COPING STRATEGIES OF FARMING HOUSEHOLDS AFFECTED BY 2010 FLOOD DISASTER IN SOKOTO STATE, NIGERIA

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Abstract

The study determined the coping strategies of farming households affected by 2010 flood disaster in Sokoto State, Nigeria. Purposive sampling was used in selecting the study area, while 178 farming households were the sample size of the study. The interview schedule with 0.82 reliability coefficient subjected to face and construct validity assessment was used as study instrument. Data were obtained from primary and secondary sources, while data analysis was achieved using descriptive and inferential statistics. The study reveals that most (45.5%) of the farming households relied on intervention from families and relatives as short term coping strategy, while majority (55.1%)of the farming households relied on borrowing as short term coping strategy. Furthermore, the study reveals that most (48.9%) of the farming households were distributed with relief materials by National Emergency Management Agency as medium term coping strategy, while majority (65.2%) of the farming households migrated to urban areas for non farm income activities as long term coping strategy. The null hypothesis between the coping strategies and adverse effects of 2010 flood disaster was rejected at 5% level of significance,while Cramer's V symmetric measure revels that the medium term coping strategy was the most (0.797)sufficient coping strategy due to intervention of multiple stakeholders. The study recommended that the provision of relief materials should cover sufficient distribution of food stuffs, drugs, livelihood materials, detergents and building materials that can be used to reduce the effects of migration to urban areas in coping with adverse effects of flood disaster.

Key Words: *Coping strategies, farming households, 2010 flood disaster*

Introduction

The farming households that are relatively close to water bodies such as rivers and lakes are vulnerable to adverse effects of flood disaster (Kingsley and Christopher, 2013). For instance, on global average about 75 million households on yearly basis would be subjected to adverse effects of flood disaster (Ismail and Mustaquim, 2013). However, in the recent past, from 2010 to date, the vulnerable States in Nigeria were exposed to adverse effects of flood disaster. For instance, National Emergency Management Agency-NEMA (2010) expressed that the flood disaster in 23 States of Nigeria was responsible for displacement of 258,044 households out of their homes. Also, the excessive rainfall witnessed in 2010 caused Goronyo Dam located in Sokoto State to release its excess water in order to save the Dam from eventual collapse was responsible for occurrence of 2010 flood disaster in the State, where more than 50 vulnerable farming communities were flooded (Tosin, 2010). Thus, based on this revelation, 2010 flood disaster was the most atrocious water related disaster occurred in the State that can be recalled in recent memories (Sokoto State Emergency Management Agency-SEMA, 2010). Therefore, to deal with adverse effects of flood disaster, coping strategies are utilised by flood affected households (Monzu, 2007; Kivaria, 2007). It is against this background that the answer was provided by this study on how the farming households were coped with 2010 flood disaster. Hence, the objective of the study is to determine the coping strategies of farming households affected by 2010 flood disaster in Sokoto State. There is no significant difference between the coping strategies of farming households and adverse effects of 2010 flood disaster was the null hypothesis of the study. The study is significant in coming up with recommendations that will be used as coping strategies in dealing with adverse effects of flood disaster. Thus, the recommendations can be added to existing knowledge, serve as reference materials for further studies, source of information to government, disaster management agencies, civil societies and flood affected farming households.

Research Methodology

Description of the Study Area

This study is carried out in Sokoto State located between Latitude 11^0 14' 00" North and Longitude $8^0$5' 00" East with a total land area of 32,000km^2, which have a projected population of 4,998,090 households according to 2016 estimation of National Population Commission. The study area also shared border with Niger Republic to the North, Zamfara State to the East and Kebbi State to the South and

West respectively (Sokoto State Government Diary, 2016). In terms of livelihood, more than 75% of households in all the 23 LGAs of the study area have relied on agriculture for their livelihoods (Sokoto State Government Diary, 2016). However, 9 LGAs in the study area were adversely affected by 2010 flood disaster, due to excessive rainfall and influence of Rima River that made Goronyo Dam to release the excess water stored beyond its absorbing capacity (SEMA, 2010). Meanwhile, rainy season in the study area started from May and ended in September with mean rainfall of 600mm. The dry season started from October to April (Iliya and Tukur, 2013), while the harmattan occurred from November to February due to movement of dry air originated from Sahara desert and warm air originated from Atlantic Ocean (Abdullahi *et al*, 2014).

Sampling Procedure and Sample Size

Purposive sampling was used to select *Kagara Rima, Taloka, Giyawa, Lugu, Tunga, BarayarZaki, BakinGulbi, KwalKwalawa* and *Rimawa* as most affected farming communities by 2010 flood disaster in Sokoto State. Therefore, from these most affected farming communities 1,425 farming households affected by 2010 flood disaster were identified as sample frame of the study, while 178farming households were selected using Yamane formula as sample size of the study.

Study Instrument

Interview schedule validated by experts in agricultural extension, community development and rural sociology was used as the study instrument for data collection.

Validity Test

Interview schedule used for data collection was subjected to face and construct validity assessment by experts in agricultural extension and rural development with a view of modifying the items of interview schedule with vague meaning.

Determination of Reliability Coefficient

Reliability coefficient of the study instrument was achieved using Cronbach's alpha test presented as $\alpha = \frac{N \times C}{\bar{v}+(N-1)\times C}$ Where α = Reliability coefficient, N = Number of items tested, C = Covariance of inter items tested and $\bar{v}$ = Variance of items tested.

$$\alpha = \frac{N \times C}{\bar{v}+(N-1)\times C} \quad \alpha = \frac{5 \times 8.4}{17.2+(5-1)\times 8.4}$$

$$\alpha = \frac{42}{17.2+(4)\times 8.4} \quad \alpha = \frac{42}{21+34} \quad \alpha = \frac{42}{51} \quad \alpha = 0.82$$

Thus, th e reliability coefficients of 0.70 as minimum and 1.00 as maximum values are required for the study instrument to be reliable (Okoro and Hassan, 2011). Therefore, the reliability coefficient of 0.82 values was obtained for the study instrument.

Table 1: Reliability Coefficient of Study Instrument

Variable	Reliability Coefficient	No. of Items Tested	Mean	Total Variance
Coping strategies of farming households affected by 2010 flood disaster	0.82	5	5.40	17.20

Source: Field Survey, 2016

Method of Data Collection

Primary and secondary sources such as response of farming households affected by 2010 flood disaster and information from published and unpublished materials were used as method of data collection for the study.

Tools for Data Analysis

The descriptive and inferential statistics such as charts, frequency distributions, percentages,Chi Square and Cramer's V were used for data analysis.

Result and Discussion

Short Term Coping Strategy

Result presented in Table 2 reveals that most (45.5%) of the farming households affected by 2010 flood disaster in Sokoto State have relied on intervention from social contacts as a short term coping strategy in coping with adverse effects of 2010 flood disaster. This means that the intervention from social contacts such as families, relatives, neighbors and friends was the first option available to farming households for coping with adverse effects of 2010 flood disaster. This result conforms with Tanvir (2015)thatthefood stuffs were immediately provided by relatives of flood affected farming households in Bangladesh and Nepal. Result presented in Table 2 also reveals that the majority (55.1%) of the farming households affected by 2010 flood disaster have relied on borrowing of food stuffs (Figure 2) from the neighborhood of non flood affected farming households as a short term coping strategy in coping with adverse effects of 2010 flood disaster. This

means that the intervention from social contact was not adequate to reach all the flood affected farming households. Therefore, borrowing was used as the next alternative in coping with adverse effects of 2010 flood disaster by flood affected farming households. This result agrees with Ninno *etal* (2001)that the flood affected households in Bangladesh were coping with adverse effects of flood disaster through the borrowing strategy. The distribution of social contacts utilised in short term coping strategy in coping with adverse effects of 2010 flood disaster in Sokoto State is presented in (Figure 1).

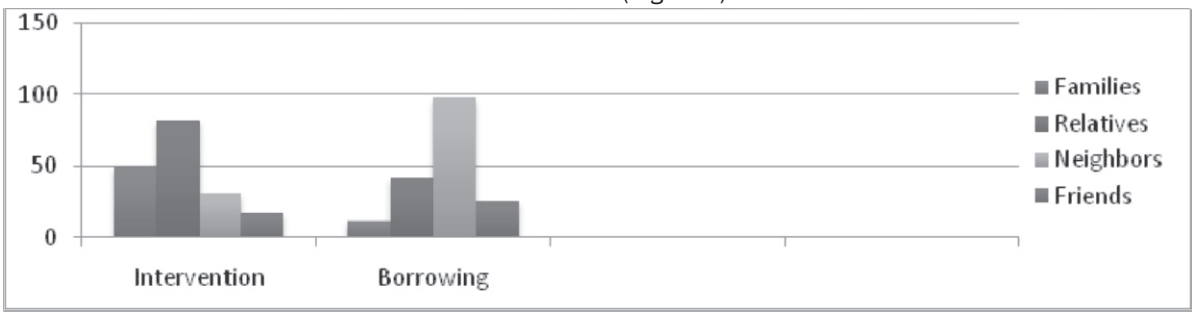

Figure 1:Short Term Coping Strategy

Items in Short Term Coping Strategy

Result presented in Figure 2 reveals that in a short term coping strategy food stuffs (95.5%) were the main items provided to flood affected farming households. This means that other items that are vital for survival such as drugs and livelihood materials were not adequately provided to flood affected farming households. Thus, the absent of these items like drugs contributed to grossly to widespread of cholera due to contamination of drinking water in flood affected areas (Tanvir, 2015).

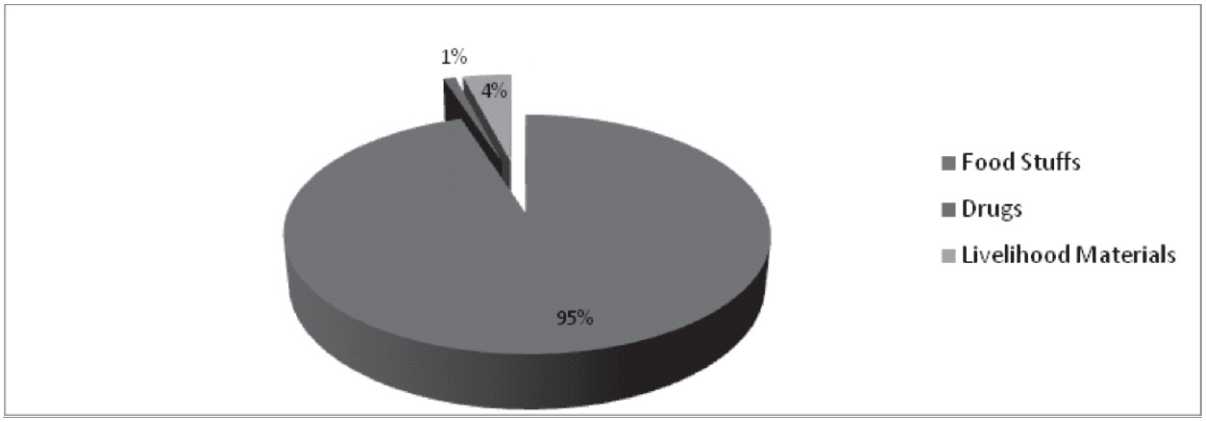

Figure 2:Distribution of Itemsin Short Term Coping Strategy

Medium Term Coping Strategy

Result presented in Table 2 reveals that most (48.9%) of the farming households affected by 2010 flood disaster in Sokoto State were distributed with relief materials by NEMA as a medium term coping strategy in coping with adverse effects of 2010 flood disaster. Evidently, other donor groups have also played a vital role for the provision and distribution of relief materials to flood affected farming households. This implies that apart from NEMA established by Nigerian government, other volunteer groups such as nongovernmental and faith based organisations are the stakeholders that were part of the humanitarian interventions in providing relief materials to flood affected farming households. This result is in line with Kinsley and Christopher (2013) that the relief materials were provided by donor groups such as United Nations Children's Fund, United Nations and European Union to flood affected farming households of Omambala riverine communities in Anambra State. Thus, the distribution of stakeholders utilised in medium term coping strategy in coping with adverse effects of 2010 flood disaster in Sokoto State is presented in (Figure 3).

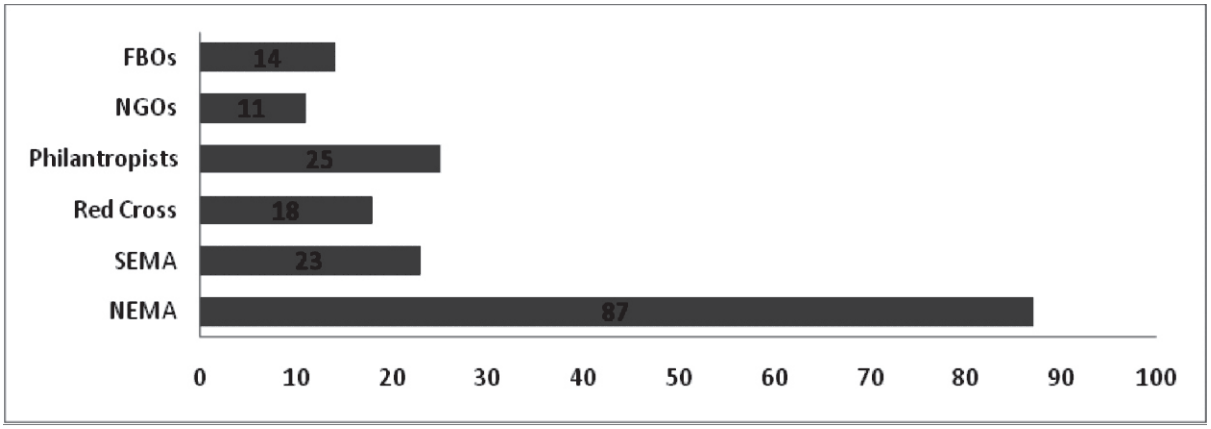

Figure 3: Medium Term Coping Strategy

Items in Medium Term Coping Strategy

Result presented in Table 3 reveals that the farming households affected by 2010 flood disaster in Sokoto State were provided with rice (83.7%) by NEMA as food stuffs, drugs (79.8%) by NEMA for the treatment of cholera, cloths (42.7%) by NEMA, roofing sheet (69.1%) by SEMA and cleaners (60.7%) were also provided by Red Cross for cleaning homes crammed with flood water. This implies that the food stuffs, drugs and livelihood materials were the items provided to farming households affected by 2010 flood disaster in Sokoto State by the NEMA as relief materials in coping with adverse effects of 2010 flood disaster. This revelation conforms with NEMA (2010) report that the relief materials such as food stuffs, drugs and livelihood materials were provided as a way of bringing quick recovery to flood affected farming households. Thus, the distribution of items to farming households affected by 2010 flood disaster in Sokoto State by different donor groups is presented in (Figure 4).

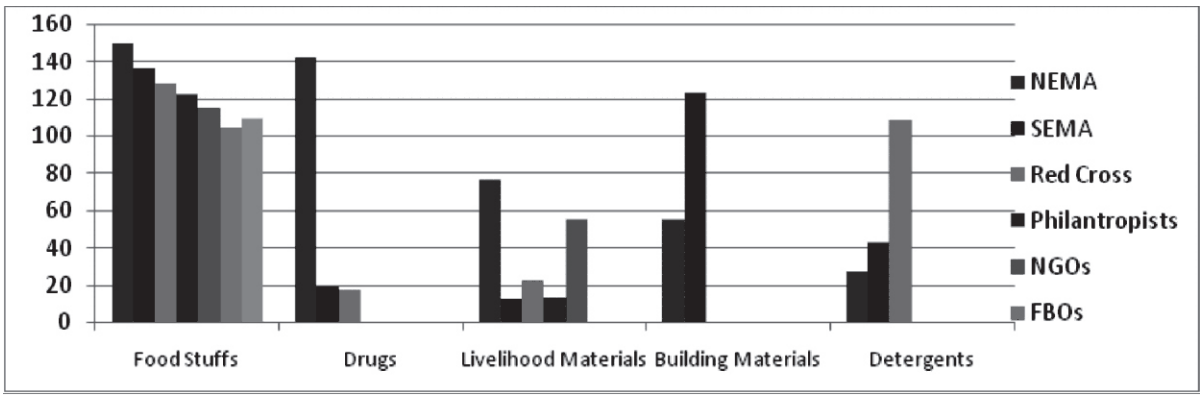

Figure 4:Distribution of Items in Medium Term Coping Strategy

Methods of Distributing the Items

Result presented in Figure 5 reveals that the majority (81%) of flood affected farming households expressed that the group method was used by donor groups for distribution of the items as relief materials in coping with adverse effects of 2010 flood disaster. This result corroborates with Nura*et al* (2013) that the group method was adopted by donor groups for distribution of the relief materials to farming households affected by 2010 flood disaster in Sokoto State.

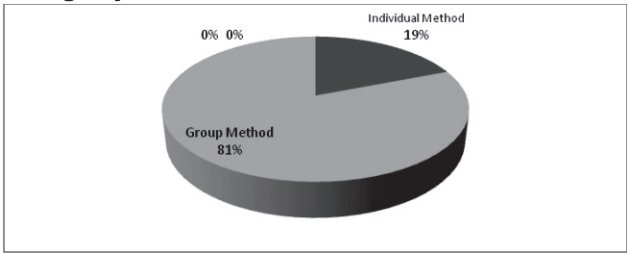

Figure 5:Methods of Distributing the Items in Medium Term Coping Strategy

Time of Providing the Items

Result presented in Table 3 reveals that most (41%) of the flood affected farming households expressed that the distribution of items as relief materials was made after 20 days after the occurrence of 2010 flood disaster. This implies that the short term coping strategy was exhausted prior to the commencement of medium term coping strategy by donor groups. This result agrees with Sidi (2013) that the timely distribution of relief materials can be achieved by articulating the framework of National Disaster Response Plan, Disaster Management Framework and National Contingency Plan for Nigeria. Thus, the time of providing the items in medium term coping strategy in coping with adverse effects of 2010 flood disaster in Sokoto State is presented in (Figure 6).

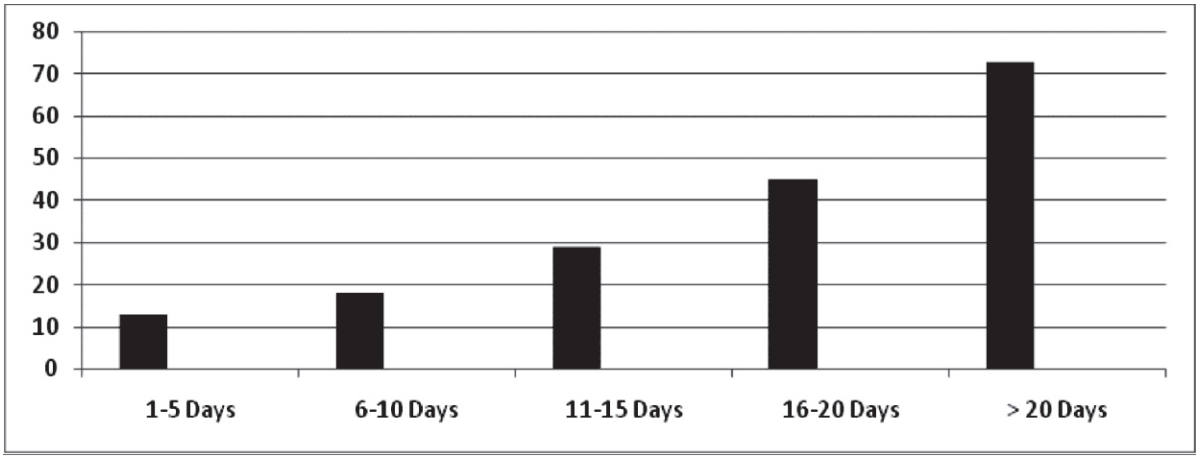

Figure 6: Time of Providing the Items in Medium Term Coping Strategy

Long Term Coping Strategy

Result presented in Table 2 further reveals that majority (65.2%) of the farming households affected by 2010 flood disaster in Sokoto State have migrated to urban areas for search of non-farm income activities as a long term coping strategy in coping with adverse effects of 2010 flood disaster. This implies that the short term and medium term coping strategies were not enough to deal with adverse effects of 2010 flood disaster. This result is in lines with Action Aid International (2006) that in African Sahel the migration of flood affected households to urban areas was used as a strategy in coping with adverse effects of flood disaster.

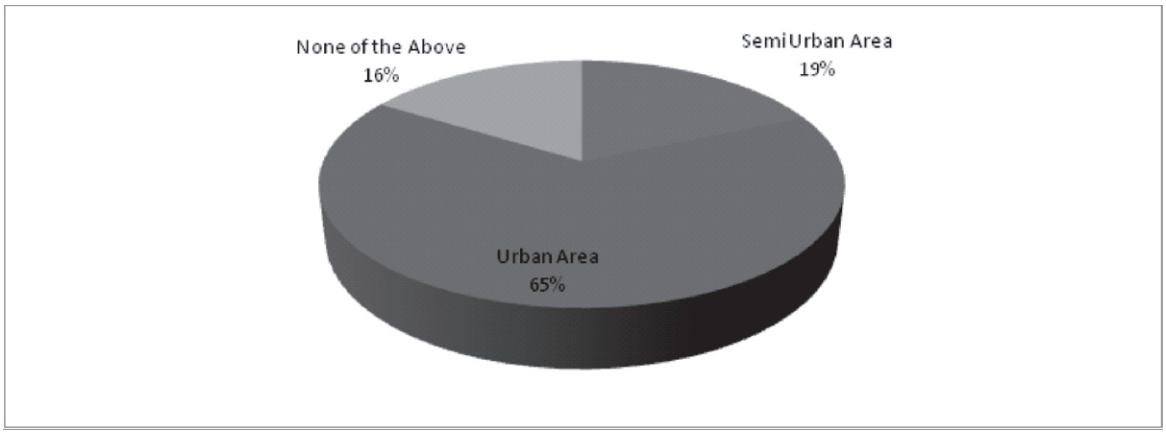

Figure 7: Long Term Coping Strategy

Non Farm Income Activities in Long Term Coping Strategy

Result presented in Table 3 reveals that most (37.6) of the farming households affected by 2010 flood disaster ventured into trading of non farm income activities in coping with adverse effects of 2010 flood disaster. In lines with this revelation, Abimbola and Oluwakemi (2013) added that the migrated flood affected households were into non farm income activities in coping with adverse effects of flood disaster in Ondo State.Thus, the distribution of non farm income activities utilised by farming households affected by 2010 flood disaster in Sokoto State is presented in (Figure 8).

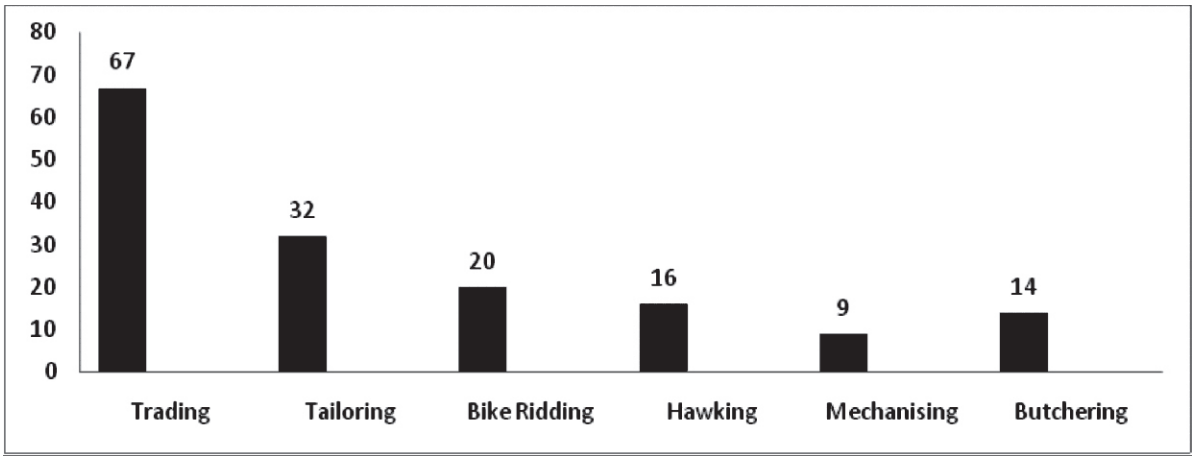

Figure 8:Distribution of Non Farm Income Activities in Long Term Coping Strategy

Table 2: Distribution of Farming Households based on Coping Strategies (n=178)

Variable	Frequency	Percentage
Short Term Coping Strategy		
Intervention from		
Families	49	27.5
Relatives	81	45.5
Neighbors	31	17.4
Friends	17	9.6
Borrowing from		
Families	12	6.7
Relatives	42	23.6
Neighbors	98	55.1
Friends	26	14.6
Medium Term Coping Strategy		
Intervention from		
NEMA	87	48.9
SEMA	23	12.9
Red Cross	18	10.1
Philanthropists	25	14.0
NGOs	11	6.2
FBOs	14	7.9
Long Term Coping Strategy		
Migration to		
Semi-urban areas for an alternative income	33	18.5
Urban areas for non-farm income	116	65.2
None of the above	29	16.3

Source: Field Survey, 2016

Table 3: Distribution of Farming Households based on Relief Materials (n=178)

Variable	Frequency	Percentage
Food Stuffs		
Rice	149*	83.7
Millet	136*	76.4
Sugar	128*	71.9
Pasta	122*	68.5
Vegetable oil	115*	64.6
Salt	104*	58.4
Drugs		
Malaria	142*	79.8
Cholera	19	10.7
Skin infection	17	9.6
Livelihood Materials		
Cloths	76	42.7
Mattress	12	6.7
Blankets	22	12.4
Nylon mats	13	7.3
Cash	55	30.9
Building Materials		
Cement	55	30.9
Roofing sheet	123*	69.1
Cosmetics and Detergents		
Jelly	27	15.2
Soap	43	24.2
Cleaners	108*	60.7
Distribution of Relief Materials		
Individual method	34	19.1
Group method	144*	80.9
Time of Providing Relief Materials		
1-5 days after flood disaster	13	7.3
6-10 day after flood disaster	18	10.1
11-15 days after flood disaster	29	16.3
16-20 days after flood disaster	45	25.3
>20 days after flood disaster	73	41.0
Non Farm Income Activities		
Trading	67	37.6
Tailoring	32	18.0
Bike ridding	20	11.2
Hawking	16	9.0
Mechanising	9	5.1
Butchering	14	7.9
Lobouring	20	11.2

Source: Field Survey, 2016 Multiple Response*

Hypothesis Test

There is no significant difference between the coping strategies of farming households and adverse effects of 2010 flood disaster in Sokoto State. Result obtained after Chi-Square analysis reveals a significant relationship between the coping strategies of farming households and adverse effects of 2010 flood disaster at 5% and 10% level of significance. This implies that the null hypothesis was rejected and alternative hypothesis was accepted, because the short, medium and long term coping strategies were the options available to flood affected farming households incoping with adverse effects of 2010 flood disaster in Sokoto State. Therefore, Cramer's V symmetric measure reveals that the medium term coping strategy was the most (0.797) effective coping strategy due to intervention of multiple stakeholders (Figure 3) that were involved in the distribution of relief materials to the farming households affected by 2010 flood disaster in Sokoto State.

Table 4: Hypothesis Test

Variable	X^2 Val	DF	P Val	Cramer's V	Remark	Decision
Short term coping strategy	336.31	312	0.17	0.794 (Strong)	S	Rejected
Medium term coping strategy	564.75	520	0.85	0.797 (Strong)	S	Rejected
Long term coping strategy	222.03	208	0.24	0.790 (Strong)	S	Rejected

X^2 Val = Chi -Square Values, P Val = Probability Values, DF = degree of Freedom, P<0.05 = Significant at 5%, and 10%, Cramer's V = Symmetric Measure of Strength of Relationship

Conclusion

It is concluded that the short, medium and long term coping strategies were the options available to flood affected farming households in coping with adverse effects of 2010 flood disaster in Sokoto State. Consequently, the medium term coping strategy was observed to be the most effective strategy, because of provision and distribution of relief materials by multiple stakeholders such as NEMA that ultimately distributed food stuffs, drugs and livelihood materials to majority of the farming households affected by 2010 flood disaster in Sokoto State.

Recommendations

i. Dry season farming should be intensified by farming households affected by flood disaster as means of reducing the effect of rural to urban migration.

ii. Crops that are resistance to adverse effects of flood disaster should be provided by stakeholders in the agricultural sector to farming households affected by flood disaster.

iii. Relief materials should be provided immediately by concerned stakeholders to farming households affected by flood disaster as best way in coping with adverse effects of flood disaster.

iv. Provision of relief materials by concerned stakeholders should cover sufficient distribution of food stuffs, drugs, livelihood materialsand building materials to farming households affected by flood disaster.

v. Income diversification by farming households affected by flood disaster should be encouraged to serve as an alternative means of survival in coping with adverse effects of flood disaster.

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