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Full Length Research Article

EVALUATING THE SOCIOECONOMIC AND HEALTH IMPACTS OF THE 2020 FLOOD IN GORONYO LOCAL GOVERNMENT, SOKOTO STATE, NIGERIA

*[1]Nasiru Lawal and [2]Aliyu Abubakar Shehu

[1]Department of Geography, Nigerian Defence Academy, Kaduna, Nigeria
[2]Usmanu Danfodiyo University, Sokoto, Nigeria

*Corresponding Author Email Address: nlawal29@gmail.com

ABSTRACT
The 2020 flood had a devastating impact on most villages in Goronyo Local Government, particularly those situated in the Fadama areas. This study employed a mixed-methods approach to obtain cross-sectional information on the impacts of the 2020 flood incident in Goronyo Local Government. Data were collected from respondents through structured questionnaires, which were subsequently sorted and coded into SPSS version 22 for descriptive analysis. The results indicated that the majority of respondents were male, with 32.4% falling within the age range of 31-40 years. Approximately 41.0% of the respondents identified as farmers. The findings also revealed that rice was the primary crop lost during the flood, and houses were the most affected building infrastructure, accounting for 43.8% of the losses. Moreover, 41% of respondents attributed the flooding to the overflow of the river due to intense rainfall and the narrowness of the river. Additionally, 32.8% of respondents believed that the flood resulted from heavy rainfall that exceeded the river's carrying capacity, leading to pressure and subsequent flooding of the affected villages. The flood was also accompanied by outbreaks of waterborne diseases, including cholera, typhoid, and diarrhea in some villages. These findings highlight the critical need for improved flood management and preparedness strategies to mitigate the adverse socio-economic and health impacts of future flood events in Goronyo Local Government.

Keywords: Farming, Flood, Impacts, Socioeconomic, Health

INTRODUCTION

Flooding is one of the most significant ecological catastrophes, accounting for over 40% of all natural disasters and responsible for more than half of the global fatalities associated with such events (CRED, 2019). In the United States, floods represent the primary cause of mortality related to natural disasters (CRED & UNDRR, 2019; United Nations Office for Disaster Risk Reduction, 2020). The ramifications of flood disasters are extensive, encompassing the disruption of human activities, habitat destruction, property damage, and loss of life (Baten et al., 2020; Bubeck et al., 2017; Jonkman & Kelman, 2005).

A recent report by the Centre for Research on the Epidemiology of Disasters (CRED) revealed that in the past two decades, flood disasters have resulted in economic losses amounting to approximately 651 billion US dollars globally. Africa has contributed 1% to this total, with an estimated economic loss of 27 billion US Dollars over the same period (CRED & UNDRR, 2019). Tingsanchali (2012) attributes the prevalence of urban flood disasters to the increasing human population, noting that half of these global disasters occur in Asia.

There is a growing consensus that the global hydrological cycle is intensifying, leading to an increase in the intensity and frequency of extreme climate events, which in turn affect flood occurrences (Babati et al., 2022). Hall et al. (2014) note that public concern over human influences on flood events is rising, with flood damage increasing globally, primarily due to the higher value of assets located on floodplains, despite improvements in flood protection measures.

Floods, often resulting in significant property loss and occasional loss of life, are caused by factors such as heavy rainfall, river overflow, tides, and drainage system failures. Anthropogenic activities, such as constructing residential homes in wetlands or flood-vulnerable areas, also contribute to flood risk (Tingsanchali, 2012; Barker, 2010). The risk of flooding is projected to increase due to climate change impacts on the water cycle and the growing habitation of people in flood susceptible areas (Bubeck et al., 2017).

The silting of riverbeds and banks has caused a notable rise in flood levels, decreasing the flood discharge capacity of rivers such as the Yangtze (Yin & Li, 2001). Additionally, changes in land use, social, and anthropogenic activities can increase flood risk beyond rainfall alone (Chandrasekara et al., 2018).

In the annals of environmental history, 2020 marked a pivotal moment for the residents of Goronyo Local Government in Sokoto State, Nigeria. The area experienced a devastating flood that left an indelible mark on its socio-economic fabric and health landscape (Muhammad & Musa, 2020). This research aims to unravel the complex repercussions of the 2020 flood, highlighting both the tangible and intangible impacts on the local populace. Understanding these multidimensional consequences is crucial for informing future disaster management strategies and fostering resilience in vulnerable communities. This study seeks to bridge the existing knowledge gap by providing a comprehensive examination of the socio economic and health dimensions of the flood's aftermath, focusing specifically on Goronyo Local Government, Sokoto State, Nigeria.

MATERIALS AND METHODS

This research employed a mixed-method approach, integrating both qualitative and quantitative data to provide a comprehensive analysis of the flood's impacts. The data were collected through structured questionnaires and surveys conducted in the areas affected by the flood (Creswell & Creswell, 2018). A total of 300 questionnaires were distributed to respondents who were randomly selected from the villages of Balla, Kagara, Boyekai, Giyawa, Tsohon Garin Dole, and Goronyo town. Out of these, 290 completed questionnaires were returned, yielding a response rate of approximately 97%.

The collected data were accurately sorted and coded into the Statistical Package for the Social Sciences (SPSS) environment for analysis. Descriptive statistics were used to present the data, employing tables and charts to illustrate the economic and health impacts of the 2020 flood on the study area. This method enabled the identification of key patterns and trends, providing a clear understanding of the socio-economic and health repercussions experienced by the affected communities.

The qualitative aspect of the research involved open-ended questions and interviews to capture personal experiences and insights from the respondents. This enriched the quantitative data by adding depth and context to the findings, ensuring a holistic interpretation of the flood's effects (Li et al., 2020). The integration of these methods allowed for a robust analysis, offering a nuanced view of the flood's impact on Goronyo Local Government.

The methodology was designed to ensure the reliability and validity of the findings, with careful consideration given to sampling techniques, data collection procedures, and analytical methods. By combining qualitative and quantitative approaches, the research provided a comprehensive overview of the socio-economic and health impacts of the 2020 flood, offering valuable insights for future disaster management and resilience-building strategies in the region.

The Study Area

Goronyo Local Government is situated in the eastern part of Sokoto State, Nigeria, between latitudes 12°30'00" and 13°40'00" North of the equator, and longitudes 5°30'00" and 6°10'00" East of the Greenwich Meridian. It shares borders with Wurno, Isa, and Gada Local Government Areas. According to Mohammed, Baba, and Nmadu (2017), the climate in Goronyo is characterized by the Sudan Sahelian savannah type, with annual rainfall ranging from 579 mm to 674 mm and average monthly temperatures varying between 24°C and 33°C.

Goronyo Dam, which impounds the Rima River, is a significant feature of the local government area. Completed in 1984 and commissioned in 1992, the dam is a sand filled structure standing 21 meters high with a total length of 12.5 km. It boasts a water storage capacity of 976 million cubic meters (Mohammed, Baba, & Nmadu, 2017). The Federal Ministry of Water Resources (2020) notes that the dam is located near Katsira village, about 25 km east of Goronyo town and approximately 90 km northeast of Sokoto city. The main dam is positioned between longitudes 5°42' and 5°52' East and latitudes 13°23' and 13°35' North. The area is primarily drained by the Maradi River from Niger Republic to the north and the Rima River to the south, creating extensive floodplains and inland valleys that contribute to the region's irrigation sectors. The basin is managed by the Sokoto-Rima River Basin Development Authority (SRRBDA), which operates under the auspices of the Federal Ministry of Water Resources (FMWR).

Vegetation in Goronyo consists mainly of short feathery grasses and scattered deciduous trees, particularly thorny species such as Acacia (Bello et al., 2022). The primary occupations of the local population include arable farming, fishing, and pastoralism. Men predominantly engage in the cultivation of crops such as rice, onions, and beans, while women are typically involved in rearing small ruminants like goats and processing agricultural products. These activities include commercial production of traditional foods like 'fura' and 'nono,' which involve processing maize and millet into pap (FMWR, 2020).

This geographical, climatic, and socio economic setting provides a backdrop for understanding the profound impacts of the 2020 flood on Goronyo Local Government. The combination of extensive floodplains, agricultural dependency, and the critical role of the Goronyo Dam underscores the vulnerability of the region to flooding and its subsequent socio-economic and health repercussions.

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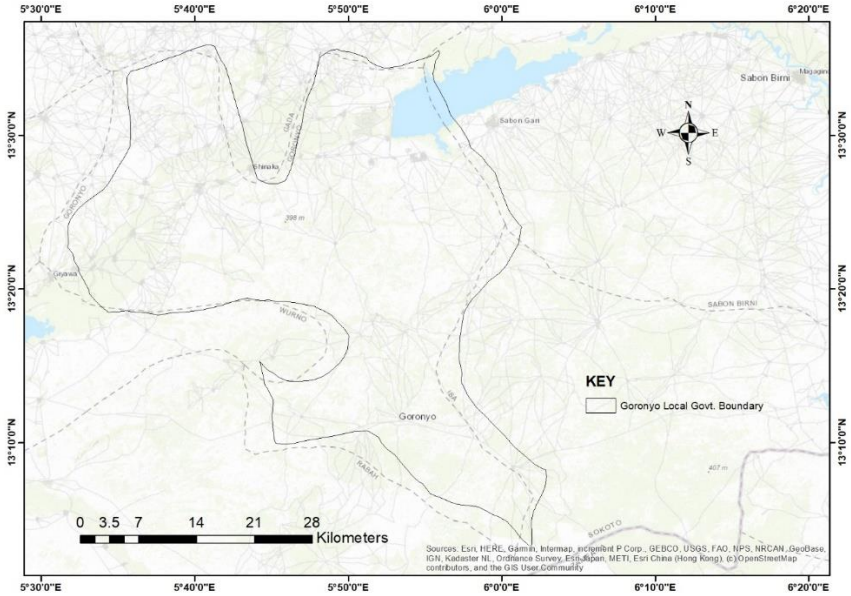

Figure 1: Map of the study area
Source: Authors' Analysis, 2020.

RESULTS AND DISCUSSION

Social and Economic Impacts of the Flood

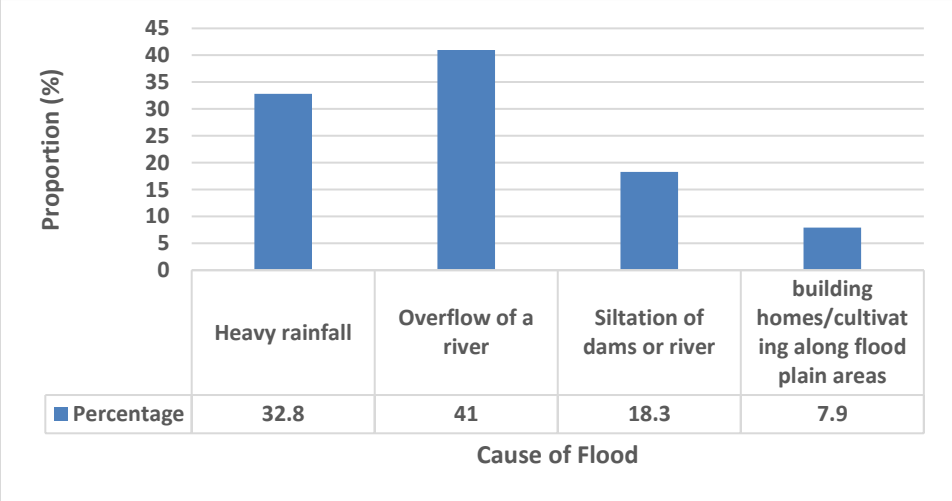

Figure 2: Respondents views on the causes of flood in the study area
Source: Authors' Analysis, 2020.

Figure 2 shows respondents views on the causes of flood in the study area. Findings revealed that a significant portion of the respondents (41%), attribute the flood to the natural overflow of the river. This suggests that the water levels exceeded the river's capacity, leading to flooding in the area. This could be due to various factors such as increased water flow upstream, blockages downstream, or changes in the river's natural course. Another notable finding is that 33% of the respondents believe that heavy rainfall was the cause of the flood. This implies that intense and prolonged rainfall in the study area contributed to the flooding. Heavy rainfall can lead to swollen rivers and saturated soil, enhancing the likelihood of flooding events. The two factors could be a product of narrow nature of the river/stream.

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Table 1: Distribution of age group according to gender of respondents

	AGE OF THE RESPONDENT				
Gender	21-30	31-40	41-50	51 and Above	Total
Male	68	95	64	46	273
Female	6	0	10	1	17
Total	74	95	74	47	290

Source: Authors' Analysis, 2020.

Table 1 presents the distribution of respondents' age groups according to gender, providing a detailed breakdown of the demographic characteristics of the study sample. The data reveals that the majority of respondents were male, accounting for 273 out of 290 total respondents (94.1%). In contrast, female respondents constituted only 17 out of 290 total respondents (5.9%). Among the male respondents, the largest age group was 31-40 years, comprising 95 individuals (32.4% of all respondents). This was followed by the 21-30 and 41-50 age groups, each with 68 and 64 male respondents respectively. The smallest age group among males was 51 and above, with 46 respondents.

For female respondents, the age group with the highest representation was 41-50 years, consisting of 10 individuals. The 21-30 age group had 6 female respondents, while the 51 and above age group had only 1 respondent. Notably, there were no female respondents in the 31-40 age group.

The total distribution across all age groups showed an equal number of respondents (74) in the 21-30 and 41-50 age categories. The 31-40 age group had the highest overall number of respondents at 95, while the 51 and above age group had the lowest total at 47 respondents.

These findings indicate a significant gender disparity among respondents, with a predominance of males across all age groups. The age distribution suggests that the most active age group in terms of participation in the survey was 31-40 years. This demographic insight is critical for understanding the socio-economic and health impacts of the 2020 flood, as it reflects the primary age and gender groups affected by the disaster.

Table 2: Occupation and annual income of the respondent

	ANNUAL INCOME OF RESPONDENT (₦)				
OCCUPATION	**150,000-200,000**	**201,000-250,000**	**251,000-300,000**	**301,000 and above**	Total
Farming	15.5	6.9	5.2	13.4	41.0 %
Civil servant	5.5	11.4	7.9	3.8	28.6 %
Business		7.6	12.4	5.5	25.5 %
Others		3.1	1.7		4.8%
Total	**21.0%**	**29.0%**	**27.2%**	**22.8%**	**100.0 %**

Source: Authors' Analysis, 2020.

The largest occupational group among the respondents is farming, comprising 41.0% of the total sample. Within this group, 15.5% of farmers earn an annual income between ₦150,000-₦200,000, 6.9% earn between ₦201,000-₦250,000, 5.2% earn between ₦251,000-₦300,000, and 13.4% earn above ₦301,000 as indicated in table 2.

Civil servants constitute the second largest occupational group, accounting for 28.6% of the respondents. Of these, 5.5% earn between ₦150,000-₦200,000 annually, 11.4% earn between ₦201,000-₦250,000, 7.9% earn between ₦251,000-₦300,000, and 3.8% earn above ₦301,000. Respondents engaged in business make up 25.5% of the total sample. This group shows a notable distribution across the income brackets: 7.6% earn between ₦201,000-₦250,000, 12.4% earn between ₦251,000-₦300,000, and 5.5% earn above ₦301,000. There are no respondents in the business category earning between ₦150,000-₦200,000 annually.

The category labeled 'Others' includes 4.8% of respondents who are engaged in various unspecified occupations. In this group, 3.1% earn between ₦201,000-₦250,000 annually, and 1.7% earn between ₦251,000-₦300,000. There are no respondents in this category earning either between ₦150,000-₦200,000 or above ₦301,000 annually. Overall, the distribution of annual income among all respondents is as follows: 21.0% earn between ₦150,000-₦200,000, 29.0% earn between ₦201,000-₦250,000, 27.2% earn between ₦251,000-₦300,000, and 22.8% earn above ₦301,000.

These findings suggest a diverse range of income levels among the different occupational groups, with farming being the predominant occupation. The data indicates that a significant portion of respondents engaged in farming earn either on the lower or higher ends of the income spectrum, reflecting the variability in agricultural income. Civil servants and business owners show a more even distribution across the income brackets, highlighting the different economic dynamics in these occupations. This income distribution is crucial for understanding the economic resilience and vulnerability of different occupational groups in the face of natural disasters such as the 2020 flood in Goronyo Local Government.

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Table 3: Type of Building and Estimated Cost Of Building Lost

	COST OF BUILDING LOST(₦)				
BUILDING	100,000-200,000	201,000-300,000	301,000-400,000	401,000 and above	Total
House	11.7		15.9	16.2	43.8%
Shop	8.6	3.1	3.8	1.7	17.2%
School	0.3	1.0	5.5	3.8	10.7%
More than one option	4.5	6.9	10.3	6.6	28.3%
Total	**25.2%**	**11.0%**	**35.5%**	**28.3%**	**100.0%**

Source: Authors' Analysis, 2020.

Table 3 details the types of buildings lost during the 2020 flood in Goronyo L the estimated costs associated with these losses.

Houses represent the highest proportion of building losses, accounting for 43. this category, 11.7% of the losses are estimated to cost between ₦100,000 largest proportions fall into the ₦301,000-₦400,000 (15.9%) and ₦401,00 ranges. This distribution indicates that houses incurred significant damage wit implications.

Shops account for 17.2% of the total building losses. The majority of sho ₦100,000-₦200,000 range (8.6%), with smaller percentages in the ₦201,0 ₦301,000-₦400,000 (3.8%), and ₦401,000 and above (1.7%) ranges. Thi losses, while significant, generally involved lower cost estimates compared to

Schools constitute 10.7% of the building losses. Only 0.3% of school losses fall into the ₦100,000-₦200,000 range. The majority are in the higher cost brackets: 1.0% in the 201,000-300,000 range, 5.5% in the ₦301,000-₦400,000 range, and 3.8% in the ₦401,000 and above range. This indicates that the damage to schools often involved higher financial costs.

The "More than one option" category, encompassing respondents who reported multiple types of building losses, accounts for 28.3% of the total. This group shows a varied distribution across all cost ranges: 4.5% in the ₦100,000-₦200,000 range, 6.9% in the ₦201,000-₦300,000 range, 10.3% in the ₦301,000-₦,000 range, and 6.6% in the ₦401,000 and above range. This highlights the complexity and multiplicity of the flood's impact on various types of buildings.

Overall, the total distribution of estimated costs of building losses is as follows: 25.2% in the ₦100,000-₦200,000 range, 11.0% in the ₦201,000-₦300,000 range, 35.5% in the ₦301,000-₦400,000 range, and 28.3% in the ₦401,000 and above range.

These findings underscore the severe financial impact of the 2020 flood on different types of buildings in Goronyo Local Government. The substantial losses, particularly in the higher cost brackets for houses and schools, reflect the extensive damage and significant economic burden borne by the affected communities. This data is crucial for informing disaster recovery efforts and the allocation of resources to rebuild and strengthen the resilience of the affe

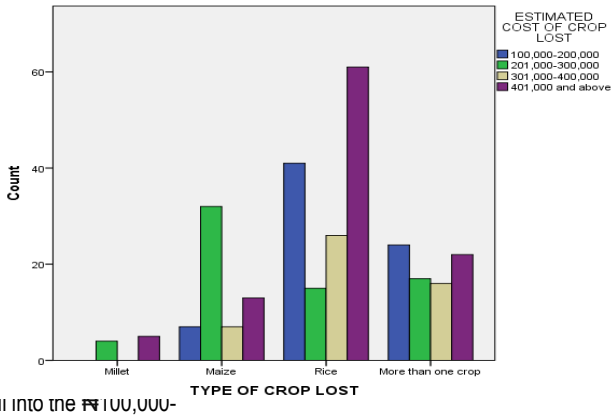

Figure 3: Cost of crops lost during the flood.
Source: Authors' Analysis, 2020.

On the type of crop lost to the flood, Figure 3 indicated that 51.4% of the respondents lost their Rice farms to the flood, 26.9% lost more than one crop to the flood and 19% lost maize farms to the flood. On the estimated cost of crop lost, majority of the respondents (37.2%) lost about ₦401,000 and above estimated cost of their crops. 23.1% lost between ₦201,000-₦4000-naira worth of their crops. The result also indicated that over 50% of the crop lost is rice and about 40% of respondent's loss crops of more than ₦400,000 in their farm. On the other hand, about 40% of the respondent's loss building infrastructure of more than ₦400,000.

Health impacts of flood in Goronyo local government

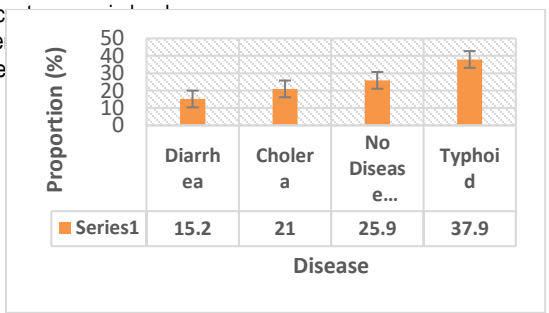

Figure 4: Distribution of Water related disease experienced during the flood. **Source:** Authors' Analysis, 2020.

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The bar chart in figure 4 presents the distribution of crop losses categorized by type of crop and the estimated financial cost of these losses due to the 2020 flood in Goronyo Local Government. The data indicates that millet suffered minimal losses compared to other crops. A small number of respondents reported losses, with occurrences primarily in the ₦100,000-₦200,000 and 401,000 and above ranges. This suggests that millet was relatively less affected by the flood, both in terms of frequency and financial impact.

For maize, the majority of losses are concentrated in the ₦201,000-₦300,000 range, indicating significant financial impact within this bracket. There are also notable losses in the ₦100,000-₦200,000 range, while fewer instances are recorded in the ₦301,000-₦400,000 and ₦401,000 and above ranges. This distribution shows that maize was moderately impacted, with a higher number of medium-cost losses.

Rice emerges as the most heavily impacted crop in terms of financial loss. The highest number of respondents reported losses in the ₦401,000 and above range, signifying severe financial damage. Additionally, there are substantial losses in the ₦100,000-₦200,000 and ₦201,000-₦300,000 ranges. This pattern indicates that rice was extensively affected, with numerous high-cost losses, reflecting its vulnerability to flooding.

The "More than one crop" category shows a diverse distribution of losses across all cost ranges. There are a significant number of respondents reporting losses in the ₦100,000-₦200,000 and ₦201,000-₦300,000 ranges. However, there are also considerable losses in the ₦301,000-₦400,000 and ₦401,000 and above ranges. This category highlights the extensive and varied impact of the flood, affecting multiple crop types with a broad spectrum of financial losses.

The data reveals that rice suffered the most severe financial losses, with a significant portion of these losses in the highest cost range (₦401,000 and above). Maize also experienced considerable losses, predominantly in the mid-range cost categories. Millet was the least affected crop in terms of financial loss, indicating its relative resilience or lower value in the affected areas. The "More than one crop" category highlights the complex and widespread nature of the flood's impact, affecting multiple crops with varying degrees of financial loss.

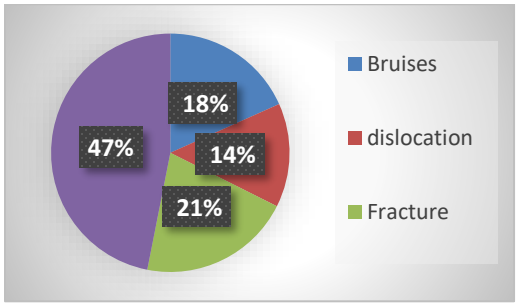

Figure 5: Distribution of injuries sustained by respondent during the flood. **Source:** Author's Analysis, 2020.

The data presented in Figure 5 shows the health impact of the flood on respondents, revealing that 47% reported no injuries, while 21% experienced fractures, 18% had bruises, and 14% suffered dislocations. The significant proportion reporting no injuries suggests that a substantial portion of the population either successfully implemented effective evacuation measures or encountered a flood event with lower physical risks. However, the percentages reporting fractures, bruises, and dislocations highlight the severity of injuries for those affected. This shows the importance of enhancing emergency preparedness and response strategies to address various health risks during floods. The findings show a need for targeted measures such as improving infrastructure safety, implementing early warning systems, and providing community education on evacuation procedures and first aid. Additionally, the findings show the importance of healthcare preparedness to address injuries, with a focus on fractures and dislocations, emphasizing the need for well-equipped medical facilities and trained personnel.

Table 4: Death During Flood

Options	Frequency	Percent
Yes	10	3.4
No	280	96.6
Total	290	100

Source: Author's Analysis, 2020.

Houses were the most significantly affected, comprising 43.8% of the total reported building losses as seen in table 4. Within this category, the losses are fairly evenly distributed across the cost ranges. The highest proportion of losses falls within the ₦301,000-₦400,000 range (15.9%) and the ₦401,000 and above range (16.2%). A smaller portion of losses falls within the ₦100,000-₦200,000 range (11.7%). This indicates that the flood inflicted substantial damage on residential structures, with many houses incurring high repair or replacement costs.

Shops represent 17.2% of the total building losses. The losses are primarily concentrated in the ₦100,000-₦200,000 range (8.6%). There are also some losses in the ₦201,000-₦300,000 (3.1%), ₦301,000-₦400,000 (3.8%), and ₦401,000 and above (1.7%) ranges. This suggests that the economic impact on commercial buildings was significant, although the financial burden was somewhat lower compared to residential buildings.

Schools account for 10.7% of the total building losses. The majority of school building losses fall within the ₦301,000-₦400,000 range (5.5%) and the ₦401,000 and above range (3.8%). There are minimal losses in the ₦100,000-₦200,000 (0.3%) and ₦201,000-₦300,000 (1.0%) ranges. This highlights the substantial financial impact on educational infrastructure, which may have long-term implications for the community's access to education.

The category for more than one type of building lost constitutes 28.3% of the total losses. The losses in this category are widely distributed across all cost ranges: ₦100,000-₦200,000 (4.5%), ₦201,000-₦300,000 (6.9%), ₦301,000-₦400,000 (10.3%), and ₦401,000 and above (6.6%). This indicates that a significant number of respondents experienced multi-faceted losses, affecting various types of buildings, which compounded the overall financial impact.

The distribution of building losses underscores the severe and widespread impact of the 2020 flood on infrastructure in Goronyo Local Government. Houses were the most affected, reflecting the vulnerability of residential structures to flooding. Financial losses were substantial across all building types, with a notable concentration in the higher cost ranges for houses and schools. The diverse distribution of losses in the "More than one option" category highlights the compounded effects on those who lost multiple types of buildings. This comprehensive understanding of the financial impact is crucial for guiding recovery and rebuilding efforts, ensuring that resources are allocated effectively to address the varied needs of the affected community.

DISCUSSION

Guha-Sapir (2019) reported that floods disasters were mostly triggered by heavy rainfall since 1982. On the other hand, Echendu (2020) opined that despite climate change has resulted in more extreme rainfall, flooding in Nigeria is more humanly induced and is caused by factors such as poor or nonexistent drainage system, poor waste management system, unregulated urbanization and poor implementation of planning laws/policies. Hall et al., 2014 also asserted that, human activities are evident at the river catchment and affects the natural landscape scale and has changed considerably in many areas across Europe, for example due to deforestation, urbanization, and the construction or the abandonment of terraces in hilly landscapes. Their findings also asserted that wetland drainage and agricultural practices have dramatically affected water flow paths. The findings show that there might be a need for better urban planning and infrastructure development, especially in managing water flow and preventing overflow. It could be beneficial to explore strategies such as widening the river or implementing flood control measures. The emphasis on heavy rainfall as a cause implies a need to consider climate change effects. With changing weather patterns, communities may experience more intense and frequent rainfall. This should be factored into future planning and mitigation efforts. Adelekan (2010) indicated that, Susceptibility indicators such as; type of building structure, length of stay of respondent in flood-affected area, past flood experience, awareness of flood hazard, perception of flood risks, and preparedness for possible flood occurrence.

Guha-Sapir (2019) reported that heavy rains that result in flood had killed 230 people and 504 were also killed in India's august flood. Olanrewaju & Chimenwo (2020) also asserted that flood that results from excess rainfall causes waterborne disease outbreaks such as cholera, cryptosporidiosis, non-specific diarrhea, rotavirus, typhoid and paratyphoid. This is also complimented by Barker (2010) who asserted that short term morbidity caused by flooding in developed countries is the product of both injury and illness. The number of orthopedic injuries associated with flooding in North Carolina in 1999 increased steadily over time and peaked several weeks after the event as people returned to their homes to clean and make repairs. He continues to say that individuals who have been affected by flooding are more likely to present to acute medical care facilities for skin rashes and exacerbation of asthma and for outpatient medical needs, such as dialysis or refills of prescriptions or oxygen. Ikechukwu (2015), who identified hazards and risks of floods on the socio-economic lives of the residents of Port Harcourt metropolis as to include: Loss of lives; Loss of property; Pollution of streets and houses; Pollution of source of water supply; Displacement of household members; Over flowing of soak ways, etc. or septic tanks. Week & Wizor (2020) also examined the effects of flood risk levels on food security, livelihood and socio-economic characteristics in the flood-prone areas of the core Niger Delta. 75% of the respondents indicates that they experience food scarcity after flood disaster.

Conclusions

From the results, it is evident that 2020 flood has resulted in the loss of building infrastructure and agricultural products such as millet, rice, maize and other legumes such as beans to the flood. Properties worth millions of naira have also been lost to the flood. It is also obvious that waterborne diseases are prevalent after the flood in the study area.

It is therefore recommended that Goronyo Dam be desilted to restore the original depth and carrying capacity of the dam in order to reduce the vulnerability of the dam to flooding when there is heavy rainfall. This with the recommendations of the ESIA conducted by the federal ministry of water resources indicated that, the most important reason to justify the proposed Goronyo Dam Rehabilitation is the associated human safety issue. The report continues to suggest that, should the dam embarkment fail, a flood event of a about 425 million cubic meters will be released to the downstream resulting in: loss of millions of human, plant and animal lives; loss of livelihoods (erosion of 5000 hectare of farmland will paralyze socio-economic activities); Environmental degradation; and loss of main source of water supply to Sokoto State. Moreover, the constant flooding of irrigation fields portends very high risk of deracination to the whole scheme (FMWR, 2020).

REFERENCES

Babati, A.-H., Abdussalam, A. F., Baba, S. U., & Isa, Z. (2022). Prediction of flood occurrences and magnitude in Hadejia-Jama'are river basin, Nigeria. *Sustainable Water Resources Management*, *8*(6), 188. https://doi.org/10.1007/s40899-022-00781-3

Barker, P. (2010). Mental health ethics: The human context. *Mental Health Ethics: The Human Context*, *321*(November), 1–378. https://doi.org/10.4324/9780203839058

Baten, A., Wallemacq, P., van Loenhout, J. A. F., & Guha-Sapir, D. (2020). Impact of Recurrent Floods on the Utilization of Maternal and Newborn Healthcare in Bangladesh. *Maternal and Child Health Journal*, *24*(6), 748–758. https://doi.org/10.1007/s10995-020-02917-3

Bello, A. A., Abua, M. A., Yelwa, S. A., Undiyaundeye, F. A., Iwara, A. I., Abutunghe, M. A., … Owalom, S. O. (2022). Geospatial Mapping of Areas at Risk to Flood along Sokoto-Rima River Basin, Sokoto Nigeria. *Environment and Ecology Research*, *10*(6), 806–823. https://doi.org/10.13189/eer.2022.100615

Bubeck, P., Otto, A., & Weichselgartner, J. (2017). Societal Impacts of Flood Hazards. In *Oxford Research Encyclopedia of Natural Hazard Science* (pp. 1–28). https://doi.org/10.1093/acrefore/9780199389407.013.281

Chandrasekara, S. S. K., Uranchimeg, S., Kwon, H. H., & Lee, S. O. (2018). Coastal Flood Disaster in Sri Lanka-May 2017: Exploring Distributional Changes in Rainfall and Their Impacts on Flood Risk. *Journal of Coastal Research*, *85*(May 2017), 1476–1480. https://doi.org/10.2112/SI85-296.1

CRED. (2019). *Natural Disasters*.

CRED & UNDRR. (2019). Disasters in Africa: 20 Year Review

2000-2019. *Cred & Undrr*, (56), 1–2.

Echendu, A. J. (2020). The impact of flooding on Nigeria's sustainable development goals (SDGs). *Ecosystem Health and Sustainability*, *6*(1). https://doi.org/10.1080/20964129.2020.1791735

Guha-Sapir, P. (2019). 2018 Review of Disaster Events. *Cred*, 1–6.

Hall, J., Arheimer, B., Borga, M., Brázdil, R., Claps, P., Kiss, A., … Blöschl, G. (2014). Understanding flood regime changes in Europe: A state-of-the-art assessment. *Hydrology and Earth System Sciences*, *18*(7), 2735–2772. https://doi.org/10.5194/hess-18-2735-2014

Health Policy Plus. (2017). Nigeria Population and Development: Sokoto State. *FACTSHEET September 2017 Population*, 1–2.

Ikechukwu, E. E. (2015). *Socio-Economic Impacts of Flooding on the Residents of Port Harcourt Metropolis in*. 1–8.

Jonkman, S. N., & Kelman, I. (2005). An analysis of the causes and circumstances of flood disaster deaths. *Disasters*, *29*(1), 75–97. https://doi.org/10.1111/j.0361-3666.2005.00275.x

Li, S., Wang, Z., Lai, C., & Lin, G. (2020). Quantitative assessment of the relative impacts of climate change and human activity on flood susceptibility based on a cloud model. *Journal of hydrology*, *588*, 125051.

Mohammed, U. S., Baba, K.M., Nmadu JN, R. . O. (2017). PROFITABILITY OF ARABLE CROP ENTERPRISE UNDER GORONYO DAM IRRIGATION PROJECT IN SOKOTO STATE, NIGERIA. *AgEcon Search*, 18.

Muhammad, Y., & Musa, D. (2020). AN ASSESSMENT ON THE ENVIRONMENTAL EFFECTS OF FLOOD ON COMMUNITIES IN SOKOTO EASTERN ZONE OF NIGERIA. *Journal of Engineering, Entrepreneurship & Environmental Studies*, *3*(1).

Olanrewaju, L., & Chimenwo, R. (2020). Analysis of Oil Spill Risk Using Space-Time Pattern of Incidents in the Niger Delta, Nigeria. *Journal of Sustainable Energy*, *10*(2), 1–11.

RESOURCES, F. M. O. W. (2020). *TRANSFORMING IRRIGATION MANAGEMENT IN NIGERIA (TRIMING) PROJECT*. *21*(1), 1–9.

Tingsanchali, T. (2012). Urban flood disaster management. *Procedia Engineering*, *32*, 25–37. Elsevier B.V. https://doi.org/10.1016/j.proeng.2012.01.1233

United Nations Office for Disaster Risk Reduction. (2020). An overview of the last 20 years. *Personality and Social Psychology Bulletin*, *21*(4), 324–343.

Week, D. A., & Wizor, C. H. (2020). Effects of Flood on Food Security, Livelihood and Socio-economic Characteristics in the Flood-prone Areas of the Core Niger Delta, Nigeria. *Asian Journal of Geographical Research*, (January), 1–17. https://doi.org/10.9734/ajgr/2020/v3i130096

Yin, H., & Li, C. (2001). Human impact on floods and flood disasters on the Yangtze River. *Geomorphology*, *41*(2), 105–109. https://doi.org/10.1016/S0169-555X(01)00108-8