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# EFFECTS OF FLOODING ON THE EDUCATION OF PUBLIC PRIMARY SCHOOLS AND THE ACADEMIC PERFORMANCE OF PUPILS IN AWKA NORTH LOCAL GOVERNMENT AREA (LGA) OF ANAMBRA STATE

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## ABSTRACT

*This study examined the effects of flooding on public primary school education and the academic performance of pupils in Awka North Local Government Area (LGA) of Anambra State, Nigeria. Employing a descriptive research design, data were collected through structured questionnaires administered to a sample of 100 primary school pupils and stakeholders in the education sector. The study revealed that flooding significantly impacts public primary school education, leading to infrastructure damage, loss of educational materials, and disruptions in the learning environment. Furthermore, flooding adversely affects the academic performance of pupils, resulting in reduced enrollment, increased dropout rates, and academic setbacks due to interrupted learning. The findings underscore the urgent need for proactive measures to mitigate the effects of flooding on education, including infrastructure resilience initiatives, early warning systems, and community-based disaster preparedness programs. Addressing these challenges is essential to ensure the continuity of education and improve academic outcomes for pupils in flood-prone areas like Awka North LGA.*

## KEYWORDS

*Flooding, education, public primary schools, academic performance*

## INTRODUCTION

Globally, floods represent environmental hazards stemming from meteorological phenomena, often exacerbated by human mismanagement of the physical environment. Heavy flooding is one physical disaster prevalent in schools as it has

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long-lasting effects on the infrastructure needs of schools compounded by the fact that schools are essential for the intellectual development of the future adults in our society and it is where academic and talent development is fostered and groomed (Okafor, 2021). A flood is characterized by an overflow from rivers or bodies of water, posing damage or imminent threat. Floods are a significant interaction between humanity and the environment, occurring worldwide and leading to substantial loss of lives, property, and socio-economic hardships (Parammal-Vatteri, 2022).

Floods, while presenting challenges, also yield benefits, albeit often overshadowed by their adverse effects. Floods result in widespread destruction of infrastructure, homes, and agricultural lands, and disruption of essential services like transportation and sanitation, posing health risks from pollution and waterborne diseases (Wibowo et al, 2024). River flooding, a natural occurrence, has been exacerbated by diminishing river spaces and increased population pressure, amplifying flood risks and burdens on formal education activities. Flooding exerts profound effects on formal education activities, disrupting learning environments and hindering academic progress (Cirella & Iyalomhe, 2018). Firstly, inundated schools become inaccessible, forcing closures and interrupting regular classes. This disruption not only disrupts the learning process but also compromises the safety of students and faculty.

Flood damage to school infrastructure, including buildings, furniture, and educational materials, undermines the conducive learning environment. Structural damage may render classrooms unsafe or unusable, delaying the resumption of educational activities even after floodwaters recede (Mfon, 2024). Moreover, the displacement of families due to flooding often results in the relocation of students to temporary shelters or distant areas, further disrupting their education continuity. This displacement may lead to absenteeism, dropout rates, and challenges in tracking and supporting students' academic progress (Petrucci, 2022).

Additionally, the psychological impact of flooding on students, including trauma, anxiety, and stress, can significantly affect their ability to focus and engage in learning activities. Formal education is a critical institution that contributes significantly to the improvement of life quality for any individual (Bolle et al, 2021). This is where lifelong skills are passed on by trained educators through theory and practice, but when a disaster like flooding occurs, the whole process comes to a halt until it is restored. Formal education therefore encompasses structured learning systems that follow established curricula and regulations (Bolarinwa, 2023). Primary education represents the initial stage of formal education, typically catering to children between the ages of 6 and 15. It lays the foundation for subsequent educational endeavors, focusing on fundamental skills such as reading, writing, and mathematics (Jada et al, 2023).

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Primary education serves as a crucial gateway to higher levels of education and plays a pivotal role in shaping individuals' academic trajectories and lifelong learning outcomes. As a fundamental component of formal education, primary education is essential for fostering cognitive development, critical thinking skills, and societal integration from an early age (Ihugba et al, 2019). Primary education is the foundational stage of formal learning, aimed at imparting fundamental skills and knowledge. Academic performance within the primary education system measures students' proficiency in essential subjects like literacy, numeracy, and critical thinking. Effective primary education lays a solid foundation for lifelong learning and future academic success (Ige, 2014). It fosters not only cognitive development but also social and emotional growth, preparing students for higher education and active participation in society.

Academic performance encompasses cognitive achievements across various subjects or specific domains, reflecting intellectual capacities through indicators such as grades, achievement tests, and educational qualifications (Ojugo et al, 2023). However, flooding poses significant challenges to primary education. It damages school infrastructure, disrupts learning environments, and displaces students and teachers. The psychological impact of flooding, coupled with logistical hurdles, hampers students' ability to focus, engage, and learn effectively. This disruption often leads to decreased academic performance, widening educational disparities, and hindering the attainment of learning objectives (Idowu & Eze, 2024). Recent flooding incidents in Nigeria, particularly in Northern states like Niger, Sokoto, Borno, Plateau, Anambra and Yobe, underscore the recurrent challenges posed by floods, with Anambra State experiencing significant impacts in areas like Awka, Oko, and Onitsha.

In Awka North LGA, floods have led to the submersion of buildings, displacement of families, and disruption of essential services, underscoring the urgent need for mitigation measures (Ebuzoeme, 2015). The adverse effects extend to economic losses, increased crime rates, and public health crises, necessitating comprehensive solutions to address the recurring menace of flooding in the region. This study aims to evaluate the impacts of flooding in Awka North LGA, proposing strategies for effective mitigation and adaptation.

### **LITERATURE REVIEW**

Flooding is a recurrent environmental challenge which has significant implications for public primary school education and pupils' academic performance. The causes of flooding are multifaceted, encompassing both natural and anthropogenic factors. Natural causes include excessive rainfall, river overflow, and topographical vulnerabilities, which are exacerbated by climate change (Chike, 2017). These natural factors are often intensified by human activities such as deforestation,

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urbanization, and poor waste management, which impede natural water drainage systems (Idowu & Eze, 2024). Inadequate infrastructure and poor urban planning further exacerbate flooding (Mfon, 2024). The lack of effective drainage systems and the encroachment on floodplains due to rapid urban expansion are significant contributors (Nkwunonwo et al, 2016). This persistent flooding disrupts educational activities by damaging school facilities, leading to the loss of instructional materials and creating unsafe learning environments (Mfon, 2024). Consequently, students' academic performance suffers due to interrupted schooling, psychological stress, and health issues related to flood exposure (Chike, 2017).

The primary challenges include disruption of school schedules, damage to school infrastructure, and psychological stress among pupils. Flooding often leads to the closure of schools, resulting in lost instructional time and delays in curriculum coverage (Mazzoli et al, 2019). Damaged classrooms, textbooks, and learning materials further hinder the educational process, making it difficult for teachers to deliver quality education (Kamenye, 2020). Additionally, the health risks associated with flooding, such as waterborne diseases, can cause absenteeism and decreased concentration among students (Kearney, 2019). The psychological impact of experiencing floods, including trauma and anxiety, adversely affects students' cognitive functions and academic engagement (Petursdottir & Ragnarsdottir, 2019). These factors contribute to poor academic performance, as pupils struggle to keep up with their studies amidst these adversities.

Addressing the challenges of flooding in public primary school education requires a multifaceted approach. Improving infrastructure resilience is crucial. This includes constructing elevated school buildings, implementing effective drainage systems, and using flood-resistant materials (Mabrouk et al, 2023). Additionally, regular maintenance and cleaning of existing drainage systems can prevent blockages that exacerbate flooding (Sandink & Binns, 2021). Community and stakeholder involvement is essential for sustainable solutions. Educating communities on flood risks and engaging them in flood mitigation efforts can enhance preparedness and response (Fox-Rogers et al, 2016). Schools should develop comprehensive disaster management plans that include early warning systems and evacuation protocols to ensure the safety of pupils and staff during floods (Shah et al, 2021).

Policy interventions are also vital. Governments should enforce strict urban planning regulations to prevent construction on floodplains and promote green infrastructure to enhance water absorption (Kiedrzyńska et al, 2015). Furthermore, integrating flood education into the school curriculum can raise awareness and build resilience among students (Hughes et al, 2021). Financial investments in flood mitigation projects and the establishment of emergency funds can support rapid recovery and

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minimize educational disruptions (Borah, 2023). Overall, a combination of infrastructural, educational, and policy measures is necessary to mitigate the impact of flooding on public primary school education.

### **RESEARCH OBJECTIVES**

1. To investigate the effects of flooding on public primary school education in Awka North LGA of Anambra State.
2. To identify the causes of flooding affecting public primary school education and the academic performance of pupils in Awka North LGA of Anambra State.
3. To examine the challenges posed by flooding on the academic performance of pupils in public primary schools in Awka North LGA of Anambra State.
4. To propose possible solutions to the challenges of flooding on public primary school education in Awka North LGA of Anambra State.

### **RESEARCH QUESTIONS**

1. What are the effects of flooding on the public primary school's education, in Awka North LGA of Anambra State?
2. What are the causes of flooding on the public primary school education, in the academic performance pupils, in Awka North LGA of Anambra State?
3. What are the challenges of flooding on public primary school education, in the academic performance of pupils, in Awka North LGA of Anambra State?
4. What are the possible solutions to challenges of flooding on public primary school's education, in Awka North LGA of Anambra State?

### **RESEARCH METHODOLOGY**

The study utilized a descriptive survey research design, focusing on gathering data to assess the effects of flooding on academic performance in public primary schools in Awka North LGA, Anambra State. A stratified sampling technique was employed to select 100 respondents from the target population of 500. This method ensured the representation of various characteristics within the population, enhancing the study's validity and generalizability. Data collection was facilitated through structured questionnaires, titled "Evaluating the Effects of Flooding on Public Primary School Education on the Academic Performance of the Pupils" (EEFPPSEAPP). The questionnaire consisted of two sections: personal information and questions related to the research objectives. Response options ranged from "Strongly Agree" to "Strongly Disagree" on a four-point Likert scale. The questionnaire underwent validation by experts in primary education and measurement and evaluation to ensure its alignment with the research questions. Reliability testing was conducted using a test-retest method, with respondents from Ogbaru and Onitsha North Local Government Areas in Anambra State, demonstrating the instrument's consistency. Data collection was carried out by the researcher and assistants, achieving a 100% return rate. Data

analysis involved organizing the collected data into tables and calculating means for each item. Items with a mean score of 2.50 and above were accepted, while those below 2.50 were rejected, serving as a cutoff point for analysis and interpretation.

### DATA ANALYSIS AND RESULTS

This chapter presents the data collected in the course of the study and the discussion of the findings. The results obtained were analyzed for the respective research questions. The results are shown in the table.

**Research Question 1:** What are the effects of flooding on the public primary school's education, in Awka North LGA of Anambra State?

S/N	ITEMS	A	SA	D	SD	TOTAL	X	DECISION
1	Reduction of pupils/student population from the school.	99	33	16	14	662	4.09	Accepted
2	It will result in the loss of valuable documents from the school saving box or backup box.	93	35	20	14	653	4.03	Accepted
3	Destroy school infrastructural facilities and equipment.	95	38	24	5	680	4.10	Accepted
4	It results to massive failure during exams because of half knowledge of the subjects they have enquired.	116	36	6	4	740	4.57	Accepted
5	It will also result in an uncovered scheme of work from the syllabus.	95	30	23	14	630	3.89	Accepted

Table 1 focused on the effects of flooding on the public primary school's education, in Awka North LGA of Anambra State. The mean scores were 4.09, 4.03, 4.10, 4.57 and 3.89, respectively and were accepted. Therefore, it was concluded that flooding can result to loss of certificate and others valuable documents.

**Research Question 2:** What are the causes of flooding on the public primary school’s education, in the academic performance pupils?

S/N	ITEMS	A	SA	D	SD	TOTAL	X	DECISION
6	Caused by proper control of dams.	99	33	16	14	300	1.85	Rejected
7	Causes of deforestation	130	30	1	1	773	4.77	Accepted
8	Through climate change	95	38	24	5	680	4.10	Accepted
9	Cause by emission of greenhouse gases	116	36	6	4	740	4.57	Accepted
10	Cause through overflowing rivers	99	33	16	14	662	4.09	Accepted
11	Through collapse of dams	95	38	24	5	680	4.10	Accepted
12	Through proper management of the water system	95	30	23	14	312	1.92	Rejected
13	Cause by snowmelt	93	35	20	14	653	4.03	Accepted

From Table 2 above, all the items had mean scores of 4.77, 4.10, 4.57, 4.09 and 4.03 respectively which were above the decision rule of 2.50. This implies that deforestation, climate change, emission of greenhouse gases, collapsed dams, snowmelt and overflowing rivers cause flooding, while 1.91, 1.92 and 1.85 were below the decision rule. Therefore, proper management of water and proper control of dams cannot cause flooding in areas.

**Research Question 3:** What are the challenges of flooding on public primary school education, in the academic performance of pupils?

S/N	ITEMS	A	SA	D	SD	TOTAL	X	DECISION
14	Flooding can lead to loss of properties.	95	30	23	14	630	3.89	Accepted
15	It leads to the loss of human life.	130	30	1	1	773	4.77	Accepted
16	It increases the level of	95	30	23	14	312	1.92	Rejected

	development.							
17	Increases in the output of productions.	99	33	16	14	300	1.85	Rejected
18	It reduces the level of economic development.	99	33	16	14	662	4.09	Accepted
19	The problem of environmental degradation of human suffering	95	38	24	5	680	4.10	Accepted
20	adequate types of equipment and facilities for participation during flooding.	95	30	23	14	312	1.92	Rejected

From Table 3 above, all the items had a mean score of 3.89, 4.77, 4.09, and 4.10 respectively which were the above decision rule of 2.50 this implies that the accepted figures are challenges of flooding while 1.92, 1.85 and 1.85 were below the decision rule. Therefore, they are not as challenged by flooding.

**Research Question 4:** What are the possible solutions to challenges of flooding in public primary school education?

S/N	ITEMS	A	SA	D	SD	TOTAL	X	DECISION
21	By Creating flood plains and overflow areas for rivers.	95	30	23	14	630	3.89	Accepted
22	By Separating rainwater from the sewer system.	130	30	1	1	773	4.77	Accepted
23	By Protecting wetlands and introducing plant trees strategically.	99	33	16	14	662	4.09	Accepted
24	Through Improving soil conditions	130	30	1	1	773	4.77	Accepted
25	Through	99	33	16	14	662	4.09	Accepted



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installing water  
infiltration and  
attenuation  
systems.

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From Table 3 above, all the items had a mean score of 3.89, 4.77, 4.09, and 4.09 respectively which were the above decision rule of 2.50 this implies that all were accepted as solutions to challenges of flooding in public primary school education.

## DISCUSSION

From Table 1, it was observed that respondents agree that the Reduction of pupils/student population from the school, will result in the loss of valuable documents from the school saving box or backup box, destroy school infrastructural facilities and equipment, results to massive failure during exams because of half knowledge of the subjects they have enquired and it will also result to the uncovered scheme of work from the syllabus. This is in line with the findings of Okafor (2021), in the education sector floods leave a trail of destruction which may result in children's education especially primary schools which seem to be the foundation of education getting to a level where it cannot be salvaged. Primary Schools maybe cancelled, children may drop out of school and school absenteeism may occur if school buildings are affected by flooding. A related study by Parammal-Vatteri (2022) pointed out that school buildings suffer structural damage, rendering them unsafe or unusable, and disrupting the educational process. This disruption according to Borah (2023) results in academic setbacks, as students struggle to access proper learning environments and resources. Consequently, primary schools in flood-prone areas may face prolonged closures, leading to interruptions in students' academic progress and potentially increasing dropout rates (Wibowo et al, 2024).

From Table 2, it was revealed that the respondents agree that deforestation, climate change, emission of greenhouse gases, overflowing rivers, collapsed dams and snowmelt cause flooding while proper control of dams and proper management of the water system don't cause flooding in the public primary school's education, in Awka North LGA of Anambra State. This finding collaborates with the findings of Nneka et al, (2023) who observed that rampant deforestation exacerbates soil erosion and reduces the land's capacity to absorb water. Additionally, a related study by Chike (2017) showed that climate change-induced extreme weather events intensify rainfall patterns, leading to increased flooding across the country. Also, the emission of greenhouse gases, primarily from industrial activities and transportation, contributes to global warming, resulting in the melting of polar ice caps and rising sea levels, which further aggravates flooding in coastal regions like Lagos (Atedhor, 2023).

From table 3, it was observed that flooding can lead to loss of properties, it leads to

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loss of human life, it reduces the level of economic development and Problem of environmental degradation of human suffering are challenges of flooding. Examples of physical assets that can be loss through flooding situation are homes, schools, hospitals, commercial and governmental buildings, transport, energy, telecommunications infrastructures and other infrastructure; business assets and industrial plants; and production such as crops, livestock and production infrastructure. Related studies have shown that flooding results in extensive damage to school infrastructure and housing, leading to substantial property losses (Cirella et al, 2024). Additionally, flooding-related fatalities in schools are a recurrent issue, with vulnerable populations disproportionately affected (Petrucci, 2022). Environmental degradation further compounds these challenges, with floodwaters causing soil erosion, pollution, and habitat destruction (Bolle et al, 2021).

From Table 4, it was observed that creating flood plains and overflow areas for rivers, separating rainwater from the sewer system, protecting wetlands and introducing plant trees strategically, improving soil conditions and installing water infiltration and attenuation systems are solutions to flooding in the public primary school's education, in Awka North LGA of Anambra State. This collaborates with the findings of Egbinola et al, (2017) who noted that the Nigerian government has implemented floodplain management projects in various regions to minimize flood damage and safeguard critical infrastructure, including educational facilities. Similarly, efforts to separate rainwater from sewer systems have been observed in urban areas like Lagos to mitigate flooding impacts (Nkwunonwo et al, 2016). Additionally, wetland conservation initiatives in places like the Niger Delta contribute to flood risk reduction and ecosystem resilience, indirectly benefiting nearby schools (Week et al, 2019). These strategies underscore the importance of comprehensive flood risk management in preserving the integrity of public primary school education in Nigeria.

Based on the findings, the research concluded that it was revealed that the respondents agree that deforestation, climate change, emission of greenhouse gases, overflowing rivers, collapse of dams and snowmelt cause flooding: Flooding can lead to loss of properties, it leads to loss of human's life, it reduces the level of economic development and Problem of environmental degradation of human sufferings are challenges of flooding and Creating flood plains and it was concluded that overflow areas for rivers, separating rainwater from the sewer system, protecting wetlands and introduce plant trees strategically, Improving soil conditions and installing water infiltration and attenuation systems are solutions of flooding in the public primary school's education, in Awka North LGA of Anambra State. The following are the educational implications of the health problems associated with flooding disasters. Raising public awareness is dependent on adult and non-formal educational, and targeted teaching as early as preprimary school, so that they should be caution flooding

and of the common knowledge of the public. Public flooding awareness could be heightened by coercion. This involves the formulation and enforcement of laws that prohibit flooding disaster. This study also implies that improving of soil conditions and installing water infiltration and attenuation systems are solutions of flooding in the public primary school's education.

### RECOMMENDATIONS

1. Public primary schools should be equipped with flood-resistant infrastructure. This includes constructing elevated buildings and ensuring that all school facilities are made with durable, water-resistant materials to withstand flooding.
2. Local government authorities should prioritize the development and maintenance of effective drainage systems around school environments to prevent water accumulation and reduce the impact of flooding.
3. Schools should implement comprehensive disaster management plans, including regular drills, to prepare staff and students for potential flooding events. These plans should include clear evacuation protocols and safety measures.
4. Efforts should be made to educate the local community about the causes and impacts of flooding, as well as effective flood mitigation strategies. Involving the community in these efforts can enhance local resilience and preparedness.
5. Schools should provide psychological support services for students who have experienced trauma due to flooding. This could include counseling and mental health resources to help students cope with stress and anxiety caused by such events.
6. Governmental and non-governmental organizations should collaborate to create policies that prevent deforestation and promote sustainable land use practices. Additionally, funding should be allocated for flood mitigation projects and emergency funds should be established to support rapid recovery efforts for schools affected by flooding.

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