

Economic Analysis of Effect of Flood on Income Distribution among Farmers in Edo State, Nigeria

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ABSTRACT

The study estimated the effect of flood on the income distribution of the victims in Etsako East Local Government Area of Edo State. A multistage sampling technique was employed to sample respondents for the study. Questionnaire and interview schedule were used to obtain information from the farmers. The data obtained were analysed econometrically. Results from analysis of data showed that the total income of the victims from all the activities before the flood was ₦876480, however, they lost 79% of this to the flood. The average compensation was ₦85676 while the uncompensated loss was ₦577574. The study reveals further that in spite of the fact that the flood incidence reduced the income of the victims, it also worsen income inequality among the victims of the flood despite the compensation received from the government. Generally, income inequality increased by 123% among the victims after the flood. The income inequality increased among the victims due to the lopsidedness of the distribution of the compensation. For example, the study indicates that the middle income group lost 18% of their income during the flood and they got only 13% of the total compensation, whereas the richest income group lost 33% of their income and received 44% of the total compensation. Corruption and nepotism/tribalism have been implicated for the skewed distribution of the compensation among the victims. This study therefore recommends the need for preventive measures to guide against future occurrence of flood among the people living close to riverine areas. In case of flood disaster, amount of compensation that is commensurable to the losses of the people is recommended. A transparent system during the registration of the losses of the victims and administration of the compensation is essential to reduce the effect of the flood incidence on depth and severity of poverty.

Keywords: Economic, Flood, Income, Distribution, Farmers

INTRODUCTION

Climate change constitutes a very serious threat to sustainable agricultural production and food security in many parts of the world (Adebayo et al, 2012). Although climate change is not new phenomenon, its recent usage, especially in the context of development refers to changes in the prevailing climate, particularly since the 20th century and the perceived impacts on the economy and livelihoods (Adebayo, 2011). Climate change is arguably the most threatening environmental problem of our time, stimulating discourses vis-à-vis the causes, long-term effects as well as forestalling the lingering and frustrating impact (Falola, et al 2012). Despite the high contribution of agriculture to the overall economy, it is challenged by many factors that are climate-related, disaster such as flood and drought which cause a lot of problems to farmers (Deressa, 2008). The Environmental Right Action (ERA, 2012) on their visit to Agenebode a community along the banks of River Niger in Etsako East Local Government Area of Edo State, whose major occupation is farming confirmed the destruction of farmlands and complete inundation of communities, which is believed to have been caused by excessive rains, leading to the overflow of dams and the flooding thereof, in communities along the banks of River Niger and Benue.

Agricultural production and food security are likely to be severely affected by climate change thereby putting some regional marginal agriculture out of production. The agricultural sector in Nigeria is prone particularly to the influence of climate change due to its reliance on rainfall and temperature. The 2012 Nigeria floods began in early July 2012, and have killed 363 people and displaced over 2,100,000 people. Benue, Kogi, Kwara, Niger, Taraba Anambra, Cross River, Delta, Edo and Imo

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states were states that were affected in Nigeria. The flooding took place in the mid-season and the flood was at its peak during harvest period. NEMA (2012) estimated that Nigeria lost 28%, 22%, 17%, 31%, 20% and 14% of yam, cassava, sweet potato, rice, maize and sorghum respectively. While it has been noted that these losses may affect income of the farmers and food security in Nigeria, the effect of these losses has not been investigated on income inequality of the farmers in Nigeria.

Inequality and poverty affect each other directly and indirectly through their link with economic growth (ODI, 2002). Poverty can be reduced through increases in income, through changes in the distribution of income, or through a combination of both. Changes in income distribution have even larger effects on measures of the depth and severity of poverty, as confirmed by evidence from Cote d'Ivoire and Bangladesh (Wodon, 1999). Policies and growth patterns that improve distribution are, therefore, a potentially significant additional tool in the fight against poverty (White and Anderson, 2001). If, in future, development policy makes inequality an explicit target, it will greatly enhance the poverty reducing effect of growth. Initial cross-country studies, including Birdsall *et al.* (1995), found that greater initial income inequality actually reduces future growth even after controlling for initial levels of GDP and human capital. The robustness of these findings has been the subject of much debate, however recent analysis using an updated and more comparable inequality data reconfirms the negative effects of inequality on growth (Knowles, 2001). Low inequality can, therefore, benefit the poor in two ways: by increasing overall growth and average incomes, and by letting them share more in that growth (The World Development Report, 2001). Tradeoffs or not, distribution matters and policy makers should consider it, if the aim is to maximise poverty reduction.

Poor targeting of the victims of the disaster may lead to regressive distribution of the compensation in which the poor may not benefit as much as the rich in its distribution. According to Harmer *et al.* (2012), the most damaging impact of corruption is the diversion of basic resources from the poor. humanitarian assistance aims to save lives and alleviate the suffering of people in times of crisis, yet these noble objectives do not immunize it from corruption. Assistance to the poor in time of disaster is vulnerable to corruption during the targeting and registration phase (Maxwell *et al.*, 2011). Harmer *et al.* (2012), using the case of Kenya, have documented various channels by which corruption can influence targeting of the poor in compensation and assistance. They revealed that there can be manipulation or bribery in assessments, registration and targeting of assistance. The information can be manipulated in order to direct assistance to certain households, groups or regions, or to inflate losses of some other households or areas. During the registration for compensation, names can be added to beneficiary lists in exchange for payment or sexual favours¹. Closely related to the issue of corruption is the role of political factors in administration of compensation. Targeting of assistance for the people creates incentives for political leaders, local elites and Local relief committees charged with distribution of beneficiary lists for assistance through cronyism, nepotism or tribalism (Harvey and Bailey, 2011). Another challenge to proper targeting of compensation is the issue of coordination processes and policies. Related to this, is the fact that response effort may be marked by poor communication and information flow. A general concern regarding administration of compensation is that without clear information regarding the number of how many people suffered, how much they lost, etc, it may be difficult to properly help those that suffered the losses. Lack of infrastructure (poor road networks and lack of communication facilities) may also make it difficult to reach the poor for assistance during disasters (Chilambe, 2008).

OBJECTIVES OF THE STUDY

The following objectives were set for the study:

- To estimate the extent of loss suffered by the flood victims on their income and income distribution in the study area.
- To determine the share of losses and compensation among the flood victims in the study area

Methodology

The study was conducted in Etsako East Local Government Area of Edo State. Edo State was created on August 27th 1991. It has a population of 3,218,332 people which is made up of 1,640,641 males and 1,577,871 female by 2006 population census. Edo state lies between longitude 05° 04' East and

¹ <http://corruptionresearchnetwork.org/resources/frontpage-articles/tackling-corruption-in-humanitarian-aid>

06° 43' East of Greenwich Meridian and latitude 05° 44' North and 07° 34' North of the Equator. It is bounded on the North by Kogi State, on the West by Ondo State, on the South by Delta State and the East by both Kogi and Anambra states. It occupies an area of about 19,794 square kilometers. It has two district seasons the wet and dry seasons. The state has 18 Local Government Areas.. The study was carried out in Etsako East Local Government Area of Edo State. The Local Government has its administrative headquarters at Agenebode. It is made of clans, and they include Avianwu, Ekperi, Okpekepe, South Uneme, Three Ibies, Weppa Wanno (Agenebode). The people from this area have common origin, hence the same tradition and little differences in dialects. Their major occupation is farming and fishing. The data for this study were obtained from respondents using questionnaire /interview schedule.

A multistage sampling technique was employed to sample respondents for the study. The first stage involved the purposive selection of Etsako East Local Government Area, being one of the local government areas badly hit by the 2012 flood disaster in Edo State. The final stage involved the simple random selection of 100 respondents from two clans affected by the flood. Questionnaire and interview schedule were used to obtain information from the farmers. Mean, Lorenz Curve and Gini Coefficient were estimated from the data using STATA Software.

Lorenz curve is the graph that shows income distribution among population segments. The Lorenz curve shows the percentage of total income earned by cumulative percentage of the population. In a perfectly equal society, the "poorest" 25% of the population would earn 25% of the total income, the "poorest" 50% of the population would earn 50% of the total income and the Lorenz curve would follow the path of the 45° line of equality. As inequality increases, the Lorenz curve deviates from the line of equality; the "poorest" 25% of the population may earn 10% of the total income; the "poorest" 50% of the population may earn 20% of the total income and so on. Using the Lorenz curve, we can also generate a numerical representation of income equality called the Gini coefficient. The Gini coefficient is equivalent to the size of the area between the Lorenz curve and the 45° line of equality divided by the total area under the 45° line of equality. The more the Lorenz curve deviates from the line of equality, the higher will be the resulting value of the Gini coefficient. The greater the Gini coefficient, the greater the degree of income inequality. A perfectly equal income distribution will have a Gini coefficient of 0, while a perfectly unequal distribution will have a Gini coefficient of 1.

RESULTS AND DISCUSSION

The fact that majority of these farmers are middle age farmer is evident in Table 1 as the mean age of the farmers are 45 years. The table also reveals that 78% of them are male, with 49% of them had no formal education. Low level of education may limit the ability of these farmers to diversify their livelihood and reduce their ability to mitigate the weather shocks. This may also explain why they lost most of their income assets during the flood. These farmers have some farming experience as they have been farming for average of 19years. Their average total income from all the activities before the flood was ₦876, 480, however, they lost 79% of this to flood. The average compensation was ₦ 85676 while the uncompensated loss was ₦ 577574. This implies that the farmers were worse off in terms of income after the flood. This also suggests that the amount of compensation the farmers received was just about 13% of their losses. Much is still needed to be done to bring these farmers to their initial income level.

Table1. Descriptive Statistics of the Flood Victims

Variable	Summary
Gender	78% Male and 22% Female
Age	Mean Age is 45 Years
Education	49% have no formal education
Farming Experience	Mean Farming experience is 19 Years
Total Income Before the Flood	₦ 876480
Total Amount of Losses	₦ 663250
Total Income After the Flood	₦213230
Loss Rate	79%
Amount of Compensation	₦ 85676
Total Income After the Compensation	₦298906
Uncompensated Losses	₦ 577574

Source: Computed from Field Survey Data, 2014.

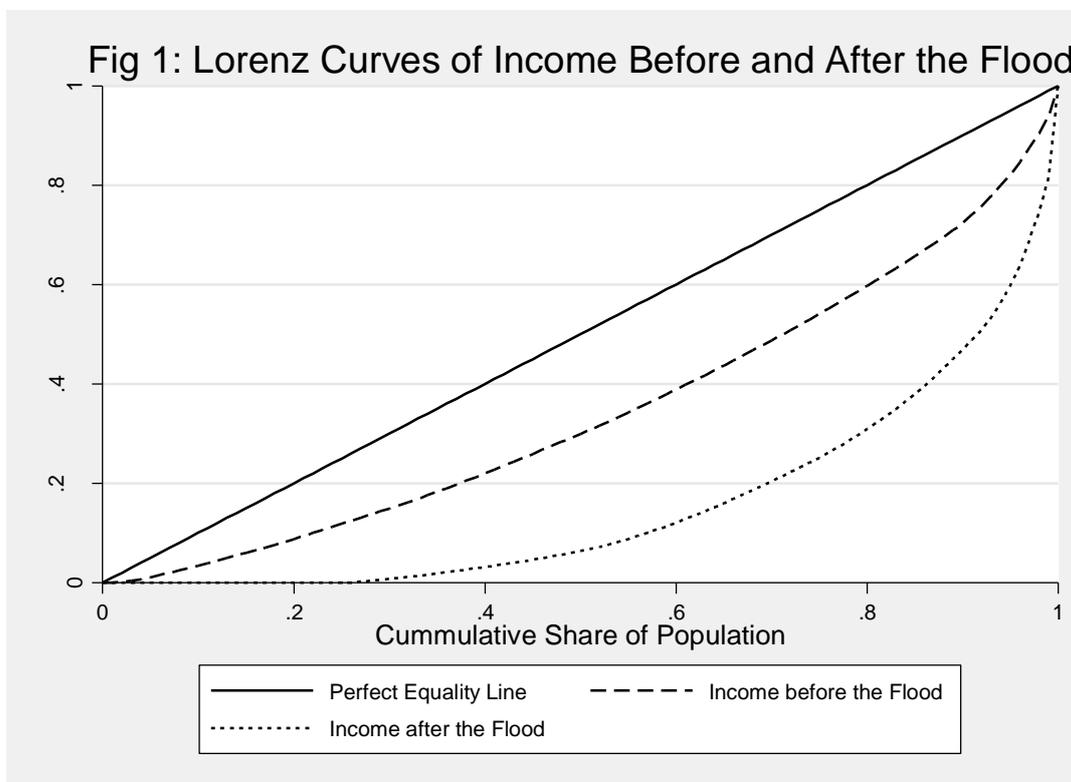
Correlation analysis presented in Table 2 reveals that only compensation received from government and total income of the victims were found to have a significant and positive correlation with losses to flood at 5% level of significance. The implication of this is that, the victims were compensated according to their losses and also, the higher the income of the respondents the higher the amount of loss sustained. To have a clearer view on the effect of the flood disaster on the income distribution of the victims, we constructed the Lorenz Curves for the victims during and after the flood incident. Figure 1 indicates that the Lorenz Curve of the income of the victims before the flood incident is nearer to the line of equality than the Lorenz Curve of the income of respondents after the flood. This implies that the flood disaster worsen the income inequality of the victims and consequently increased the poverty of the people. Wodon (1999) has indicated that this type of increase in income inequality has larger effects on the depth and severity of poverty, which means that the incidence of the flood has made more people in the study area to fall below the poverty line.

Table 2. Correlation Analysis between Socio-economic Variables of Respondents and Losses suffered due to flood.

Education	-0.037
Gender	0.135
Compensation	0.317**
Age	0.019
Experience	0.118
Total Income	0.490**

Source: Computed from Field Survey Data, 2014.

**Significant at 5%



Source: Computed From Survey Data; 2014

Table 3 corroborates the fact that inequality worsens among the victims of the flood despite the compensation received from the government. The table indicates that Gini Coefficient increased from 0.31 before the flood to 0.69 after the flood incidence. This is increase of about 123%, which is more among the male than among the female victims. The inequality among the male increased from 0.32 before the flood incidence to 0.73 after the flood incidence, while the inequality increased from 0.27 to 0.41. The percentage change in income inequality was 128% and 70% for male and female victims respectively.

Table3. Change in Income Inequality as a Result of Incidence of Flood in the Study Area

Income Inequality	Male Victims	Female Victims	All Victims
Gini Coefficient Before the Flood	0.32	0.27	0.31
Gini Coefficient After the Flood	0.73	0.46	0.69
Change in Gini Coefficient	0.41	0.19	0.38
% Change in Income Inequality	128	70	123

Source: Computed From Survey Data; 2014

Income inequality can increase if the victims are not compensated after the disaster, and the poor suffered the incidence of the flood more than the rich. The other reason that may promote income inequality after the victims might have been compensated is the lopsidedness of the distribution of the compensation. If the victims are not paid based on the proportion of their losses, the income inequality will worsen after the compensation. This is evident in Table 4 that shows that middle income group lost 18% of their income during the flood and they got only 13% of the total compensation, whereas the richest income group lost 33% of their income and received 44% of the total compensation. Many reasons can be attributed to this skewed distribution of compensation. Maxwell et al., (2011) and Harmer et al (2012) have indicated that assistance in form of compensation is vulnerable to corruption during the registration for the compensation and administration of the compensation. The richest income group can bribe the compensation administration to get larger share of the compensation. Nepotism/tribalism may also not be ruled out if the administrator of the compensation is from the particular tribe of the richest income group (Harvey and Bailey, 2011). This is possible because the administration of the compensation was handled by Local Government Officials in the study area who are from the same locality where flood occurred (NEMA, 2012).

Table4. Distribution of Compensation and Losses Among the Victims

Income Group	Losses		Compensation	
	Amount	%	Amount	%
Poorest	442221	13	24737	15
Poor	470250	14	22500	14
Average	574300	18	22500	14
Rich	726500	22	21000	13
Richest	1091950	33	69000	44
All	663255	100	32020	100

Source: Computed From Survey Data; 2014

CONCLUSION AND RECOMMENDATIONS

Majority of the flood victims in the study area in 2012 were middle age farmer with mean age of 45 years. About half of them had no formal education. Their average total income from all the activities before the flood was ₦876, 480; however, they lost 79% of this to flood. The average compensation was ₦ 85676 while the uncompensated loss was ₦ 577574. This implies that the farmers were worse off in terms of income after the flood. This also suggests that the amount of compensation the farmers received was just about 13% of their losses. The study also reveals that in spite of the fact that the flood incidence reduced the income of the victims, it also worsen income inequality among the victims of the flood despite the compensation received from the government. Generally, income inequality increased by 123% among the victims after the flood, which was more among the male (128% increase) than among the female victims (70% increase). The income inequality increased among the victims due to the lopsidedness of the distribution of the compensation. For example, the study indicates that the middle income group lost 18% of their income during the flood and they got only 13% of the total compensation, whereas the richest income group lost 33% of their income and received 44% of the total compensation. Corruption and tribalism/nepotism have been implicated for the skewed distribution of the compensation among the victims; this study therefore recommends the need for preventive measures to guide against future occurrence of flood among the people living close to riverine areas. Weather warning signals can be communicated to people living in flood prone areas. In case of flood disaster, amount of compensation that is commensurable to the losses of the people is recommended. A transparent system during the registration of the losses of the victims and administration of the compensation is essential to reduce the effect of the flood incidence on the depth and severity of poverty among the victims.

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