100
<b>Educational Qualification</b>		
First School Leaving Certificate	23	21
SSCE	31	28
OND/NCE	19	17
First Degree/HND	10	9
No Formal Education.	27	25
Total	110	100

Source: Field Survey, 2016

**Duration of Stay in the Area****Table 2: Duration of Stay in the Area**

<b>S/N</b>	<b>Duration</b>	<b>Frequency</b>	<b>Percentage (%)</b>
1	6months-1year	9	8
2	2years-4years	10	9
3	5years-8years	32	29
4	9years-above	59	54
5	Total	110	100

Source: Field Survey, 2016

Table 2 reveals that 54% of the respondents have lived in their immediate environment for a long period of time (above 9 years), while 29% have lived between 5-8years. Only 8% of the respondents claimed that they have lived in the area between 6months and 1 year, and

9% 2-4years. This is important because it shows that the respondents have experienced different incidence of flood event in the area and have learned to adapt to the hazards posed by flood to their livelihoods.

## Frequency of Flood Incidence

**Table 3:** Frequency of Flood Incidence

S/N	Frequency of flood incidence	Frequency	Percentage (%)
1	1-5years	71	65
2	6-10years	22	20
3	11-15years	17	15
4	Total	110	100

Source: Field Survey, 2016

When the respondents were asked about the frequency of flood incidence in their area, 65% said they have had repeated incidence of flood between 1-5years, 20% have had repeated flood incidence between 6-10years and 15% between 11-15years. This shows that majority of the respondents have had repeated experience of flood incidence in the area. Many of them have good

account of their experience of flood disaster in the area and the coping measures they adopted. Flood occurs almost every year according to some of the respondents, particularly those living on the bank of River Benue but the major flood disaster which caused severe damages in the area are those of 1988, 1994 and 2012.

## Perceived Causes of Flood in the Area

**Table 4:** Perceived Causes of Flood in the Area

S/N	Perceived Causes of Flood in the Area	Frequency	Percentage (%)
1	Heavy Rainfall	27	24.5
2	Release of water from upstream dam	25	22.7
3	Overflow of River Benue	20	18.2
4	Poor drainage system	15	13.6
5	An act of God	23	21.0
6	Total	110	100

Source: Field Survey, 2016

The respondents were asked if they know the causes of flood in the study area, their responses are presented in Table 5. The Table shows that 24.5% of the respondents claimed that heavy rainfall is the cause of flood, 22.7% claimed that the release of water from dam upstream in the Republic of Cameroon was the major cause of flooding in the area. The Table also shows that

18% of the respondents claimed that overflow of River Benue is responsible for the flood, 14% attribute flood to poor drainage system in the area and 21% believed that flood is an act of God. Field observation shows that the nature of the topography in the area which is lowland and the proximity of the study area to River Benue make it vulnerable to flood disaster.

## Effects of Flood to Rural Communities in the Study area

**Table 5:** Effects of Flood

S/N	Effects of Flood	Frequency	Percentage (%)
1	Farmlands	69	63
2	Houses	10	9
3	Livestock	14	13
4	Furniture/other utensils	12	11
5	Loss of lives	5	4
6	Total	110	100

Source: Field Survey, 2016

The effects of flood in the study area are mostly in terms of losses suffered by the rural dwellers and the destructions to lives and properties. 63% of the respondents claimed they lose their farmlands, 9% loss their houses to flood (Table 4), 13% loss their livestock, 11% loss their furniture/other utensils and 4% claimed to have loss the lives of family members. Many respondents claimed to have lost more than a single property mentioned in Table 5. The results of the study show that flood destroy farmlands, cause erosion, pollute water bodies in the study area and create breeding grounds for insects and pest. The results show that destruction of farmlands by floods was ranked

highest (39%) by the respondents followed by soil erosion (25%) and inundation of some areas (12%) in that order.

13% of the respondents claimed that they lost their livestock to flood in the area. These livestock usually acts as their safety net that they always fall back to in times of financial difficulty. For other respondents, the flood caused disruption in their day to day business activities and by extension their overall income. There was also lost of foodstuff and food reserves.

Other respondents claimed that beyond the damages, the flood had positive effects. These positive effects include enriching the soil and providing both

water and livelihood opportunity for the fishermen. The higher the flood waters from the river, the better the harvest for the year according to some respondents. This agrees with an earlier study by (Efobi and Anierobi, 2013) that despite the wide-spread devastating impacts

of flood, rural dwellers attested to its benefits, particularly in the areas of abundant harvest of fishes, consumable delicacies, sea and wild animals that were traded for financial gains.



**Plate 1:** Submerged house during 2012 flood and a cracked house in Kunini



**Plate 2:** A cracked house and a collapsed house caused by flood in Lau 1



**Plate 3:** Erosion in Lau 1 ward caused by flood



**Plate 4:** Erosion gullies in Jimlari ward

### Coping Mechanism to Flood Disaster in the Study area

Coping has been described as expending conscious effort to solve personal and interpersonal problems, and seeking to master, minimize or tolerate stress or conflict (Weiten and Lloyd, 2008). By this description, all unconscious or non conscious strategies (e.g., defense mechanisms) are generally excluded. After several incidence of flood disaster in the study area, the local communities have developed resilience to the problem

by adapting different coping mechanism as presented in Table 6. Based on the information deduced from the response of the respondents in Table 6, the people adopted the problem-focused (adaptive behavioural) mechanism in dealing with the problem of flood in the study area. This problem focused coping mechanism has been described by Opondo (2013) as a strategy of finding out information on the problem and learning new skills to manage the problem. Problem-focused coping mechanism is aimed at changing or eliminating the source of the stress (Opondo, 2013).

**Table 6:** Coping Mechanism to Flood Disaster in the study area

S/N	Adaptive Strategies to cope with flood	Frequency	Percentage (%)
1	Reconstruction of houses with reinforced material	13	12
2	Building of dikes in front of house using sand bags	15	14
3	Evacuating the Family to safer place.	39	35
4	Creating of water channels	30	27
5	Frequent removal of sand blocked drainages	10	9
6	Fumigation of stagnant flood water	3	3
7	Total	110	100

Source: Field Survey, 2016

The Table shows that 35% of the respondents evacuate their families to safer place as a form of coping mechanism to flood disaster in the area. 27% of the respondents create water channels (Plate 7&8), 14% build dykes in front of their houses using sand bags (Plate 5), 12% reconstruct their houses with reinforced materials among others. Other people in the study area construct temporary shelters (Plate 6) to enable them carry out their livelihood activities and once the rainy season comes, they relocate to higher grounds. 9% of the respondents engaged in frequent removal of sand

blocked drainages and 3% fumigate stagnant water in their surroundings to help them cope with the challenges of flood in the area. Some of the respondents claimed to have gotten used to the flood incidence and as such are not willing to relocate to higher grounds. Some of the community members have 2 houses, one on the higher ground and the other on the flood plain (Plate 6). Many of them are attached to their ancestral lands and depend so much on the local natural resources such as fish from River Benue and fertile flood plains for farming activities.





**Plate 5:** Dikes created by individual effort



**Plate 6:** Temporary shelter in the study area



**Plate 7:** Water channels created by the people for flood water to flow into the River Benue in Lau 1 ward



**Plate 8:** Water channels created by the people for flood water to flow in Kunini ward

### Factors Influencing the Choice of Coping Mechanism

**Table 7:** Factors Influencing the Choice of Coping Mechanism

S/N	Factors that influenced the choice	Frequency	Percentage (%)
1	The geographic location	69	63
2	Household size	15	13
3	Occupation	13	12
4	Status of property	13	12
5	Total	110	100

Source: Field Survey, 2016

The study sought to know the factors influencing the choice of coping mechanism adopted by the rural dwellers in the study area. The responses of the respondents are presented in Table 7. From Table 7, 63% of the respondents claimed that the geographic location influenced their choice of coping mechanism adapted, 13% by the size of household, 12% by their

occupation and the status of their property respectively. The respondents claimed that their choice of coping mechanism helps them minimize potential loss and damages from flood incidence and adapt to the problems caused by the flood. This has helped them continue living in the environment despite impending dangers and vulnerability in the area.

### Government Response to Flood Disaster in the study area

**Table 8:** Government Response to Flood

S/N	Government Response to flood	Frequency	Percentage (%)
1	An early warning sign	55	50
2	Construction of drainages	7	6
3	Provision of aid and relief materials	15	14
4	Build dikes	11	10
5	Removal of sand from blocked drainages	22	20
6	Total	110	100

Source: Field Survey, 2016.

The Local Government Authority (LGA) has over the years responded to the challenges of flood disaster in the area as presented in Table 8. From the Table, 50% of the respondents claimed that the LGA has responded by issuing early warning signs to the local communities through announcements from media houses such as

radio, telephone calls and SMS from families/relative and verbal interactions from one person to another. 20% of the respondents also claimed that the LGA has helped in the removal of sand from blocked drainages in the area, 10% in building dykes and 14% provision of aid and relief materials.

## Level of Preparedness of Households for Future Flood Event

**Table 9:** Level of Preparedness of Households for Future Flood Event

S/N	Level of preparedness	Frequency	Percentage (%)
1	Well prepared	43	39
2	Not prepared	51	46
3	Undecided	16	15
4	Total	110	100

Source: Field Survey, 2016

The study attempted to find out the level of preparedness of the rural households to future flood event in the area. The response is presented in Table 9. The results in Table 9 shows that 46% of the respondents are not prepared for future flood event in the area. This is because despite been affected by flood in the area, the people claimed that they have no alternative because it is their home and they have been living there for several years. 39% of the respondents claimed that they are well prepared for future flood event because the past flood events has caused great havoc to them and they wouldn't like such an events to cause any damage to them. These preparations include relocating away from the flood affected site. 15% of the respondents claimed that they are undecided. These groups of respondents claimed to like their environment and are used to the flooding. They are also avoiding the cost and inconveniency of relocation. Some of them have not been affected by flood in the area.

### Discussion

The study area consists of poor rural households living mostly in informal settlements on the flood prone areas along the banks of River Benue. The area experienced periodic floods annually resulting from heavy rainfall during the rainy season and release of water from Lagdo dam located upstream in the Republic of Cameroon. This periodic flood has made life miserable and causes severe loss of life, property and crops to the rural communities in the study area. The repeated incidence of flooding in the area has forced the local communities to adopt various coping mechanisms to survive.

The coping mechanism mostly employed by the rural dwellers is concerned mainly with finding shelter and having access to food. This is especially when the flood destroyed or damaged their houses or when their farmlands or stored food are washed away. Although the respondents admit receiving emergency aids and assistance from government and non-governmental organizations, experience has shown that emergency assistance are usually inadequate and insufficient. To cushion the impact of flood disaster in the area, households had to rely on support from family members and relations. This support includes monetary and material support in form of food stuffs. The findings of the study show that the coping mechanisms adopted by households in the study area were not effective in averting loss and damage especially in future event. The coping mechanisms were mainly temporal palliative measures to cushion the pains. Other coping mechanism reported in similar studies carried out in Kenya included seeking support from organizations, temporary relocation, reduction of expenditure on

household necessities, engagement in extra income-generating activities, sale of property, reliance on social networks, and modification of food consumption pattern (Opondo, 2013).

Although some of these coping mechanisms may be successful in the short term, they could have severe implications at the long run in terms of achieving livelihood sustainability in the area. This may be obvious when people are unable to recover from impacts of flood disaster. Opondo (2013) opined that the loss and damages that could result from inadequate and unsustainable coping mechanisms to flood disaster will eventually drag rural communities into an ever-more vicious cycle of poverty.

### Conclusion

This study has examined the effects of flood disaster on rural livelihood and coping mechanism in the study area. It is clear from the study that floods have had adverse impact on the socio-economic status and livelihoods of the people of Lau Local Government Area. Flooding affects more people on an annual basis than any other form of natural disaster in the study area. Its frequency and intensity is on the increase every year. In terms of livelihood, the study discovered that the flood incident has seriously devastated the economy of the rural community especially farming which is the major source of livelihood of the people. Farmlands were submerged and agricultural produce were destroyed. It has also affected the environment by causing serious gully erosion. However, the rural dwellers have devised means to cope with the disaster which include: relocation out of the flood plain, reconstruction of houses with reinforced materials, raising of houses above flood plains, creation of water channels for flood water evacuation, frequent removal of sand from blocked drainages, building of dikes using sand bags and fumigation of stagnant flood water. Unfortunately, these coping mechanisms are not sustainable in the long run.

### Recommendations

Based on the findings of the study, the following measures are suggested;

- i. There is need for repair and construction of new drainages and construction of flood diversion channels which involves the construction of artificial channels along main river channels to evacuate excess water during floods.
- ii. Governmental and Non-Governmental organizations to assist in enlightenment

- campaign and dissemination of early warning to the local communities.
- iii. Adequate medical facilities should be provided for the treatment of various environmental diseases resulting from flood.
  - iv. The construction of houses using durable materials for the flood victims and away from the flood prone areas should be considered. Community based coping strategies should be incorporated for strengthening the mitigation measures.
  - v. Relocation to a higher ground is a necessary condition. Also, there should be a deliberate policy to compel communities especially in rural areas to build house using durable materials and away from the flood prone areas.

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