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Livelihood assets and socio-economic characteristics of communities to flood hazards in Central Niger Delta, Nigeria

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Abstract

The study examined the livelihood assets and socio-economic characteristics of communities to flood hazards In Niger Delta, Nigeria. The population of the study consists of communities impacted by flood within the Niger Delta States. Purposive and random sampling methods were adopted in selecting the sample size of the respondents for this study as three of those most vulnerable Local Government Areas are selected. A self-designed instruments titled "Livelihood Assets and Socio-economic Characteristics of Communities" were used for data collection. Face and content validities of the instruments were ensured. Its instrument consists of 10-item while grand mean statistics was used to test the null hypotheses at 0.05 level of significance. The study found among others that considering the various factors that may have contributed to flooding residents' strategy to mitigate and survive its effects are imminent. Actions to control and/or cope with the factors that are mainly responsible for flooding in the study area are more than necessary in order to save human lives and forestall loss of properties to flood ravage. Based on the findings, the study recommended that massive campaign against improper dumping of refuse and public awareness of flood risks should be highlighted; creation of awareness among people living in disaster-prone areas of the risk they face and how best to respond when it occurs can be done to enhance local people's confidence and empower them to act when faced with danger and there should be policies that target the marginalized in society, such as women, children, elderly, or the poor otherwise these groups will remain most vulnerable.

Keywords: Livelihood; Socio-economic; Flood hazards; Central Niger Delta; Nigeria

1. Introduction

Flood is considered to be one of the most devastating and frequently occurring natural hazards in the world. Impacts of flood disaster on the society and its effect on sustainable development are overwhelming in recent years. The increasing climate change, accompanied with excessive rainfalls and its devastating consequences remain indelible in the lives of many people and the environment [1]. Over the years and in almost every part of the world, excessive rainfall due to climate change have resulted in flooding, which has claimed lives and properties. These unpalatable experiences have placed many countries, on hold in their struggle for development. As the world's population increase at an alarming rate with increase in infrastructural development on the rise, more lives and properties are becoming vulnerable to the risk of flood hazards whenever extreme events occur [2], [3]. The devastating effects are recorded in terms of mortality and economic risk by both national and international agencies. Although research claims that the mortality rate is reducing globally due to the established early warning systems in some countries (mostly the developed), but in some localities, especially in the developing and under developed countries, those living in the coastal areas, increasing deaths are witnessed because of their level of exposures and vulnerability.

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The severity with which flood disasters occur is on the increase in many regions of the world. Nigeria is no exception as in 2012, it experienced an unprecedented flood disaster that affected half of the 36 states including Rivers State, with 21 million people displaced; 597,476 houses destroyed or damaged; over 363 people killed and an estimated loss of USD 19.6 billion [4]

It has also been predicted that 70% of Nigeria's 36 states are at risk from flooding in 2013 [1]. Consequently, there has been an increase in recognition by both governments and multilateral agencies of the need to mainstream flood risk reduction into development plans. Nigeria's (2003) agenda 21 document spelt out objectives to combat floods which include providing a master plan for flood control and relief measures for victims; mitigate floods through the relevant land use laws and edicts; improve institutional capacity for flood prediction and public awareness programmes and minimize the impact of floods through the provision and maintenance of appropriate infrastructure.

However, governments in Nigeria have consistently failed to systematically treat risk reduction from floods as an integrated, cross-sectoral objective. Instead, they have dealt with flood risk primarily within the very narrow framework of flood control, improved preparedness, relief and rehabilitation and preparedness capabilities and expose support to affected groups, consequently, flood hazards continue to cause great damage to infrastructure and loss of life. Furthermore, although international databases on disasters such as the database of the Centre for Research on Epidemiology of Disasters (CRED), exist, their application for vulnerability measurement is limited by the fact that the data does not give sufficient information to assess the various vulnerabilities at different spatial levels and units and also the fact that reported damages predominantly focus on direct costs and losses, often excluding indirect losses such as the long-term socio-economic impacts of a disaster [5]. Additionally, the different definitions of the categories used in these statistics, such as "affected" or "injury" are a complication when trying to make comparisons and analysis [6]. Moreover, although government disaster managers are generally aware of the propensity of many flood disaster scenarios in Rivers state and indeed Nigeria, the fact that their occurrence and consequences are often sudden, random and not well predicted creates difficulty in getting the appropriate response. This makes analysis of the vulnerability at local level necessary in order to identify weak points needing special attention during disaster situations.

Accordingly, livelihood resilience as the building block of this study is conceptualized as "the capacity of all people across generations to sustain and improve their livelihood opportunities and well-being despite environmental, economic, social, and political disturbances" [7]. Livelihood assets refer to the resource base of people. Assets are often represented as a pentagon in the Sustainable Livelihoods Framework, consisting of the following five categories: natural resources (also called 'natural capital'), physical reproducible goods ('physical capital'), monetary resources ('financial capital'), manpower with different skills ('human capital'), social networks of various kinds ('social capital') [8]. These various categories cover the following types of issues and details according [9], [10] and [11].

1.1. Human capital

Labour capacity, health and nutritional status, employable skills and knowledge; education; employable skills; and local employment opportunities.

1.2. Natural capital

Access to land, water, wildlife, flora, forest; access to common property resources (e.g. rangelands, places of worships, water reservoirs/ponds); access to agricultural inputs (e.g. seed, fertilizers, insecticides); access to irrigation infrastructure; livestock holding; and crops (staples, cash, vegetables, fruits).

1.3. Social capital

Refers to those stocks of social trust/status, social organizations; norms and networks that people and links with family and friends; and confidence.

1.4. Physical capital

Houses, vehicles, equipment/ mechanical infrastructure, livestock; water supply; housing; communications, roads, bridges and access to markets

1.4.1. Financial capital

Wages; individual or communal savings, gold/jewellery, access to regular income, net access to credit, insurance, and indebtedness

A close examination of the global disaster databases from EM-DAT for the last three decades (1982-2012) revealed that climatic events (flood, storms, extreme temperature and droughts) accounts for about 69% of total economic losses globally with flood events causing 25% of all the total losses [12]. United Nation reports a 35% increase in flood economic risks, driven by the increasing people's exposure and economic assets experienced in the last decades [12]. In Nigeria, flood accounts for the highest occurring natural hazards, with great consequences on the life and property [13]. Despite the almost yearly occurrence of flood hazards and the huge risks associated with them, it appears not much works have been done presently on livelihood, resilience and capacity assessment of communities. The present study examined the livelihood assets and socio-economic communities to flood hazards in Niger Delta regions, Nigeria.

2. Material and methods

The study made use of both primary and secondary sources of data. The primary data sources consist of field data collection and questionnaire administration, which was used to collect the required information from the respondents while the secondary data sources were books, both published and unpublished materials.

2.1. Research Methodology

Two hundred and seventy (270) respondents were selected from each state (i.e., thirty (30) from each zone and ninety (90) from each LGA) and interviewed in face-to-face interaction during a four-week period. The data for this study were collected through a questionnaire survey of household heads, key informant interviews and a focus discussion with selected representatives of various neighbourhoods. The questionnaire explores household characteristics before and after the flood disaster and their different coping mechanisms. To determine the strength of resilience of the zones, the coping strategy with the highest score at the household level was summed up and then divided by the total number of indicated coping measures in each zone to obtain an index of the relative strength of coping measures at each zone.

Table 1 Study Location from LGA and Corresponding Communities used for the study

State	LGA	Zone 1	Zone 2	Zone 3
Bayelsa State	Sagbama	Adagbabiri, Elemebiri and Asamabiri	Ekperiware, Igoni and Anibeze	Agbere, ofoni and Agoro
	Yenagoae	Tombia, Agudama-Epie and Igbogene	Opolo, Azikoro and Agbia	Amarata, Biogbolo and Kpansia
	Ogbia	Ayama, Otuobhi and Emadike	Ologoghe, Epebu and Imiringi	Opume, Olobiri and Sagatama
Delta State	Patani	Abare, Torou-Angiama and Aven	Koloware, Ogor and Adobor	Odorubu, Ebresegha and Amatebe
	Isoko South	Akemu-Asarueha, Ivrogbor-Irri and Uzere	Araya, Odabor and Umeh	Ozoro, Emede and Ikpide-Irri
	Ndokwa East	Iyede-Ame, Onogbokor and Ibrede	Iselegu, Ashaka and Ossisa	Abala, Utchi and Aboh
Rivers State	Ahoada East	Ubie, Ikodu and Olokuma	Ubeta, Ula-Ubie and Ebriba	Ubtama, Owubo and Odiku
	Ahoada West	Akinima, Udoda and Igovia	Mbiama, Okarki town and Isusu	Oshiebele, Oshi and Odiereke-Ubie
	Ogba/Egbema/Ndoni	Ndoni, Ase-Azaga and Isukwa	Ugbaja, Akabuka and Obrikom	Erema, Ebocha and Obagi

A risk index was calculated with the calculated coping strength of the zones and hazard occurrences using the UNDP (1992) formula:

Vulnerability = hazards/coping strategies

Summation of weighted value (SWV) = Ranked rated value

Causes of flood index (CFI), Effectiveness of flood index (EFI) and severity of the effect of flood disaster index (SFI). To calculate the causes of flood index (CFI, EFI and SFI) we divided the Summation of weighted value (SWV) by the sum total.

3. Results and Findings

As presented in table 2, 34.5% of the respondents were males and 65.5% were Females. This study showed that the populations of the affected respondents are predominated by the females in the study area. With regards to education, research however indicated that secondary education was predominate with a frequency of 307 (39.1%), primary 284 (36.1%), tertiary 103 (13.1%) and none formal education as 92 (11.7%). Age variation of respondents as shown in the study includes 16-30, 31-45, 46-60 and >60 age bracket has a corresponding 18.7%, 30.9%, 39.7% and 10.7% respectively. The study indicates a simple majority for age bracket of 46-60 as 39.7%. Occupation of respondents shown in a descending order thus: farmers 47.3%, trading/business 24.4%, civil servant 17.9%, self-employed 8.8% and others 1.5%. Study area indicated that vast respondents are farmers and trader/business related persons. Of these said population over 578 (73.5%) are house owners while only 208 (26.5) are tenants. However, study revealed that squatters were absent. Study reveals the monthly income of the respondents in the study area whereby it is shown that 32.7% of respondents obtained between #10,000 and #30,000, 26.0% and 24.6% for #30,000-#50,000 and #50,000-#70,000 respectively. Well over 598 (76.1%) of the respondents are above four (4) person per family size. However, just two (2) persons 0.3%, three (3) persons 5.0% and four (4) persons 18.7%.

Table 2 Household characteristics of Respondents

Characteristics	Group	No. of respondents	Percentage
Sex	Male	271	34.5
	Female	515	65.5
Education	None	92	11.7
	Primary	284	36.1
	Secondary	307	39.1
	Tertiary	103	13.1
Age of Household Heads	16 – 30	147	18.7
	31 – 45	243	30.9
	46 – 60	312	39.7
	>60	84	10.7
Occupation of Household	Civil servant	141	17.9
	Trader/Business	192	24.4
	Farmer	372	47.3
	Self Employed	69	8.8
	Others	12	1.5
House Owners Status	Owner	578	73.5
	Rented	208	26.5
	Squatter	0	0
Monthly Income of Household Head	10,000 – 30,000	257	32.7
	30,000 – 50,000	204	26.0
	50,000 – 70,000	193	24.6

	>70,000	132	16.8
Family size	Only 2 Persons	2	0.3
	3 Persons	39	5.0
	4 Persons	147	18.7
	>4	598	76.1
	Total		

3.1. Identification of the Population of the Vulnerable Groups with respect to Socio-economic Characteristics

Considering the various factors that may have contributed to flooding as shown in table 3, it can be inferred that the respondents' perception on causes of vulnerabilities in the study area with the highest mean of 3.4 is nearness to river and while the least of 2.3 is poor housing structure. However, the average mean for the causes of vulnerability to flood hazards is 3.02. Causes of vulnerability with mean above the average mean value include nearness to river, land elevation, frequency of flood, flood height, access to hazard information and high rainfall. However, factors higher than the criterion of 2.5 where accepted while those below where rejected.

Table 3 Respondents' perception on causes of vulnerability to flood

	Level of Vulnerabilities	SA	A	D	SD	Total	SWV	Mean	Remarks	Rank	x-x⁻	(x-x⁻)²
		4	3	2	1							
1	Poor Drainage system	804	882	224	179	786	2089	2.7	Accept	9th	-0.32	0.1024
2	Inadequate Refuse dumping	856	666	516	92	786	2130	2.7	Accept	8th	-0.32	0.1024
3	High Rainfall	1192	822	396	16	786	2426	3.1	Accept	6th	0.08	0.0064
4	Nearness to River	1728	723	168	29	786	2648	3.4	Accept	1st	0.38	0.1444
5	Frequency of Flood	1636	849	136	8	786	2629	3.3	Accept	3rd	0.28	0.0784
6	Access to hazard information	1096	976	372	34	786	2478	3.2	Accept	5th	0.18	0.0324
7	High ratio of illiteracy	988	705	402	103	786	2198	2.8	Accept	7th	-0.22	0.0484
8	Flood height	1680	693	156	57	786	2586	3.3	Accept	4th	0.28	0.0784
9	Land elevation	1592	873	218	0	786	2683	3.4	Accept	2nd	0.38	0.1444
10	Poor housing structure	568	501	586	184	786	1839	2.3	Reject	10th	-0.72	0.5184
								30.2				1.256
								3.02				

*SA – Strongly Agree; A-Agree; D-Disagree; SD-Strongly Disagree

3.2. Factors responsible for Susceptibility (Unavailability of Basic Needs)

From table 4, it shows that the respondents' perception on unavailability of basic need in event of flooding in the study area with the highest mean is 3.5 while the least is 1.9. However, the average mean is 2.7. The range of severity of unavailability of basic needs in the event of flood disaster is 1.6. The effects with mean above the average mean are considered to be very severe in the area. Effects with high severity of unavailability of basic needs in event of flooding

are water supply, electricity, food shortage, lack of planting materials as a result of inundation of flood and absence of storage facilities with 3.5, 3.3, 3.1, 3.0 and 2.8 respectively. However, effects higher than the criterion of 2.5 where accepted and ranked accordingly while those below where rejected.

Table 4 Factors responsible for Susceptibility (Unavailability of Basic Needs)

	Unavailability of Basic Needs	SA	A	D	SD	Total	SWV	Mean	Remarks	Rank	x-x⁻	(x-x⁻)²
		4	3	2	1							
1	Water Supply	1608	1116	16	4	786	2744	3.5	Accepted	1st	0.84	0.7056
2	Electricity	1568	804	220	16	786	2608	3.3	Accepted	2nd	0.64	0.4096
3	Tarred Road	268	327	624	298	786	1517	1.9	Rejected	10th	-0.76	0.5776
4	Health Facilities	264	594	562	241	786	1661	2.1	Rejected	9th	-0.56	0.3136
5	Mobility	376	567	566	220	786	1729	2.2	Rejected	7th	-0.46	0.2116
6	Food shortage	1236	846	284	53	786	2419	3.1	Accepted	3rd	0.44	0.1936
7	Poor accommodation	792	552	372	218	786	1934	2.5	Accepted	6th	-0.16	0.0256
8	Absence of storage facilities	1096	630	370	117	786	2213	2.8	Accepted	5th	0.14	0.0196
9	Inadequate communication gadgets to facilitate information	568	396	458	283	786	1705	2.2	Rejected	8th	-0.46	0.2116
10	Lack of planting materials as a result of inundation of flood	1188	795	278	85	786	2346	3.0	Accepted	4th	0.34	0.1156
	Total							26.6				2.784
								2.66				

3.3. Examining the Types of Livelihood Assets of the Residents in the Study Area

Study shows a wide variation in the respondent's perception on the types of livelihood assets of the respondents.

Respondents' perception on types of livelihood assets of the residents engulfed by flood as shown in table 5 in the study area has a highest mean of 3.4 is Household income while the least mean of 2.8 is quality of agricultural tools. The average mean is 3.1. However, the range of severity of flood hazard on the livelihood assets of resident is 0.6. The effects with mean above the average mean are considered to be very severe in the area. Effects with high severity of flood hazard on types livelihood assets are household income, water resources, number of workforce (human capital) and number of livestock. However, criterion mean of 2.5 was used to either accept or reject items as well as the ranking.

Table 5 Respondents' perception on types of Livelihood Assets of the Residents

	Type of Livelihood Assets	SA	A	D	SD	Total	SWV	Mean	Remarks	Rank	x-x⁻	(x-x⁻)²
		4	3	2	1							
1	Cultivated Land Area	1224	753	336	61	786	2374	3.0	Accepted	6th	-0.04	0.0016
2	Quality of Cultivated Land	1068	867	344	58	786	2337	3.0	Accepted	8th	-0.04	0.0016
3	Quality of Agricultural Tools	1028	822	258	126	786	2234	2.8	Accepted	10th	-0.24	0.0576
4	Number of Livestock	1236	882	204	81	786	2403	3.1	Accepted	4th	0.06	0.0036
5	Number of Workforce (Human Capital)	1324	657	396	38	786	2415	3.1	Accepted	3rd	0.06	0.0036
6	Agricultural Technical Capacity of Labourers	964	1176	188	59	786	2387	3.0	Accepted	5th	-0.04	0.0016
7	Degree of Neighbourhood Communications	1152	807	232	113	786	2304	2.9	Accepted	9th	-0.14	0.0196
8	Household income	1648	852	136	22	786	2658	3.4	Accepted	1st	0.36	0.1296
9	Water resources	1288	804	264	64	786	2420	3.1	Accepted	2nd	0.06	0.0036
10	Housing characteristics	1316	696	238	106	786	2356	3.0	Accepted	7th	-0.04	0.0016
	Total							30.4				0.224
								3.04				

3.4. Identification of the Resilience Level of the Different Communities

Considering the various level of resilience to flood hazard as shown in table 6, it can be inferred that the respondents' perception on flood resilience in the study area with the highest mean of 3.3 is my household can find a safe place to evacuate to if there is an extreme flood event in the future and while the least of 1.8 is I have insured my farm and properties in the case of flood outbreak. However, factors higher than the criterion mean of 2.5 were ranked and categorised as either accepted or rejected.

Table 6 Residents' agreement on Resilience level to flooding in the area

S/N	Identification of Resilience Level to Flooding	SA 4	A 3	D 2	SD 1	Total	SWV	Mean	Remarks	Rank	x-x⁻	(x-x⁻)²
1	I can replace my home quickly when it is affected by flood	1088	678	368	104	786	2238	2.8	Accepted	3rd	0.35	0.1225
2	I have insured my farm and properties in the case of flood outbreak	128	168	768	314	786	1378	1.8	Rejected	10th	-0.65	0.4225
3	My household can find a safe place to evacuate to if there is an extreme flood event in the future	1504	882	138	47	786	2571	3.3	Accepted	1st	0.85	0.7225
4	I have learnt skill(s) to help me cope with event of flood	1152	921	196	93	786	2362	3.0	Accepted	2nd	0.55	0.3025
5	I have constructed barriers (levees, beams, floodwalls) to stop floodwater from entering your home.	468	327	374	373	786	1542	2.0	Rejected	9th	-0.45	0.2025
6	I have sealed my walls in basements with waterproofing compounds to avoid seepage.	376	693	618	152	786	1839	2.3	Rejected	5th	-0.15	0.0225
7	I listen to the radio and television for information on flooding risk.	492	456	470	276	786	1694	2.2	Rejected	7th	-0.25	0.0625
8	I avoid building in a floodplain	836	852	512	37	786	2237	2.8	Accepted	4th	0.35	0.1225
9	I have an emergency plan and practice survival skills, like first aid and how to disinfect water.	388	456	542	266	786	1652	2.1	Rejected	8th	-0.35	0.1225
10	I turn off utilities at the main switches or valves and also disconnect electrical appliances in the event of flooding.	516	282	728	199	786	1725	2.2	Rejected	6th	-0.25	0.0625
	Total							24.5				2.165
								2.45				

3.5. Coping Capacity of the Residents to Flooding

From table 7, the highest mean is 3.1 while the least is 2.0. However, the average mean is 2.9. The range of effectiveness of flood control strategy in the event of flood disaster is 1.1. The control measure with high deviation above the mean include; raising of building foundation (3.1), construction of wooden bridges (3.0) and construction of levees by the River bans (2.9). These factors are considered to be effective in the study area in the control of flooding.

Table 7 Residents' level of agreement on effectiveness of flood control strategy/coping capacity

S/N	Effectiveness of Flood Control/Coping Capacity	SA	A	D	SD	Total	SWV	Mean	Remarks	Rank	x-x⁻	(x-x⁻)²
		4	3	2	1							
1	Road reclamation using sandbags and sawn dust	840	1026	226	121	786	2213	2.8	Accepted	6th	0.2	0.04
2	Construction of wooden bridges	1284	795	202	99	786	2381	3.0	Accepted	2nd	0.4	0.16
3	Clearing blocked drainages channels	964	834	302	116	786	2216	2.8	Accepted	5th	0.2	0.04
4	Periodic environmental sanitation measures	836	852	512	37	786	2237	2.8	Accepted	4th	0.2	0.04
5	Proper refuse disposal	192	642	612	218	786	1564	2.0	Rejected	9th	-0.6	0.36
6	Raising of building foundation	1536	618)	228	82	786	2464	3.1	Accepted	1st	0.5	0.25
7	Construction of levees by the River Bans	944	723	572	23	786	2262	2.9	Accepted	3rd	0.3	0.09
8	Building platform/elevation above flood level inside houses	468	327	374	373	786	1542	2.0	Rejected	10th	-0.6	0.36
9	Clearing trash along water ways	692	372	492	243	786	1799	2.3	Rejected	8th	-0.3	0.09
10	Blockage/damming the confluence between major Rivers/Rivulets	376	693	618	152	786	1839	2.3	Rejected	7th	-0.3	0.09
	Total							26.0				1.52
								2.6				

3.6. Influence/Effects of Flooding on Capacity Level of Residents

Table 8 Residents' agreement index on the effects of flood disaster in the area

S/N	Severity of Effects of Flood Disaster	SA	A	D	SD	Total	SWV	Mean	Remarks	Rank	x-x⁻	(x-x⁻)²
		4	3	2	1							
1	Loss of life/injury	328	468	462	317	786	1575	2.0	Rejected	10th	-0.78	0.6084
2	Loss of livelihood	1332	903	168	68	786	2471	3.1	Accepted	4th	0.32	0.1024
3	Damage to property	1084	789	308	98	786	2279	2.9	Accepted	6th	0.12	0.0144
4	Displacement	1176	756	278	101	786	2311	2.9	Accepted	5th	0.12	0.0144
5	Outbreak of disease	492	456	470	276	786	1694	2.2	Rejected	8th	-0.58	0.3364
6	Famine	1636	885	68	48	786	2637	3.4	Accepted	1st	0.62	0.3844
7	Loss of planting materials	388	456	542	266	786	1652	2.1	Rejected	9th	-0.68	0.4624

8	Inflation of farm produce	1492	840	164	51	786	2547	3.2	Accepted	2nd	0.42	0.1764
9	Damage to farm land	1084	645	298	151	786	2178	2.8	Accepted	7th	0.02	0.0004
10	Food loss	1572	663	202	71	786	2508	3.2	Accepted	3rd	0.42	0.1764
	Total							27.8				2.276
								2.78				

From table 8, its evident that residents' agreement index on the effects of flood disaster in the study area with the highest mean is 3.4, while the least is 2.0. the average mean is 2.7. the range of the severity of the flood disaster variable is 1.4. The control measure with high deviation above the mean include; famine (3.4), inflation of farm produce (3.2), food loss (3.2), loss of livelihood (3.1), displacement (2.9), damage to property (2.9) and damage to farm land (2.8). The effects with mean above the average mean value are considered to be very severe in the area.

3.7. Organizational Support to Flood Hazards

Several agencies and NGOs are in charge of different forms of support in event of emergencies. From table 9, it can be inferred that in the study area the highest mean is 2.2, while the least is 1.9. The average mean is 2.05. the range of the effectiveness of organizational support to flood disaster variable is 0.3. Study shows that none of the parameter is above criterion mean hence where all rejected.

Table 9 Respondent's perception on organizational support

S/N	Respondent's perception on organizational support	SA	A	D	SD	Total	SWV	Mean	Remarks	Rank	x-x⁻	(x-x⁻)²
		4	3	2	1							
1	Emergency shelter	600	318)	578	241	786	1737	2.2	Rejected	2nd	0.14	0.0196
2	Public awareness program	279	345	614	271	786	1509	1.9	Rejected	9th	-0.16	0.0256
3	Emergency management plan	328	384	584	284	786	1580	2.0	Rejected	6th	-0.06	0.0036
4	Early warning system	472	426	550	251	786	1699	2.2	Rejected	4th	0.14	0.0196
5	Flood insurance	368	453	578	254	786	1653	2.1	Rejected	5th	0.04	0.0016
6	Institutional capacity	216	336	682	279	786	1513	1.9	Rejected	8th	-0.16	0.0256
7	Search, rescue and evacuation plan	624	417	454	264	786	1759	2.2	Rejected	1st	0.14	0.0196
8	Development control	996	1041	258	61	786	1456	1.9	Rejected	10th	-0.16	0.0256
9	Routine training	136	582	570	273	786	1561	2.0	Rejected	7th	-0.06	0.0036
10	Financial support	516	282	728	199	786	1725	2.2	Rejected	3rd	0.14	0.0196
	Total							20.6				0.164
								2.06				

4. Discussion of Findings

The study revealed that 34.5% of the respondents are males while 65.5% are females as shown in table 2. Study showed clearly that females were predominant across the study area. Women are particularly vulnerable to natural disasters compared to men because of their involvement in household tasks, such as collecting water and fuel wood, cooking, managing food, and providing child care. In all of these activities, women are at closest contact with the environment [14], [15]. They may also become victims of violence and face additional problems because of long-existing gender disparities [16]. This study agrees with [17] posited that women tend to recover more slowly than men from natural disasters and play a key role in the work of recovery after flood events. As primary care-givers women are more likely than men to have responsibility for dependants in the event of a flood and conversely are also more likely to be the sole adult householder. The gender division of labor critically determines women' s economic opportunities, constraints, incentives, and capacity and women's position in different sectors [18]. Low level of education is one of the main factors that deter women from equal participation in socioeconomic activities with their male counterparts. Poor parents consider any expenses for educating a girl unproductive as she leaves their family after marriage [19]. According [20], the literacy rate is 62 percent for males and 53 percent for females. In 2011, the rate of labor force participation was 84.3 percent for males and 57.2 percent for females [21] and the unemployment ratio of females to males is 7.4:4.2 [22]. Women's participation in economic activities remains unvalued at the national level because of the patriarchal structure, tradition, and norms. For example, more than three quarters of employed women of 15 years and above are found to be unpaid family laborers as opposed to less than one tenth who are self-employed and a few percentage contract workers [23]. Study also revealed that nearly all communities ravaged by flood has a high proximity to water body, low elevation, regular flood return period with a gig flood height ratio, lacks flood hazard information, high rainfall, high ratio of illiteracy, inadequate refuge dumping, poor drainage system to mention but a few. Absence of basic needs in the face of flood hazards such as water supply, electricity, food shortage, lack of planting materials as a result of inundation of flood, absence of storage facilities and poor accommodation has worsened the deployable pitiful situation. The study revealed that the assets of the respondents in the study area varied across several areas from Household Income (3.4), Water Resources (3.1), Number of Workforce (3.1), Number of Livestock (3.1), Agricultural Technical Capacity of Labourers (3.0), Cultivated Land Area (3.0), Housing Characteristics (3.0), Quality of Cultivated Land (3.0), Degree of Neighbourhood Communication (2.9) and Quality of Agricultural Tools (2.8). All the livelihood assets of the respondents were accepted as all its mean are above grand mean value. [24] stated that in Southern Nepal, flooding leads to large scale disruption of social and economic lives. The rivers bring large sediments whose deposition on agricultural lands harms productivity. The poor mostly live in these floodplains (vulnerable zones) because they have no opportunity to live in less hazardous areas. In Nepal, every year floods cause death, cultivated fields and irrigation, bridges and after rural infrastructure. He argues that policy makers, donors and relief and development agencies treat flood disaster as isolated events that break the continuity of the normal way of life. Most interventions to mitigate disasters are adhoc responses made under the assumption that an emergency support in the form of relief will help overcome the situation of hardship. Such support aims at restoring the situation to what it was before the disaster. Even when a flood disaster affects the same community every year, government, donors and non-governmental organizations respond by providing the same relief and rehabilitation measures each time. This approach does not consider the situation of a society during normal times between the occurrences of two hazard events. There are various measures that have been employed in the control of flood in the area. Among these measures include raising of building foundation, construction of wooden bridges, construction of levees by the river bans, periodic environmental sanitation measures among others. But the constant experience of flood in the study area has been very enormous in the recent time as if no action has been taken in the community. The effectiveness of the of flood control within the study area is explained using Likert's scale. From table 7, the highest mean is 3.1 while the least is 2.0. However, the average mean is 2.9. The range of effectiveness of flood control strategy in the event of flood disaster is 1.1. The control measure with high deviation above the mean include; raising of building foundation (3.1), construction of wooden bridges (3.0) and construction of levees by the River bans (2.9). These factors are considered to be effective in the study area in the control of flooding. However, effects higher than the criterion of 2.5 where accepted and ranked accordingly while those below where rejected. [25] states that flood disaster has different impact on individuals, households and communities. People cope in different ways. Those who have the capacity after being hit by a disaster emerge faster while those without such capacity sink deeper into the spiral of impoverishment. Coping strategies include actions such as migration from floods affected areas, flood forecasting, flood insurance of animals and crops, food stockpiling, providing emergency health services and building flood shelters. They have, however, not been woven systematically into the approach to achieve security from flooding. If the approaches build on coping strategies and seek to identify new ones, they could address the social impacts of flood problems affectively at a lower social, economic and environmental cost than approaches that attempt to manage or control the resource base itself [24]. [25] give vivid view on how structural and non-structural measures could curb the menace of floods. The structural measures such as check dams, levees, flood walls and adequate drainage systems will help control periodic inundation in the areas that are liable to flooding in the following ways: The construction of structures for irrigation and the use of excess run-off water for inter-basin transfer as an alternative to

absorb excess water from the Cameroons; Check dams will reduce peak flows; Levees and flood walls confines flow within predetermined channels; Adequate drainage systems will reduce peak flow stages of flood and divert excessive flow; In communities where the rate of flow of storm water is high, embankments should be constructed to breakdown storm water so as not to result into floods [26]. From the Table 8, it can be inferred that the severity of the effects of flood disaster in the study area with the highest mean is 3.4, while the least is 2.0. The average mean is 2.7. The range of severity of the effects of flood disaster index (SFI) variables is 1.4. The effects with mean above the average mean value are considered to be very severe in the area while those below the average mean are considered no so severe in the area. Effects with high severity of flooding index (EFI) are famine, inflation of farm produce, food loss, loss of livelihood, displacement, damage to property and damage to farm land with 3.4, 3.2, 3.2, 3.1, 2.9, 2.9 and 2.8. respectively. The least mean of the effects of flood is 2.0 which stands for loss of lives/injury in the study area. Though, loss of lives as effects of flood has the least mean of severity statistically from the perceptions of the respondents, but is the greatest loss as it is the only effect of flood that is irreplaceable.

A study by [27] suggest that floods are the most taxing of water related natural disasters to humans, material assets as well as to cultural and ecological resources affecting people and their livelihoods and claiming thousands of lives annually worldwide. According to the Australian experience, the emotional behaviour of many flood victims was shocking. The emotional cost of flooding was long lived. Follow-up studies found that about one-quarter still had not recovered from the emotional trauma of the event. Factors that contributed to the non-recovery included the severity of the flooding, the degree of the resulting financial hardship, age and socio-economic status. Elderly people on low incomes whose houses were deeply flooded were the most ill-affected [28].

NGOs are organizations that are non-profit making, voluntary and independent of government, engaged in activities concerning various societal and developmental issues. The role of the NGO's during a disaster is to have quick response and to try and save as many lives as it can with the given resources. NGO's have a faster response to situations because it does not need to clear paperwork. Study on the different NGOs in charge of different supports in event of emergencies as shown in the study area varied a crossed the across. The highest mean is 2.2 while the least is 1.9. Study reveals that mean of all the items are below the grand mean hence all the items were rejected. NGO is a legally constituted, voluntary association of individuals or groups that is neither a government agency nor profit enterprise. It is a private organisation that pursues activities to relieve suffering, promote the interests of the poor, protect the environment, provide basic social services, and/or understand community development [29]. Based on the findings of this study, it revealed that though NGOs may be aware and knowledgeable about flooding and have include it in their program and as such yet to reach their clients /beneficiaries with information related to it. The NGOs are acts as facilitators to emergencies and serves as succour to the plight of the vulnerable.

5. Conclusion

Farming is a significant part of the study area as over 48.9% of the respondents depends on farming as its livelihood assets. Most of the villagers are directly and indirectly dependent on the agricultural lands and cultivate for their livelihood. Nonetheless, the preeminent role of agriculture in reducing vulnerability to floods has not shifted significantly. Daily survival of these people is highly dependent on agricultural lands and other informal sources of livelihoods. Therefore, impact of disaster is not only dependent on access to sources of livelihoods but also on the level of dependency on these sources of livelihoods. Obviously, this destruction had negative effects on the livelihoods of the people with grave implication on their financial and health status. However, the people are not deterred as majority of those interviewed declined to vacate/relocate from the area after the 2012 flood disaster despite the high vulnerability of the area to floods. However, the understanding of the vulnerability of the area to flooding was instrumental in the peoples' choice to live with the floods, and by extension the need to grow resilience. Respondents' agreement on resilience level to flooding in the study area include: my household can find a safe place to evacuate to if there is an extreme flood event in the future, I have learnt skill(s) to help me cope with event of flood, I can replace my home quickly when it is affected by flood and I have insured my farm and properties in the case of flood outbreak. This resilience of the people its firm on her belief that their tradition forbids them from relocating from the area, hence flood warning issued by government for relocation prior to flooding may not be heeded by the people.

The study also revealed that the following measures were considered effective in control, management and coping capacity of flood: raising of building foundation, construction of wooden bridges, periodic environmental sanitation measures, road reclamation using sandbags and sawn dust, clearing blocked drainages channels and proper refuse disposals. Study also revealed that members of the communities have tried their best in controlling or avoiding flood occurrences through various community projects like drainage and clearing of water ways in the community. However, major projects like dredging of river, construction of drainages and bridges where necessary and proper adherence to planning regulations are expected from government for implementation. However, residents' agreement on the severity

of effects of flood disaster in the study area include loss of livelihood, displacement, damage to property, outbreak of disease and loss of life/injury. The study recommended that creation of awareness among people living in disaster-prone areas of the risk they face and how best to respond when it occurs can be done to enhance local people's confidence and empower them to act when faced with danger; there should be policies that target the marginalized in society, such as women, children, elderly, or the poor otherwise these groups will remain most vulnerable; the people must be empowered to improve on their level of resilience to flooding, respond effectively and contribute to the development of their own communities on a sustained basis; and successful flood risk management should therefore be dependent upon the active support of all on whom the effects of flooding may impact, those directly at risk, the civil authorities and the wider community.

Compliance with ethical standards

Disclosure of conflict of interest

There is not conflict of interest among the authors in this paper.

Statement of informed consent

Informed consent was obtained from all individual participants included in this study.

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