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Evaluation of the Effect of 2022 Flooding on Business Activities in Lokoja Metropolis

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Flooding has become a global issue and its effect varies with the level of flooding at a given period. In the wake of urban floods, public and commercial institutions are currently finding it difficult to develop and assess risk management and adjustment methods that include land use planning and urbanization patterns in addition to systems for flood prevention and early notifications. Flooding is one of the negative effects of global warming and most countries in the world are making effort to reduce its associated effects. This study examined the effect of 2022 flooding on business activities in Lokoja Metropolis. The study used a survey research design and a Taro Yamani sample size

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selection method to select 400 respondents. Questionnaire was administered to the respondents based on simple random selection and the data was analysed using Analysis of Variance (ANOVA) regression. The findings show that 2022 flooding exerts negative and statistically significant effect on business activities. there was low business patronage and high cost of goods during the flood period. Also, the findings show that small businesses were mostly affected during the flood period than large businesses. The study therefore recommends dredging of the River Niger and River Benue to increase water holding capacity. Also, there should be enactment of laws against building or citing of businesses along flood route to reduce the level of damages during flooding

Keywords: Flooding; household; business activities; ecological damages.

1. INTRODUCTION

One of the notable causes of ecological and human harm is flooding. According to Allaire [1] and Parida [2], it has an impact on the ecosystem, impairs public health, creates unemployment, and impacts socioeconomic conditions. In the wake of urban floods, public and commercial institutions find it difficult to develop and assess risk management methods that include land use planning and urbanization for flood prevention patterns and earlv notifications [3]. Nonetheless. Olajuvigbe, Rotowa and Durojeye [4] noted that there are significant challenges for policymakers around the world in mitigating the impact of natural disasters. As a result, compared to developing nations. countries with stable economic structures and administration have reported lesser socioeconomic damages and fewer deaths [5.6].

Onyedinefu [7] reported that the recent floods have caused immense difficulty for locals and even travelers traveling along the Kogi axis. Major roadways and transit routes, including the Abuja-Lokoja highway and the Lokoja-Kotonexperienced Karfe road, severe traffic congestion for many days as a result of the floods. Thousands of trucks carrying gasoline and perishable goods were left stranded as a result, which caused shortages of fuel in Abuja and other parts of the nation and caused losses for company owners. The devastation caused by the flood also extends to small enterprises, especially Micro, Small, and Medium Enterprises (MSMEs) [7]. Onyedinefu [7] also noted that business owners in the state and city lose significant amount of money due to severe disrupted economic activity. According to data from the 2020 MSME survey report, there are 938,740 businesses in Kogi. It was discovered that the ten LGAs that are submerged under water have a high population density for these enterprises [7].

According to official data from the State Emergency Management Agency (SEMA), the floods in Kogi state affected an estimated 5,550 pupils and at least 1,380 schools. Numerous locals surveyed by Kunle [8] confirmed that the flooding occurs every year and that the damage caused by the flooding in 2022 is still the worst since 2012. According to the Minister of Water Resources, Suleiman Adamu, about 80% of Nigeria's floods are caused by rainfall [9].

This study evaluates the effects of 2022 flooding on Business activities in Lokoja Metropolis. It would help to ascertain the extent of damage caused by the 2022 Flooding in Lokoja Metropolis.

2. LITERATURE

Floods are the deadliest natural calamity on Earth, destroying more property and taking more lives than any other natural event [10]. Data from the World Food Programme (WFP), Tellier Research, and the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) indicate that at least 3.5 million of the five million people affected by flooding in Africa are Nigerians.

The volume and extent of destruction of 2022 flood was not expected by many households in Lokoja Metropolis especially farmers as such have not occurred for the past 10-year. According to Kunle [8], the flood incident caused many farmers and households to run for shelter in Ozi Primary School, Koton-Karfe town, Kogi local government area. One of the numerous victims of the floods that wrecked homes in Kogi State was Ms. Ajara, a 40-year-old fish vendor who sought safety in the Koton-Karfe Primary School. Even though the widow's life has been difficult since her spouse passed away, she claimed that the floods have made her socioeconomic situation worse [8]. Globally, flooding has really distorted business activities at varying degrees thereby causing significant losses, including stock and assets [11]. Small businesses are more vulnerable to natural disasters compared to larger establishments due, in part, to their inability in the short term to quickly adapt to extreme circumstances [12]. Flooding could lead to damage of company inventory, vehicles, fixtures, and fittings. Further, there are concerns that increased severe weather events from growing climate volatility will disproportionally and negatively impact small businesses as a result of the higher degree of natural disaster vulnerability (United Nations Environmental Programme [13]. While federal and state governments emphasize local community preparedness to help address this increased risk, there may also be polarization between community members and local authorities in terms of implementing disaster protection measures [14]. At the same time, it is necessary that all community stakeholders, including local small businesses, are engaged in community resilience plans for such plans to be effective [15].

Much of the literature exploring the impact of natural disasters on small businesses relies on post-disaster surveys to better understand factors that contribute to small establishment resiliency [16,17,18]. Findings show that poor planning on the part of the small business, local area infrastructure issues, disruptions to the business cash flow, externalities from federal assistance, and barriers to access recoveryrelated capital negatively impacted establishment resilience in the wake of a natural disaster [18]. In addition, women-owned, minority-owned, and veteran-owned businesses appear more likely not to survive a natural disaster [19]. However, establishments that were older, larger in size, with owners who had greater industry experience and owners with prior experience navigating natural disaster, were more likely to survive [20].

The researchers found a small number of studies that examined the longer-term impacts of natural disaster events on US small businesses while also considering a range of industries in the affected region [21,22]. These studies explored the longer effects from natural disasters, specifically the 1993 Midwest Flood, on the local economy. The findings were that the long-term impact of flooding on local economies was negligible [21], and this was especially true in regions with greater economic diversity [22]. However, the effect on the agriculture sector was negative and for longer term for some communities [21].

In many parts of the world, flooding is the leading cause of losses from natural phenomena and is responsible for a greater number of damaging events than any other type of natural hazard [23,24], yet, floods seem to be part of the lives of most communities in the world particularly in developing countries. In Nigeria, the pattern is similar with the rest of the world. Floods are major environmental problem seriously affecting cities and villages in recent times causing damage to property and loss of lives [25,26,27].

There is increasing vulnerability of populations and infrastructure to flooding and flood related hazards [28]. Flood hazards are natural phenomena, but damage and losses from floods are usually, the consequence of human action [29]. Unlike, other forms of flood, urban flood refers to the inundation of sections of urban areas which can be caused by a combination of high intensity rainfall and prolong rainfall leading to the development of flash floods [30]. Urbanization aggravates flooding by restricting where flood water flows into. Covering large parts of the ground with roofs, roads and pavements, obstruct sections of the natural channels and drains that ensure that water moves to rivers faster than it did under natural conditions.

As an area become "urbanized" or go through the process of urbanization, there are increased flood risks that result due to human activities such as deforestation, building without plan and so on [31,32]. As a result, even quite moderate storms produce high flows in rivers because there are more hard surfaces than drains. In the last 50 years, Benin City has witnessed a tremendous growth in population and area coverage. A prominent environmental problem associated with this expansion is flooding. Flooding affects numerous aspects of man's environment. These include his economic activities; settlements and lifestyle. Several threats to livelihoods ranging from the physical threats to social and economic threats exist, while affected persons suffer some psychological effects [31].

Economic measurements are difficult but they are much easier to make than estimating the disaster's impacts on the emotional and social structures [33]. Studies have also attempted to quantify the lasting post-traumatic stress syndrome on individuals in disaster-impacted communities [34] (Erickson, 1998). A study of suicide rates before and after disasters indicated that suicide rates rose 13.8 percent in the four years after floods [35]. Olajuyigbe et. al. [4] observed that flooding events are usually not limited to destruction of physical structures but are also accompanied with prevalence of diarrhea and other waterborne diseases as most sources of water are polluted. UNISDR [36] reported that the economic impact of natural disaster shows a marked upward trend over the last several decades. The study further noted that hazards tend to hit communities in developing countries especially the developed countries, increasing their vulnerability and setting back their economic and social growth sometimes by decades. Floods have led to loss of human life, destruction of social and economic infrastructure and degradation of already fragile ecosystems.

Small and Medium scale businesses have been found to be highly vulnerable to flooding and other natural hazards due to their inherent characteristics [37,38]. The impacts may have either directly or indirectly through damaged or lost stock, damage to building / premises, damaged or lost building equipment, inability to conduct business, and inconvenience to staff.

The flood events caused significant disruptions to the business sector, especially small and medium-sized businesses (SMEs), which are often affected disproportionately hard by such events and are less prepared to manage the consequences [38,39]. In Nigeria, while several studies have been undertaken to assess the environmental and socioeconomic impacts of urban flooding little attention has been given to impact of flooding on small and medium scale business and coping strategies [4,3,32]. This is in spite of increasing evidence of changing climatic pattern. This study therefore attempted to evaluate the impacts of urban flooding on business types and coping methods in Benin City.

Butu, Ubachukwu and Emeribe [40], investigated the impact of urban flooding on small and medium scale businesses in Benin City. Ten locations including, BDPA quarter, Uselu market, Oliha market, Ekenwanquarter, Ogida quarter, New Benin, Uwelu market. Ikpoba Hill. Aduwawa, Upper Sakponba were purposively selected for the study due to previous flood experience [41,42]. In terms of spatial dimension of impact, analysis showed that all the sample locations have similarly experienced various degree urban flood impacts in terms of disruptions of business activities.

3. METHODOLOGY

This study adopted survey research design. This enabled the researcher to gather meaningful data on the phenomenon for the purpose of reliability and generalization. The area of study is Lokoja, a city in Nigeria. It lies at the confluence of the Niger and Benue rivers and is the capital city of Kogi State. While the Yoruba (Oworo), Bassa Nge and Nupe are indigenous to the area. other ethnic groups of Nigeria, including the Kupa-Nupe, Hausa, Ebira, Igala, Igbo, Bini/Edo, and Tiv., have recently established themselves, Lokoja is projected to be the third fastest growing African continent city between 2020 and 2025, with a 5.93% growth (Avery, 2021). It was listed a second-class township by the 1917 township ordinance of the colonial administration. This shows that Lokoja is an old city. Lokoja is also a Local Government Area of Kogi State with an area of 3,180 km² and a population of 195,261 at the 2006 census. It is bounded by the Niger in the north and east upstream from the capital until the border with Kwara State, and includes the city of Lokoja.

The current metro area population of Lokoja in 2023 is 839,000, a 6.07% increase from 2022. The metro area population of Lokoja in 2022 was 791,000, a 6.75% increase from 2021. The metro area population of Lokoja in 2021 was 741,000, a 7.08% increase from 2020 (United Nations, 2023). With this, the population of the study is 839,000. This permitted the researcher to adopt Yamane (1964) model for determining the sample size of a finite population and a sample of 400 households were used in the study.

The study designed questionnaire using five-Likert method of strongly agree, agree, neutral, disagree and strongly disagree and a benchmark mean of 3.0 was established. On the spot filling of questionnaire was used to ensure the retrieval of all the questionnaires distributed. The reliability test of the instrument was conducted on 30 respondents and the Pearson Product Moment Correlation coefficient of 0.82 was obtained. This shows that the instrument is highly reliable.

3.1 Method of Data Analysis

The study used mean and standard deviation to analyse the data while the hypotheses were tested using multiple regression analysis. The regression model to examine the extent to which 2022 flooding affected Business activities in Lokoja is specified as follow;

$$Busactivities = f(flooding, X)$$
(1)

Where business activity is proxy by the volume of sales during the flooding period,

And X stands for other factors that could affect business activities. This includes low patronage. High cost of goods, Small size of business, and Low quality of goods and services.

 $Busactivities_i = \beta_0 + \beta_1 flooding_i + \beta_2 lowpatronage_i +$ $\beta_3 Ssize of bus_i + \beta_4 Lquality of gds_i + \beta_5 H cost of gds_i + \mu_i$ (2)

Equation (2) measures the effect of flooding on holding other variables constant. The values of β_1, \dots, β_5 measure the slope of the parameters to be estimated. It is expected that flooding, low patronage, small size of the business, low quality of goods and services and high cost of goods and services should exert negative effect on business activities. This model will be estimated using the Analysis of Variance regression approach. This would help to reveal the effect of flooding on business activities in Lokoja Metropolis.

4. ANALYSIS AND PRESENTATION OF RESULTS

The study analyses and interprets the data generated from the guestionnaire distributed to

residents in Lokoja, Kogi State. Section A was analysed using simple percentages while section B was analysed using ANOVA regression analysis.

4.1 Background Characteristics of the Respondents

Table 1 shows the percentage distribution of gender of respondents. It is observed that 154 male and 246 female were sampled. This represents 38.5 percent and 61.5 percent respectively. The study shows that female respondents exceed male respondents by 92 (23 percent).

Table 2 shows the percentage distribution of age of respondents. It is observed that 31 of the were less than 20 respondents vears representing about 7.8 percent of the total respondent. Also, 225 respondents were above 20 years but less than 40 years. This represents about 56.3 percent of the total respondents sampled in this study. Lastly, 144 respondents sampled were found to be 40 years and above. This represents about 36.0 percent of the total respondents sampled in this study. With this, it is observed that greater percent of the respondents fall within 20 years and above. This shows that the quality of data generated from them would portray the effect of flooding on the socio-economic activities of the residents.

| | | | Gender | | |
|---------|--------|-----------|-------------------|---------------|--------------------|
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Male | 154 | 24.4 | 38.5 | 38.5 |
| | Female | 246 | 39.0 | 61.5 | 100.0 |
| | Total | 400 | 63.5 | 100.0 | |
| Missing | System | 230 | 36.5 | | |
| Total | | 630 | 100.0 | | |
| | | | hor's Field Surve | NY 2022 | |

Table 1. Percentage distribution of gender of respondents

Author's Field Survey, 2023

| Age Group | | | | | | | | | |
|------------------------------|---|--|--|--|--|--|--|--|--|
| | Frequency | Percent | Valid Percent | Cumulative Percent | | | | | |
| Not more than 20 years | 31 | 4.9 | 7.8 | 7.8 | | | | | |
| above 20yrs but less than 40 | 225 | 35.7 | 56.3 | 64.0 | | | | | |
| 40 years and above | 144 | 22.9 | 36.0 | 100.0 | | | | | |
| Total | 400 | 63.5 | 100.0 | | | | | | |
| System | 230 | 36.5 | | | | | | | |
| | 630 | 100.0 | | | | | | | |
| | above 20yrs but less than 40 40 years and above Total System | Not more than 20 years31above 20yrs but less than 4022540 years and above144Total400System230630 | Not more than 20 years 31 4.9 above 20yrs but less than 40 225 35.7 40 years and above 144 22.9 Total 400 63.5 System 230 36.5 630 100.0 | Not more than 20 years 31 4.9 7.8 above 20yrs but less than 40 225 35.7 56.3 40 years and above 144 22.9 36.0 Total 400 63.5 100.0 System 230 36.5 | | | | | |

Author's Field Survey, 2023

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| Marital Status | | | | | | | | | |
|----------------|----------|-----------|---------|---------------|--------------------|--|--|--|--|
| | | Frequency | Percent | Valid Percent | Cumulative Percent | | | | |
| Valid | Single | 107 | 17.0 | 26.8 | 26.8 | | | | |
| | Married | 273 | 43.3 | 68.3 | 95.0 | | | | |
| | Divorced | 20 | 3.2 | 5.0 | 100.0 | | | | |
| | Total | 400 | 63.5 | 100.0 | | | | | |
| Missing | System | 230 | 36.5 | | | | | | |
| Total | • | 630 | 100.0 | | | | | | |

Table 3. Percentage Distribution of Marital Status of Respondents

Author's Field Survey, 2023

Table 3 shows the percentage distribution of marital status of respondents. It is observed that out of the total respondents sampled, 107 (26.8 percent) were single, 273 (68.3 percent) were married and 20 (5.0 percent) were divorced. This further revealed that the study sampled more of married respondents than single or divorced. The implication of this is that these respondents would be more responsible and would actually account for the effect of flooding on their household.

Table 4 shows the percentage distribution of qualification of respondents. It is observed that 157 (39.3 percent) of the respondents hold NCE/OND or below qualification while 198 (49.5 percent) hold HND/B.SC. the respondents that hold M.Sc. /PhD were about 45 (11.3 percent). This shows that greater percentage of the respondents hold HND/BSC. The implication of this to the study is that the respondents would supply rational information based on how they were affected by the flood.

Table 5 shows the percentage distribution of job type of respondents. It is observed that 106 (26.5 percent) of the respondents do business, 183 (45.8 percent) are civil servants, 79 (19.8 percent) do Handiwork while only 32 (8.0 percent) of the respondents are transporters. It shows that this study addressed the different job type available in Lokoja and as a result, the respondents' views would represent the true views of the entire population.

Table 6 shows the percentage distribution of how long the respondents have stayed in Lokoja. This variable is added because it is expected that a respondent who has stayed for a longer time would possess more valuable information about the history of flooding most especially the 2022 flooding. It is observed that only 2 (0.50 percent) of the respondents have not stayed in Lokoja for more than 2 years. Also, 168 (42 percent) of the respondents have stayed in Lokoja for more than 2 years but less than 5 years. Lastly, it was observed that respondents who have stayed 5 years and above in the area were about 230 (57.5 percent). The information available on Table 6 shows that most of the respondents sampled have stayed in Lokoja for more than 2 years and as a result have adequate knowledge of the 2022 flood incident in the area.

4.2 The Extent to Which 2022 Flooding Affected Business Activities in Lokoja

The study evaluates the extent to which 2022 flooding affected business activities in Lokoja and the independent variables used include, quality of goods affected volume of sales, flood led to low patronage of customers, small size of business affected volume of sales, Flood affected Business activities, high cost of goods during flooding discourage customers. The dependent variable is the business activities. This was proxy by Business activities was going on smoothly during flooding. Table 7 shows the result of the effect of 2022 flooding on business activities in Lokoja Metropolis.

Table 7 (a) shows the Model summary of the effect of flooding on business activities in Lokoja. It is observed that the correlation coefficient (R) of 0.909 shows that there is very strong but nonperfect linear relationship between the explanatory variables included in the model and the dependent variable. Also, the R-Square value of 0.826 shows that about 82.6 percent of the variation in business during period of study could be attributed to the explanatory variables. The small value of the standard error shows that the model is significant.

Table 7 (b) shows the ANOVA result of the effect of 2022 flooding on business activities in Lokoja Metropolis. The sum of squares from regression is 14.273 with 5 degrees of freedom while the sum of squares from residual is 180.664 with 394 degrees of freedom. It is observed that significant value (0.032 < 0.05) of the F-statistic indicates that the model is significant at 5 percent. Emmanuel et al.; J. Geo. Env. Earth Sci. Int., vol. 28, no. 4, pp. 15-26, 2024; Article no.JGEESI.113824

Table 4. Percentage Distribution of Qualification of Respondents

| | | Qual | ification | | |
|---------|-------------------|--------------|--------------|---------------|--------------------|
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | NCE/OND and below | 157 | 24.9 | 39.3 | 39.3 |
| | HND/B.Sc. | 198 | 31.4 | 49.5 | 88.8 |
| | M.Sc./ PhD | 45 | 7.1 | 11.3 | 100.0 |
| | Total | 400 | 63.5 | 100.0 | |
| Missing | System | 230 | 36.5 | | |
| Total | | 630 | 100.0 | | |
| | | Author's Eig | Id Survey 21 | 023 | |

Author's Field Survey, 2023

Table 5. Percentage distribution of job type of respondents

| | | | Job Type | | |
|---------|---------------|-----------|-----------------|---------------|--------------------|
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Business | 106 | 16.8 | 26.5 | 26.5 |
| | civil servant | 183 | 29.0 | 45.8 | 72.3 |
| | Handiwork | 79 | 12.5 | 19.8 | 92.0 |
| | Transporter | 32 | 5.1 | 8.0 | 100.0 |
| | Total | 400 | 63.5 | 100.0 | |
| Missing | System | 230 | 36.5 | | |
| Total | | 630 | 100.0 | | |
| | | Author | 'a Field Survey | , 2022 | |

Author's Field Survey, 2023

Table 6. Percentage Distribution of Length of stay in Lokoja of Respondents

| | Length of | stay in Lokoja | | | |
|---------|---|----------------|---------|------------------|-----------------------|
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | not more than 2 years | 2 | .3 | .5 | .5 |
| | more than 2 years and less than 5 years | 168 | 26.7 | 42.0 | 42.5 |
| | 5 years and above | 230 | 36.5 | 57.5 | 100.0 |
| | Total | 400 | 63.5 | 100.0 | |
| Missing | System | 230 | 36.5 | | |
| Total | - | 630 | 100.0 | | |

Author's Field Survey, 2023

Table 7. Effect of 2022 Flooding on Business Activities in Lokoja Metropolis

7a. Summary of Model

| Model Summary | | | | | | | |
|---------------|-------|----------|-----------------------------|----------------------------|--|--|--|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | | | |
| 1 | .909ª | .826 | .815 | .03715 | | | |
| | | | Author's Field Survey, 2023 | | | | |

7b. ANOVA Result

| ANOVAª | | | | | | | |
|--------|------------|----------------|-----|-------------|-------|-------------------|--|
| Mode | el | Sum of Squares | Df | Mean Square | F | Sig. | |
| 1 | Regression | 14.273 | 5 | 2.855 | 6.220 | .032 ^b | |
| | Residual | 180.664 | 394 | .459 | | | |
| | Total | 194.937 | 399 | | | | |

Author's Field Survey, 2023

| | | Coe | efficients ^a | | | |
|----|--|--------------------------------|-------------------------|------------------------------|--------|------|
| Me | odel | Unstandardized Coefficients | | Standardized Coefficients | Т | Sig. |
| | | В | Std. Error | Beta | | |
| 1 | (Constant) | 1.315 | .390 | | 3.367 | .001 |
| | 2022 Flood affected Business activities | 071* | .033 | .067 | -2.152 | .012 |
| | low patronage of customers as a result of flood | 055* | .024 | 065 | -2.292 | .027 |
| | High cost of goods during flooding discourages customers | .095** | .050 | .109 | 1.901 | .058 |
| | Size of business | .069* | .032 | .107 | 2.145 | .033 |
| | Quality of goods affected volume of sales | 036 | .044 | 041 | 818 | .414 |

7c. Regression Result

a. Dependent Variable: Business activities was going on smoothly during flooding Author's Field Survey, 2023 * sig. at 5 percent ** sig. at 10 percent

Table 7 (c) shows the regression result of the effect of flooding on. It is observed that flooding of 2022, low patronage of customers as a result of flood and small size of Business affected volume of sales were found to be statistically significant at 5 percent while high cost of goods during flooding discourage customers was found to be significant at 10 percent. Quality of goods affected volume of sales was observed to exact insignificant effect on education system in 2022.

Considering the impact of each of the significant independent variables, the study found that holding other variables in the model constant, 1 unit increase in the volume of 2022 flooding would lead to about 0.071-unit decrease in business activities in 2022. The probability of 2022 flooding was found to be 0.012.

Also, low patronage of customers as a result of flood was found to exert negative but statistically significant effect (0.027 < 0.05) on business activities in 2022. The study found that holding other variables in the model constant, 1 unit increase in the number of days of closure of schools would lead to about 0.055-unit decrease in business activities.

Similarly, the effect of business size was found to exert negative but statistically significant effect on business activities. The study found that holding other variables in the model 1 unit increase in the size of constant. business would lead to about 0.069-unit increase in the level of business activities during 2022 flooding.

5. DISCUSSION

The effect of flooding in Kogi state cuts across all aspects of socioeconomic activities of the households. The business sector was observed to be badly affected by the 2022 flooding. This is evident with the probability value of 0.012. the result indicates that with 1 unit increase in the volume of 2022 flooding, business activities in the area would decrease by would 0.071-unit. Put differently, 100 percent increase in the volume of 2022 flooding would decrease business activities in Lokoja Metropolis by 7.1 percent. Thus, this study found a negative but statistically significant effect of 2022 flooding on business activities. This confirmed the findings of Crichton [38] and Research [39] who found negative effect of flooding on business activities. The implication is that while households were faced with the challenge of having access to goods and services, the business firms face low patronage, low sales and low profits. Also, the governments on their part suffer decrease in tax revenue from business activities. Therefore, the effect of flooding on business activities produces negative chain reaction in the economy and no sector is left unaffected.

More so, the findings further revealed the effect of flooding on businesses varies with the size of the business. The probability value of size of business was found to be (0.033 < 0.05) less than 0.05. This indicates that small businesses were mostly affected by the 2022 flooding than large businesses. This was attributed to small businesses inability in the short term to quickly adapt to extreme circumstances. This confirms

the findings of Davlasheridze and Gevlani [12] who noted that small businesses are more vulnerable to natural disasters compared to larger establishments. It is not uncommon for most large businesses to have branches and outlets that help them to cushion the effect of flooding on sales and profits level. However, small businesses within Lokoja Metropolis finds it difficult to survive the stiff competition from their large counterpart and further distress on small businesses caused by flooding could lead to winding-up. Also, when these small businesses fold-up, there would be loss of revenue, unemployment and hardship in the area which might further lead to social unrest. So, if flooding is not checked in Lokoja Metropolis, the trickledown negative effect might not be contained by the government (state and federal) and households in the area.

6. CONCLUSION

Flooding is one of the effects of global warming and most countries in the world are making effort to reduce its associated effects. This study evaluates the effect of flooding on business activities in Lokoja metropolis. The study adopted a survey research design and a sample of 400 respondents were used. Self-structured questionnaires were administered to the respondents and the data was used to examine the extent to which 2022 flooding affected business activities. An ANOVA regression analysis was used to test the hypothesis that 2022 flooding has no significant effect on business activities in Lokoja Metropolis. The study found that 2022 Flood exerts negative and statistically significant effect on business activities (Prob. Value = 0.012 < 0.05). Also, the 2022 flooding resulted to low business patronage, severe damage to small businesses and high cost of goods. The study therefore recommends that the River Niger and River Benue should be dredged to increase their water holding capacity. Also, there should be enactment of laws against building or citing of businesses along flood route to reduce the level of damages during flooding.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX I

QUESTIONNAIRE

Please tick as appropriate [/]

SECTION A

Gender: (a). Male [] (b). Female []

Age group you belong to? (a). Not more than 20 years [] (b). Above 20 but less than 40 [] c. Above 40 years []

3. Marital status? (a). Married [] (b). Single [] c. Separated []. (d). Complicated []

4. What is your academic qualification? (a). NCE/OND and below [] (b). HND/BSC []

(c). MSC/PHD []

5. Employment type? (a). Business [] (b). Civil servant [] (c). Handiwork []

6. For how long have you been in Lokoja?

(a). Not more than 2 year [] (b). More than 2 years but less than 5 years [] (c). 5 years and above []

SECTION B

What is the extent to which 2022 flooding affected Business activities in Lokoja Metropolis?

| S/N | Item | SA | Α | Ν | D | SD |
|-----|---|----|---|---|---|----|
| 7 | Business activities in Lokoja was going smoothly throughout the | | | | | |
| | flood period | | | | | |
| 8 | Flooding affected business activities in Lokoja | | | | | |
| 9 | Flooding led to low patronage of customers | | | | | |
| 10 | High cost of goods discouraged buyers during the flood period | | | | | |
| 11 | The small size of business outlet affected the volume of business | | | | | |
| | activities during the flood period | | | | | |
| 12 | Low Quality of goods and services affected the volume of | | | | | |
| | business activities | | | | | |

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