

Perceived Influence of Flood Disruption on Academic Performance and Attendance among Senior Secondary School Students in the Orashi Region of Rivers State

Francisca Uju Udeagha¹, Christiana Ihuoma Ahaneku², Edna Nkechi Ofogebe³, Immaculata Adanma Ubah⁴, Amed Ademola Oyeyemi⁵

^{1,2,3}Department of Guidance and Counselling, Faculty of Education, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria

⁴Department of Guidance and Counselling, Alvan Ikoku federal university of Education owerri Imo state

⁵Department of Educational Foundations, Faculty of Education, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria

DOI: <https://doi.org/10.47772/IJRISS.2026.100900027>

Received: 13 September 2026; Accepted: 18 September 2026; Published: 28 September 2026

ABSTRACT

The effect of flooding on students cannot be overemphasized. It is demoralizing; waking up to a flooded home disrupts one's mindset and leaves the mind unprepared for academic activities. This significantly affects students' readiness to learn. This study investigated senior secondary school students' perceptions of the influence of flood disruption on their school attendance and academic performance in the Orashi region of Rivers State, an area identified by the Rivers State Government and the Nigerian Meteorological Agency (NiMET) as the epicentre of flooding in the state. Guided by two research questions and two null hypotheses, the study adopted a descriptive survey design. The population comprised all senior secondary school students in public secondary schools in the four Orashi-region local government areas (Abua/Odual, Ahoada East, Ahoada West, and Ogba/Egbema/Ndoni), one school was purposively selected in each of the four Local Government Areas, and simple random sampling was used to draw a sample of 270 students (135 male and 135 female). Data were collected with a four-point Likert-scale questionnaire, the Flood Disruption and Academic Performance Questionnaire (FDAPQ), which was validated by three experts in Measurement and Evaluation and Guidance and Counselling and yielded a Cronbach alpha coefficient of 0.83. Mean and standard deviation were used to answer the research questions, while the independent samples t-test was used to test whether male and female students' ratings differed significantly at the 0.05 level of significance. Students agreed that flooding disrupts their school attendance through inaccessible roads, displacement, loss of learning materials and unsafe school buildings (grand mean = 3.40), and they also agreed, on the whole, that it affects their academic performance. No statistically significant gender difference was detected in ratings of attendance ($t(268) = 0.43$, $p = .670$) or academic performance ($t(268) = 0.76$, $p = .446$). Because the data are self-reported perceptions from a cross-sectional survey, the findings describe perceived effect and do not establish causal or objectively measured changes in attendance or examination performance. The study recommends flood-resilient infrastructure around schools, flood-emergency and learning-continuity plans, replacement of lost learning materials, and counselling-based psychosocial support for students in flood-prone communities.

Keywords: flood disruption, academic performance, school attendance, perceptions, flood-prone communities

INTRODUCTION

In ancient times, floods were largely understood through spiritual and cultural lenses, while modern science explains them through hydrological and environmental processes. Without meteorology, hydrology, or climate science, early societies explained flooding through stories, gods, and spiritual ideas (Wisner et al., 2004). Across different cultures, floods were commonly regarded as acts of the divine rather than natural events. Many ancient

cultures believed that flooding was caused by angry gods or as divine punishment for human behavior. In Mesopotamia, the Epic of Gilgamesh describes a great flood sent by the gods because humans had become too noisy and sinful (Dalley, 1989). In the Hebrew and Biblical tradition, Noah's Flood was viewed as God's judgment on human wickedness (Brueggemann, 2002). In Ancient Egypt, the annual flooding of the Nile was linked to Hapi, the god of the Nile, and it was believed that if Hapi was displeased, the flood would either be too low for farming or too destructive (Wilkinson, 2010). In Greek mythology, Zeus was said to send floods to punish humanity, as seen in the story of Deucalion and Pyrrha (Hamilton, 1942). The central misconception in these accounts was that floods occurred because people behaved badly, not because of rainfall, river volume, or geography. Other traditions attributed floods to supernatural creatures or cosmic forces. In ancient Chinese belief, events such as the Great Flood of Yu were blamed on dragons stirring the rivers or on imbalances in nature (Allan, 1991). In Norse mythology, floods were associated with the breaking of cosmic dams or the tears of giants (Lindow, 2001). Some African traditional beliefs also linked floods to water spirits, mermaids, or ancestors who were angry (Mbiti, 1990). In these views, spirits rather than weather systems were thought to control the movement of water. Floods were also often seen as cyclical and mystical rather than seasonal and scientific. The Ancient Egyptians were an exception to some extent because they tracked the Nile flood and used it to guide farming (Butzer, 1976). However, most other cultures regarded floods as random acts of the divine that could not be anticipated through observation. The prevailing belief was that floods could not be predicted, and the only way to avoid them was through prayer and sacrifice. Because floods were understood in spiritual terms, the solutions offered were also spiritual. People made offerings to river gods, performed human or animal sacrifices, built temples near rivers, and had kings perform rituals intended to calm the waters (Frazer, 1922; Eliade, 1959). In this framework, morality and ritual were considered more important for flood control than drainage, dams, or any form of early warning. Another common belief was that the whole world would be flooded again. Following narratives such as Noah's Flood and the story in Gilgamesh, many ancient societies developed the idea that one day the entire earth would be wiped out by water as an act of final judgment (Dalley, 1989; Brueggemann, 2002). This belief created widespread fear and a sense of fatalism. Before the rise of modern science, the main misconceptions about flooding were that floods were caused by gods, spirits, or human sin rather than by rainfall and topography, that they could be prevented mainly through prayer, sacrifice, and pleasing deities, and that they were unpredictable acts of divine will instead of natural hydrological events (Wisner et al., 2004). In contrast, modern scientific understanding attributes floods to natural physical causes. Floods are now known to result from excessive rainfall, snowmelt, storm surges, poor drainage, and the overflow of rivers and other water bodies (Ward et al., 2017). Unlike in ancient times, floods can be predicted using weather forecasts, hydrological models, rainfall data, and floodplain mapping (WMO, 2020). Prevention is no longer based on rituals but on engineering and planning solutions such as dams, levees, drainage systems, urban planning, and early warning systems (UNDRR, 2019). Science also recognizes the role of humans, not in terms of morality, but through activities such as deforestation, poor waste disposal, wetland reclamation, and climate change, all of which increase flood risk (IPCC, 2021; NEMA, 2023). Furthermore, floods are understood to follow seasonal patterns and are influenced by rainfall intensity as well as geographical and climatic conditions (NiHSA, 2022). Rather than being viewed as spiritual messages, floods are now understood as natural hydrological events with clear social, economic, and environmental consequences. Education is widely recognized as the foundation for personal development and national growth (UNESCO, 2015). However, the realization of educational goals can be severely undermined by environmental hazards, one of which is flooding. In recent years, flooding has become a recurring environmental challenge in Nigeria, particularly in the Niger Delta region (Adelekan, 2016). Port Harcourt, the capital of Rivers State, is one of the most flood prone urban centers in the country due to its coastal location, poor drainage systems, rapid urbanization, and the effects of climate change (Okali, 2020; Agbonkhese et al., 2014). For senior secondary school students, the school environment is meant to be a safe and stable space for learning, growth, and preparation for external examinations such as WAEC and NECO. Unfortunately, in flood prone communities within Port Harcourt, this stability is constantly threatened. During the rainy season, many schools experience partial or total submersion, roads become impassable, learning materials are destroyed, and students are displaced from their homes (Agbonkhese et al., 2014; Okali, 2020). These disruptions force students to miss school for days or weeks, break the continuity of teaching and learning, and create immense psychological stress (UNICEF, 2019; Adelekan, 2016). Test anxiety is further heightened in such conditions because students are often unprepared for examinations due to lost instructional time (Oyesiku and Akinjogbin, 2018). The inability to attend classes regularly, coupled with the trauma of displacement and destruction of property, contributes to poor academic

performance and low retention of knowledge (UNESCO, 2015; NEMA, 2023). While government agencies and non governmental organizations have made efforts to provide relief materials, little attention has been paid to the long term academic consequences of flooding on students in senior secondary schools (NEMA, 2023; Adekola and Lamond, 2018). Education remains a fundamental right and a critical determinant of individual and national development (UNESCO, 2015). However, the consistent delivery of quality education depends heavily on environmental stability, particularly regular school attendance and an uninterrupted academic calendar (Federal Ministry of Education, 2018; IPCC, 2021). In many parts of Nigeria's Niger Delta region, including Port Harcourt in Rivers State, annual flooding has become a recurring environmental hazard that threatens the continuity of schooling for thousands of students (Nkeki and Osirike, 2023). Flooding disrupts transportation networks and ruins classrooms, libraries, desks, and books. Washed out roads and broken bridges make travel to school unsafe or impossible. Families lose their homes and move away, forcing children to drop out or change schools. Stagnant water spreads waterborne diseases and causes stress, making it hard for students to focus, all of which have far reaching implications for students' attendance and academic performance. Flood disruption refers to the interruption of normal social, economic, and educational activities caused by the overflow of water onto land that is typically dry, resulting from heavy rainfall, poor drainage, or river overflow (Ogbuene et al., 2022). In educational contexts, flood disruption manifests through school closures, damaged infrastructure, impassable roads, and displacement of students and teachers, all of which combine to interrupt the continuity of instruction (Nkeki and Osirike, 2023). Port Harcourt and its environs have witnessed increasingly severe flood events linked to climate change, poor urban drainage planning, and the topography of the Niger Delta (Ogbuene et al., 2022). Communities situated along low lying areas and riverbanks are particularly vulnerable, with schools in these areas frequently forced to close or operate under compromised conditions during the rainy season. Students from such communities often face extended periods of absenteeism, loss of continuous assessment scores, and psychological stress associated with displacement and property loss, all of which may undermine their academic achievement (Eze and Chukwu, 2021). Academic performance refers to the measurable outcomes of a student's learning, typically assessed through test scores, continuous assessment results, and examination grades (Eze and Chukwu, 2021). School attendance, on the other hand, refers to the regularity with which students are physically present in school to participate in instructional activities. Both constructs are widely recognised as interdependent, as consistent attendance is a strong predictor of academic achievement. This study is anchored on Bronfenbrenner's Ecological Systems Theory (1979), which posits that a child's development and functioning are shaped by interacting environmental systems, ranging from the immediate microsystem such as home and school to broader macrosystem influences such as climate and infrastructure. Within this framework, flooding represents a disruptive ecological event that permeates the student's microsystem through damaged home and lost materials and the mesosystem through broken link between home and school, thereby undermining educational continuity and performance. Within the framework of guidance and counselling, understanding how environmental disruptions such as flooding affect students' educational outcomes is essential for developing appropriate school based interventions, including psychosocial support and flexible academic accommodations. Recent empirical studies confirmed that students from flood prone communities achieved poorly in their end of term examinations compared to their counterparts in non flood prone areas. Nkeki and Osirike (2023) examined the effects of seasonal flooding on school attendance in riverine communities of Rivers State and found a statistically significant decline in attendance rates during flood months compared to dry season months. Similarly, Ogbuene et al. (2022) reported that flood affected schools in the Niger Delta experienced substantial disruptions to the academic calendar, with some schools losing up to six instructional weeks annually. Eze and Chukwu (2021), in a related study conducted in Anambra State, found that students from flood prone communities recorded significantly lower mean scores in end of term examinations compared to their counterparts in non flood prone areas. These studies collectively support the need for the present investigation focused specifically on the Port Harcourt context. Despite ongoing efforts by government and non governmental agencies to mitigate the effects of flooding in the Niger Delta, students in flood prone communities of Port Harcourt continue to experience disrupted schooling nearly every rainy season (NEMA, 2023; NiHSA, 2022). Anecdotal reports from school administrators suggest declining attendance rates, poor performance in continuous assessments, and rising dropout tendencies among affected students (Okali, 2020; Adekola and Lamond, 2018). However, there is limited empirical documentation, particularly from a guidance and counselling perspective, of the extent to which flood disruption specifically influences students' academic performance and attendance in this context (Oyesiku and Akinjogbin, 2018; UNICEF, 2019). Despite the critical role of education in national development (UNESCO, 2015), the academic progress of senior secondary school

students in flood prone areas of Port Harcourt continues to be threatened by recurrent flooding. Each year, heavy rainfall leads to the submersion of schools, destruction of learning materials, displacement of students and teachers, and the abrupt relocation of schools without adequate planning (Agbonkhese et al., 2014; Adelekan, 2016). This disruption results in irregular school attendance, loss of instructional time, heightened test anxiety, and ultimately, a decline in academic performance (UNICEF, 2019; IPCC, 2021). Students are forced to learn in unstable conditions, often missing classes for weeks and returning to damaged classrooms with little or no instructional support (Okali, 2020). Students and communities currently adopt several coping techniques. Some relocate classes temporarily to nearby churches, community halls, or unflooded classrooms in other schools, often done abruptly without considering distance (Adekola and Lamond, 2018; NEMA, 2023). Students and parents construct wooden planks, sandbags, and local bridges to cross flooded areas. In severe cases, canoes and kekes are used to ferry students to school (Okali, 2020; Agbonkhese et al., 2014). Despite ongoing efforts by government and non governmental agencies to mitigate the effects of flooding in the Niger Delta, students in flood prone communities of Port Harcourt continue to experience disrupted schooling nearly every rainy season (NEMA, 2023; NiHSA, 2022; Jibril, 2026). Anecdotal reports from school administrators suggest declining attendance rates, poor performance in continuous assessments, and rising dropout tendencies among affected students (Okali, 2020; Adekola and Lamond, 2018; Brown and Chikagbum, 2015). However, there is limited empirical documentation, particularly from a guidance and counselling perspective, of the extent to which flood disruption specifically influences students' academic performance and attendance in this context (Oyesiku and Akinjogbin, 2018; UNICEF, 2019; Cirella and Iyalomhe, 2018). Despite the critical role of education in national development (UNESCO, 2015), the academic progress of senior secondary school students in flood prone areas of Port Harcourt continues to be threatened by recurrent flooding. Each year, heavy rainfall leads to the submersion of schools, destruction of learning materials, displacement of students and teachers, and the abrupt relocation of schools without adequate planning (Agbonkhese et al., 2014; Adelekan, 2016; UNOCHA, 2018). This disruption results in irregular school attendance, loss of instructional time, heightened test anxiety, and ultimately, a decline in academic performance (UNICEF, 2019; IPCC, 2021; Paterson et al., 2018). Students are forced to learn in unstable conditions, often missing classes for weeks and returning to damaged classrooms with little or no instructional support (Okali, 2020; Federal Ministry of Education, 2018). Coping and Adaptive Strategies. Students and communities currently adopt several coping techniques. Some relocate classes temporarily to nearby churches, community halls, or unflooded classrooms in other schools, often done abruptly without considering distance (Adekola and Lamond, 2018; NEMA, 2023). Students and parents construct wooden planks, sandbags, and local bridges to cross flooded areas. In severe cases, canoes and kekes are used to ferry students to school (Okali, 2020; Agbonkhese et al., 2014; Jibril, 2026). During prolonged closure, senior students form study groups in homes to cover topics, especially WAEC and NECO subjects, while WhatsApp groups are used to share notes and past questions (UNOCHA, 2015). Parents and students also try to rescue books and uniforms and dry them in the sun, while some schools keep an emergency stock of textbooks in higher, safer areas. At the school level, some institutions extend the term or reschedule exams after floods recede to recover lost instructional time (Jha et al., 2012). A few private schools have raised classroom floors, built drainage, or used sandbags around school premises (Cirella and Iyalomhe, 2018). To accommodate displaced students, some schools run morning and afternoon shifts in available classrooms. At the household level, parents who can afford it hire home tutors during flood periods to prevent academic decline, and some students temporarily move to live with relatives in less flood prone areas of Port Harcourt such as GRA and New Layout during peak flood months (Brown and Chikagbum, 2015; Jibril, 2026). Despite these efforts, most techniques are reactive and not sustainable. There are no government provided boats, flood resilient school buildings, or emergency learning kits. There is no official e-learning platform for when schools are closed, and there is no psychosocial support for students traumatized by displacement (UNICEF, 2019; Wisner et al., 2003). This has led to increased test anxiety and learning loss due to irregular attendance. Many flood prone countries have moved beyond coping to building flood resilient education systems. In Bangladesh and Vietnam, schools are built on stilts or raised platforms two to three meters above ground. The Netherlands uses amphibious and floating classrooms, while in Lagos the Makoko Floating School was designed so lessons can continue even when water rises (Jha et al., 2012; Cirella and Iyalomhe, 2018). In the Philippines and Japan, schools double as evacuation centers with raised floors, water tanks, and emergency supplies (UNDRR, 2019). Mozambique and India adjust school terms to avoid peak flood months and reschedule exams with buffer weeks built into the calendar (OECD, 2016). Pakistan and Indonesia use radio, television, and WhatsApp or Zoom classes during floods, and distribute school-in-a-box kits with tablets and solar chargers (UNICEF, 2019). Thailand and

Cambodia use boats converted into classrooms that move to flooded communities. Bangladesh provides government boats that pick students daily during flood season with teachers onboard for lessons during transit (Jha et al., 2012). The United Kingdom and Germany have permanent raised walkways to connect homes to schools. UNICEF globally distributes waterproof bags with books, pens, and uniforms before flood season. The United States and the Philippines deploy counsellors to schools after disasters to manage trauma and test anxiety (Paterson et al., 2018). Caribbean countries use school disaster funds to rebuild classrooms quickly. Japan and New Zealand teach disaster risk reduction in the curriculum, while Australia uses early warning systems and SMS alerts to parents and teachers 48 hours before floods, after which schools close officially and online learning begins immediately (FEMA, 2012). Most literature focuses on attendance and performance. However, field reports also show less discussed consequences. Parents spend extra money on boats, canoe transport, replacing destroyed uniforms and books, and relocating students, and many drop out due to cost (Komolafe et al., 2015; UNOCHA, 2018). When schools are abruptly relocated, students lose peer groups and support networks and friendships and group study break down (UNICEF, 2019). Girls in flooded areas face higher risks of teenage pregnancy, early marriage, and gender based violence during displacement, and their attendance drops more than boys (UNOCHA, 2018). Exposure to flood water leads to skin infections, malaria, and cholera, and students attend school sick, affecting concentration (Paterson et al., 2018; Ekpo et al., 2013). Repeated disruption creates learned helplessness, where students ask why study if flood will wash it away, leading to apathy before WAEC and NECO (Wisner et al., 2003). Teachers are also displaced and teach in two or three locations, leading to burnout, lower lesson quality, and the exit of experienced teachers from flood prone schools. Laboratories, computers, and technical equipment are destroyed, and science and vocational students lose the most because these resources cannot be replaced easily. In Port Harcourt and other Niger Delta riverine communities, government drainage projects often do not reach the grassroots (Jibril, 2026; Brown and Chikagbum, 2015). As a result, indigenous people have developed their own local techniques that have been passed down and adapted over time (Cirella and Iyalomhe, 2018; Wisner et al., 2003). In the area of land and water management, one of the most common practices is raised compound sand filling. Families and communities collectively contribute money to buy sand in order to raise the level of their compounds and building foundations by one to three feet. This method is widely used in places like Diobu, Rumuolumeni, and Ogbogoro (Okali, 2020; Jibril, 2026). Another approach involves the creation of local drainage channels commonly called gutters. Youth groups dig narrow channels through compounds to direct flood water into nearby creeks, streams, or the Bonny River, and these channels are usually cleared and maintained at the beginning of every rainy season (Adekola and Lamond, 2018; Agbonkhese et al., 2014). Some indigenous communities in Okrika, Ikwerre and Kalabari areas also continue to protect mangroves and swamp forests around their settlements. They regard these natural areas as sponges that drink excess water and prevent it from entering homes (Cirella and Iyalomhe, 2018; European Commission, 2015). In terms of housing and building adaptations, people in riverine areas such as Buguma, Abonema and parts of the Trans Amadi waterfront have continued the traditional practice of building houses on wooden stilts or on floating rafts made from empty drums and planks. This reflects the traditional Ijaw architecture that was designed to live with water (Cirella and Iyalomhe, 2018; Jha et al., 2012). Communities also construct elevated walkways made from planks and palm fronds to connect houses so that people can move between homes without wading through flood water. There has also been a gradual shift toward water resistant building materials, with more people using concrete blocks instead of mud and raising zinc roofing higher to prevent water entry (Komolafe et al., 2015; UNOCHA, 2018). Social and community based techniques are equally important. Age grade groups and youth emergency teams organize what is called flood watch during periods of heavy rain. They assist in evacuating the elderly, salvaging property, and blocking runoff from entering the community with sandbags (UNICEF, 2019; UNOCHA, 2018). Elders also rely on indigenous knowledge to predict floods by observing signs such as the early flowering of certain trees, bird migration patterns, and changes in river water colour. Based on these signs, communities move valuables and children to higher ground ahead of time (Wisner et al., 2003; Cirella and Iyalomhe, 2018). Another community practice is rotational hosting of displaced families. When some streets are flooded, families living in unflooded parts of the community temporarily accommodate those who have been displaced. Churches and town halls also serve this purpose during severe flooding (UNOCHA, 2018). Spiritual and cultural practices still play a role in some communities. In parts of Kalabari and Ijaw settlements, traditional priests perform rituals and make offerings to water deities before the peak of the rainy season, asking for controlled flooding and protection (Cirella and Iyalomhe, 2018). There are also indigenous laws in the form of taboos against blocking waterways, which forbid dumping refuse and building on natural water channels (Komolafe et al., 2015). However, these practices are

gradually breaking down due to urbanization and population pressure (Adelekan, 2016). Despite their value, most of these methods are reactive and self funded. While they help to reduce damage at the household and community level, they cannot stop major floods caused by poor city drainage, blocked canals, and the effects of climate change (IPCC, 2021; Jha et al., 2012). This limitation is why many residents are now calling for government engineered solutions such as the Port Harcourt Storm Water Drainage Master Plan to complement indigenous efforts (Jibril, 2026). Tribune Online highlights key elements shaping the current flood decongestion efforts in Port Harcourt (Jibril, 2026). One of the major strategies is the reopening of natural water channels. Over time, many drainage paths in the city have been narrowed or blocked by sand, waste and informal construction. Restoring both natural and man made waterways allows rainwater to move more freely into larger drainage systems and this reduces surface flooding during heavy downpours (Jha et al., 2012; Adeloye and Rustum, 2011). Another focus is on removing bottlenecks in major flood corridors. Certain roads in Port Harcourt consistently experience flooding because they act as collection points for runoff water. Ikwerre Road is one of such corridors where water buildup often disrupts traffic during rainfall (Jibril, 2026; Brown and Chikagbum, 2015). Targeted drainage work in these areas is therefore centered on clearing blockages and improving flow capacity along these high pressure routes. There is also a shift toward designing roads with built in drainage systems. Modern infrastructure projects in the state now include drainage design from the planning stage (Jibril, 2026; Walesh, 1989). This ensures that roads are not only built for traffic but also for water management during heavy rains. The approach helps to reduce the rapid deterioration of road surfaces and limits flooding caused by poor runoff control. Managing solid waste in drainage environments has equally become a priority. Flooding in Port Harcourt is closely linked to improper waste disposal. Plastic waste, sand and household refuse often end up in drainage channels and this reduces their capacity (Agbonkhese et al., 2014; Komolafe et al., 2015; UNOCHA, 2018). When rainfall occurs, these blocked systems overflow quickly and small rain events can turn into street flooding (Agbonkhese et al., 2014; Komolafe et al., 2015). Rapid response clearing during heavy rainfall has been adopted as part of the strategy. During peak rainy periods, emergency teams are sometimes deployed to clear critical drainage points (Jibril, 2026; Brown and Chikagbum, 2015). These interventions help to reduce the duration of flooding and restore movement in affected areas faster (Jha et al., 2012; UNOCHA, 2018). Such responses are especially important in densely populated or low lying parts of the city (Okali, 2020; Cirella and Iyalomhe, 2018). This gap in empirical evidence limits the capacity of school counsellors, administrators, and policymakers to design targeted interventions (Oyesiku and Akinjogbin, 2018; UNICEF, 2019). It is against this background that this study investigated senior secondary school students' perceptions of the influence of flood disruption on academic performance and attendance in Orashi region of Rivers State.

Purpose of the Study

The objectives of this study was to:

1. Determine the extent to which senior secondary school students perceive that flood disruption influences their school attendance in a Orashi region of Rivers State.
2. Determine the extent to which senior secondary school students perceive that flood disruption influences their academic performance in a Orashi region of Rivers State.

Research Questions

1. To what extent do senior secondary school students perceive that flood disruption influences their school attendance in a Orashi region of Rivers State?
2. To what extent do senior secondary school students perceive that flood disruption influences their academic performance in a Orashi region of Rivers State?

Hypotheses

H₀₁: There is no significant difference in the mean ratings of male and female students on the influence of flood disruption on school attendance.

H02: There is no significant difference in the mean ratings of male and female students on the influence of flood disruption on academic performance.

Theoretical studies

Various authoritative bodies define flooding in closely related terms. The Intergovernmental Panel on Climate Change describes a flood as the overflowing of the normal confines of a stream or water body, or the accumulation of water over areas not normally submerged (IPCC, 2021, p. 2218). The World Meteorological Organization offers a similar view, defining it as an overflow of water beyond normal confines, or the accumulation of drainage water over areas that are usually dry (WMO, 2020, p. 15). Cirella and Iyalomhe (2018) further characterize flooding as a temporal state of partial or full submersion resulting from overflows of inland or tidal waters due to rapid runoff accumulation. The causes of flooding are both natural and human made. Natural causes include heavy rainfall, snowmelt, and coastal storm surges (IPCC, 2021; Dunning et al., 2016). Human causes stem from urbanization, poor waste disposal, and blocked drainage channels which reduce the capacity of cities and communities to absorb and channel excess water (Agbonkhese et al., 2014; Komolafe et al., 2015; Cirella and Iyalomhe, 2018). Understanding the different types of floods and how they are managed is essential for reducing their devastating impacts on communities worldwide. Flooding is generally categorized according to how and where it occurs, and effective management requires a combination of physical engineering solutions and policy planning (Jha et al., 2012; OECD, 2016). Floods vary in terms of speed of onset, location, and water source. Flash floods arise from intense heavy rainfall or sudden dam failures and develop very rapidly, often within minutes to hours. They are common in low lying areas, urban zones, and dry riverbeds where water has little time to drain (FEMA, 2012; NEMA, 2023). Fluvial or river floods result from sustained rainfall or snowmelt that causes river banks to overflow. These develop gradually over several days and primarily affect river basins and floodplains (Ward et al., 2017; Patra, 2001). Pluvial or surface floods occur when heavy rain overwhelms local drainage systems (Adeloye and Rustum, 2011; Okali, 2020). They develop at a rapid to moderate pace and are most common in urban environments and flat terrains with poor drainage (Adeloye and Rustum, 2011; Okali, 2020). Coastal floods are driven by storm surges, cyclones, and high tides. They usually develop within hours and affect coastal areas and estuaries where seawater pushes inland (IPCC, 2021; Paterson et al., 2018). Modern flood management combines structural measures with non structural approaches to build community resilience (Jha et al., 2012; UNDRR, 2019). Structural measures are engineering solutions designed to control or contain floodwater. Dams and reservoirs store excess water upstream and regulate river flow rates. Levees and floodwalls serve as physical barriers along riverbanks to keep water contained within channels. Retention ponds are constructed in urban areas to collect runoff temporarily and reduce pressure on drainage systems (Ward et al., 2017; Walesh, 1989; FEMA, 2012). Non structural measures focus on nature based solutions and policy planning. Early warning systems use meteorological and hydrological data to alert communities before floodwaters rise, giving people time to evacuate (WMO, 2020; Addor et al., 2012). Zoning regulations restrict building and infrastructure development in high risk floodplains to minimize exposure (OECD, 2016; Komolafe et al., 2015). Wetland restoration is another key strategy, as revitalized marshes and natural floodplains act like sponges that absorb excess water and reduce flood intensity (European Commission, 2015; Cirella and Iyalomhe, 2018). Together, these approaches provide a comprehensive framework for protecting lives, property, and livelihoods while promoting long term environmental sustainability (IPCC, 2021; UNDRR, 2019). People who survive devastating floods around the world share powerful and haunting accounts of the sheer force of water, the terror of losing everything, and the mental toll of survival (UNICEF, 2019; Paterson et al., 2018). Many describe how quickly a dry street can turn into a raging river. Survivors often believed they had hours to evacuate, only to find water blocking their doors within minutes (FEMA, 2012; UNOCHA, 2018). Another recurring memory is sound. For many flash flood survivors, the water does not sound like water at all but like a freight train tearing through the earth, and that roar remains with them long after the event (Paterson et al., 2018). In the midst of rising waters, people are forced into desperate choices. As water rises toward the ceiling, survivors speak of leaving behind family heirlooms, pets, or vital medications because there was only enough time to save themselves and their children (UNOCHA, 2018; Wisner et al., 2003). Those who climbed onto roofs describe the helplessness of sitting in freezing rain or scorching sun while waiting for a rescue boat or helicopter, watching family photos, cars, and homes float away (UNICEF, 2019). The trauma does not end when the water recedes. Survivors often recall that floodwater is never clean, and the smell of mud, sewage, and decaying debris lingers in memory for years (Paterson et al., 2018; Ekpo et al., 2013). Long after the event, a heavy thunderstorm or even the sound of dripping water can trigger panic attacks, fear of another

evacuation, and hyper vigilance (UNICEF, 2019; IPCC, 2021). Many who reached higher ground also carry survivor's guilt, wondering why their home remained while a neighbor's was swept away (Wisner et al., 2003). In places where flooding is an annual reality, healing is closely tied to community action and adaptation. In Bangladesh, where formal psychological resources are scarce, local organizations train community leaders, teachers, and elders in psychological first aid so that neighbors can support one another in processing guilt and anxiety (UNICEF, 2019; Wisner et al., 2003). Mobile clinics are deployed during and after monsoon seasons to provide counseling alongside medical aid in remote villages (Paterson et al., 2018). Healing is also supported through adaptation, as communities rebuild using climate resilient techniques such as raising homes on plinths and cultivating floating gardens, which transforms fear into collective strength (Jha et al., 2012; Cirella and Iyalomhe, 2018). In the Netherlands, mental well being is supported through a structural approach that shifts the mindset from fighting nature to living with it (UNDRR, 2019). A national philosophy of creating room for the river involves allowing rivers to safely flood designated areas, which reduces public anxiety about catastrophic dike failure. Municipalities also conduct regular flood drills and simulations to educate citizens on what will happen during an event, replacing fear of the unknown with preparedness (WMO, 2020). Following localized floods, mental health experts are integrated into emergency response teams so that post traumatic stress and weather induced panic are treated as standard medical priorities (Paterson et al., 2018). Across different contexts, several universal methods support psychological healing. Trauma informed storytelling uses group sessions where survivors share experiences in safe spaces, helping to reduce isolation and survivor's guilt (UNICEF, 2019; Wisner et al., 2003). Cognitive behavioral therapy helps individuals reframe negative thoughts associated with rain and storms, and is effective in managing panic attacks and anxiety triggered by bad weather (IPCC, 2021). Collective action is also important. Engaging survivors in rebuilding efforts or in early warning teams restores a sense of control and agency, and builds resilience through contribution to community protection (UNDRR, 2019). Modern flood early warning systems do more than broadcast alarms. They provide predictable and clear information that reduces panic and restores a sense of control (WMO, 2020). When people know what to do and when to do it, the psychological toll of disaster drops significantly (FEMA, 2012). Community based systems rely on local volunteers who monitor river levels and alert neighbors through calls, sirens, or loudspeakers. Because the warning comes from trusted community members, it encourages immediate and organized action (Cirella and Iyalomhe, 2018; UNOCHA, 2018). Sensor based and automated systems use satellite and radar imaging, ultrasonic river gauges, and artificial intelligence to track storms and predict which streets will be affected (Addor et al., 2012; Ward et al., 2017). This precision removes the terror of the unexpected and allows for rational preparation. Flash flood and urban drainage alarms are designed for speed, using sensors in storm drains and automated barriers at underpasses to prevent people from entering dangerous areas (FEMA, 2012). Communication and broadcast systems ensure that alerts reach everyone through wireless emergency notifications, colour coded mobile applications, and neighborhood messaging networks (WMO, 2020). Clear and structured instructions replace ambiguity and help people know exactly where to go and what to do. The way emergency information is communicated also shapes public response. Panic inducing messages often increase fear and lead to poor decisions, while psychologically safe messages promote calm and effective action (Paterson et al., 2018). Alarming headlines can trigger helplessness, whereas direct and instructional wording conveys urgency without paralyzing fear. Vague statements about risk can cause unnecessary anxiety and clog escape routes, while specific location information allows resources to be targeted and evacuation to proceed orderly. Likewise, clear step by step guidance eliminates confusion and helps people act quickly during emergencies. Safe messaging therefore balances urgency with clarity, reduces fear, and guides protective action for both individuals and communities (UNICEF, 2019; UNDRR, 2019). Training citizens to respond to alerts is equally important. In the Netherlands, flood literacy is taught in schools from a young age and communities practice opening and closing temporary flood gates, which normalizes response and reduces panic (UNDRR, 2019). In other countries, citizens are trained to follow designated evacuation routes marked by color coded lines so that during an alert they can move without needing to consult a map (FEMA, 2012). Community marshal systems assign volunteers to check on elderly or vulnerable neighbors, ensuring that no one is left behind (UNICEF, 2019; Wisner et al., 2003). Recent advances in flood forecasting are moving away from slow traditional physics models toward artificial intelligence and digital tools that are faster and more localized (WMO, 2020). Machine learning systems process global weather data, satellite imagery, and river gauge information simultaneously, enabling predictions several days in advance across many countries (Ward et al., 2017). When combined with physics informed simulations and high resolution mapping, these systems can estimate flood depth at the level of individual streets and buildings within minutes, a process that previously

took much longer with older models (Addor et al., 2012). Digital twins create real time replicas of river basins and dams, allowing authorities to visualize how an overflow or surge will affect terrain (Jha et al., 2012). In areas without sensors, new methods analyze public disaster reports and news to fill data gaps and provide urban flash flood forecasts (Fohringer et al., 2015). Internet connected sensors now track rainfall, river velocity, and soil moisture in real time, feeding information directly into public alert platforms and navigation systems so citizens can route around flooded areas (WMO, 2020). The shift from legacy hydrological models to modern artificial intelligence forecasting has therefore improved prediction and management. Legacy models depended on localized historical river records, which limited their scope and slowed updates. Modern systems draw on global atmospheric data, satellite feeds, and other analytics to capture a wider range of influences (IPCC, 2021). Simulations that once took many hours can now be completed in minutes, supporting near real time decisions. Accuracy has also improved, with alerts moving from broad regional warnings to precise street level information. Lead time has expanded as well, giving communities more days to prepare, evacuate, and protect assets before water rises (NEMA, 2023). Nigeria's approach to flood management has shifted significantly in recent years from simply reacting after floods occur to focusing on prevention and preparedness ahead of time. A major step in this direction is the Anticipatory Action Framework launched by Vice President Kashim Shettima. The framework is designed to move the country from a wait and rescue model to one of forecast and act early (NEMA, 2023). It is built around real time early warning, pre arranged financing, and community preparedness. Alongside this, there have been proposals for a National Flood Management Council to be domiciled in the Office of the Vice President to coordinate activities across ministries and levels of government (NiHSA, 2022). The Nigeria Hydrological Services Agency also produces an Annual Flood Outlook each year to identify high risk states and guide planning (NiHSA, 2022). In addition, a Presidential Committee on Flood Mitigation recommended a dedicated annual budget for flooding, an emergency budget approach, and greater use of the Ecological Fund (UNOCHA, 2018). In the area of early warning and data, a trigger group comprising NiMet, NEMA and other agencies has been set up to synthesize data and provide forecasts up to two weeks in advance (NiHSA, 2022). Satellite technology is being combined with community based networks to deliver warnings in local languages, even to remote communities (Cirella and Iyalomhe, 2018). There is also a flood forecasting, monitoring and control division within the Federal Ministry of Environment under the Erosion, Flood and Coastal Management department. To test readiness, NEMA has conducted large scale simulation exercises in high risk states such as Anambra, Kano and Rivers to assess evacuation and rescue plans (NEMA, 2023; Brown and Chikagbum, 2015). On physical and structural measures, efforts have included drainage desilting, and the construction of levees and embankments in flood prone areas (NEMA, 2023; Jha et al., 2012). NEMA and state governments have also advocated for improvements in urban drainage infrastructure (Brown and Chikagbum, 2015; NiHSA, 2022). Nature based solutions are being promoted, including wetland restoration, water harvesting, and flood resilient housing and road designs (European Commission, 2015; Cirella and Iyalomhe, 2018). In the past, water harvesting projects such as over 600 underground reservoirs in Jigawa State were implemented to reduce flash floods, although some were later abandoned due to lack of continuity (Komolafe et al., 2015; UNOCHA, 2018). Community and social measures have also been emphasized. NEMA continues to work with local leaders, religious bodies, and youth groups on sensitization around clearing drains, proper waste disposal, and compliance with evacuation orders (NEMA, 2023; UNICEF, 2019). Local Emergency Management Committees have been established in several states, and the current framework directs all high risk states to set them up and train community leaders (NEMA, 2023). For risk communication, states are encouraged to use radio, town halls, and local broadcasts to reach vulnerable populations (WMO, 2020; UNOCHA, 2018). The anticipatory plan also includes cash assistance and the provision of evacuation sites, with funding allocated for multipurpose cash support to households in high risk states (NEMA, 2023; UNOCHA, 2018). In terms of environmental and urban planning, there has been renewed emphasis on enforcing environmental laws and stopping illegal construction on waterways (Adeloye and Rustum, 2011; Agbonkhese et al., 2014). Integrated water resources management and improved urban planning are being pursued in partnership with states such as Lagos (Adekan, 2016). The SURWASH Programme is another platform through which the federal and state governments are collaborating to improve drainage, sanitation, and water supply (Federal Ministry of Environment, 2021). Despite these efforts, officials acknowledge that challenges remain. Poor drainage, deforestation, land degradation, and the dumping of waste in channels continue to worsen flooding (Agbonkhese et al., 2014; Komolafe et al., 2015). The previous reactive approach has also been costly, with significant portions of GDP lost yearly to disaster response (IPCC, 2021; UNDRR, 2019). While Nigeria previously relied mostly on NEMA relief and post flood aid, the focus since 2024 and 2025 has shifted toward anticipatory action

(NEMA, 2023; NiHSA, 2022). This includes better forecasting, community early warning, investment in drainage and embankment infrastructure, stronger policy coordination, and financing measures put in place before floods occur (UNOCHA, 2018). Nigeria has not built one single mega project like the Netherlands' sea walls. Instead the response has been a mix of engineering works, nature based projects, and state level infrastructure spread across flood prone areas (Jha et al., 2012; Cirella and Iyalomhe, 2018). On the structural and engineering side, several dams and reservoirs have been constructed to regulate river flow and store excess water upstream. These include Kainji, Jebba and Shiroro Dams on the River Niger, as well as Dadin Kowa and Goronyo Dams (Komolafe et al., 2015). The Lagdo Dam in Cameroon remains a major source of transboundary flooding, and Nigeria and Cameroon have discussed building buffer dams such as the proposed Dasin Hausa Dam in Adamawa to hold back releases from Lagdo (UNOCHA, 2018). Levees, dikes and floodwalls have also been built along parts of the River Niger, River Benue, and in urban floodplains in Lagos, Port Harcourt, Kano and Maiduguri to keep water within channels (Brown and Chikagbum, 2015; Agbonkhese et al., 2014). Major cities have constructed concrete drainage channels and underground retention basins. Examples include the Lagos drainage masterplan, Abuja storm water channels, and Port Harcourt flood control channels (Adelekan, 2016; Jibril, 2026). In the north, water harvesting structures such as over 600 underground reservoirs and earth dams in Jigawa State have been used to trap runoff and reduce flash floods (Komolafe et al., 2015). For erosion and coastal protection, coastal groynes, revetments and sand filling have been carried out in Lagos, Rivers, Delta and Bayelsa States to resist ocean surges and coastal erosion (Adelekan, 2016). Notable works include the Lagos Bar Beach shoreline protection and the Eko Atlantic City sea wall, an 8.5 kilometer barrier designed to protect Victoria Island from Atlantic erosion and sea level rise (Adelekan, 2016). NEMA and the Federal Ministry of Environment also have ongoing shoreline protection projects in Niger Delta communities affected by tidal surges (NEMA, 2023). River bank stabilization works using gabions and riprap have been done along parts of the River Niger and River Benue to prevent bank collapse and land loss (Jha et al., 2012). Nature based and land reclamation efforts have focused on restoring ecosystems that absorb water. There are wetland restoration initiatives in the Hadejia Nguru wetlands and in parts of the Niger Delta to serve as natural sponges for floodwater (European Commission, 2015; Cirella and Iyalomhe, 2018). Afforestation and tree planting are being pursued through gully reclamation projects in the Southeast and erosion control works in Anambra, Imo and Enugu to reduce runoff that washes away land (Komolafe et al., 2015; Agbonkhese et al., 2014). In Lagos and Rivers State, sandfilling and land reclamation have been used to raise low lying areas and create buildable land that sits above flood levels (Adelekan, 2016; Brown and Chikagbum, 2015). Urban planning infrastructure has also been part of the response. The SURWASH Programme involves federal and state collaboration to improve drainage, sanitation and water supply in cities in order to reduce surface flooding (Federal Ministry of Environment, 2021). There is regular desilting of major canals in Lagos, Kano, Rivers and the FCT to keep drainage systems clear so water does not overtop into communities (NEMA, 2023; Agbonkhese et al., 2014). In flood prone local government areas, new roads and public buildings are being constructed on raised plinths, especially in parts of Rivers, Bayelsa and Jigawa States (Cirella and Iyalomhe, 2018; Komolafe et al., 2015). Despite these efforts, many of the structures remain incomplete, poorly maintained, or localized. Poor drainage, illegal structures on waterways, and lack of continuity mean that floods still take over land every rainy season (Adeloye and Rustum, 2011; Agbonkhese et al., 2014). This is why the new Anticipatory Action Framework is pushing for more coordinated nationwide infrastructure combined with early warning (NEMA, 2023; NiHSA, 2022). In summary, Nigeria has built dams, levees, drainage channels, sea walls such as Eko Atlantic, retention basins, and erosion control works (Adelekan, 2016; Jha et al., 2012). However most of these are fragmented by state. For riverine areas like Ahoada East, Ahoada West, Abua Odual, Ogba Egbema Ndoni and Degema, the main structures are river embankments, local drainage channels, and some community sandfilling (Brown and Chikagbum, 2015; Jibril, 2026). These are often overwhelmed by the River Orashi, the River Niger and tidal surges (UNOCHA, 2018).

METHODOLOGY

The study adopted a descriptive survey research design, considered appropriate for eliciting the opinions of a relatively large population regarding an existing phenomenon. The study was conducted in the Orashi region of Rivers State, comprising Abua/Odual, Ahoada East, Ahoada West, and Ogba/Egbema/Ndoni Local Government Areas, which the Rivers State Government and the Nigerian Meteorological Agency (NiMET) have identified as the area of the state most severely and recurrently affected by flooding, particularly communities along the

Orashi River and its tributaries. The population comprised all senior secondary school (SS1–SS3) students in public secondary schools in the flood-affected communities of these four Local Government Areas. Exact enrolment figures for the four Local Government Areas were not readily available at the time of the study; the population is therefore described in qualitative rather than numerical terms. Teachers were not part of the population or sample. One public secondary school was purposively selected from each of the four Local Government Areas on the basis of its location in a community that experiences recurrent flooding: Government Secondary School, Abua Central (Abua/Odual); Western Ahoada County High School, Ahoada (Ahoada East); Community Secondary School, Ikodi (Ahoada West); and Government Secondary School, Ndoni (Ogba/Egbema/Ndoni). A purposive sampling technique was used to select the four schools, and simple random sampling was then used within each school to draw a total sample of 270 students (135 male and 135 female), in approximately equal numbers across the four schools. The instrument for data collection was a structured questionnaire titled “Flood Disruption and Academic Performance Questionnaire (FDAPQ),” developed by the researcher on a four-point Likert scale of Strongly Agree (4), Agree (3), Disagree (2) and Strongly Disagree (1). It had two sections addressing the two research questions and measured students’ self-reported perceptions; it did not include attendance registers or examination records. The instrument was validated by three experts in Measurement and Evaluation and Guidance and Counselling, whose corrections informed the final version. To establish reliability, a trial test was conducted on 20 students outside the study area, and the data were analysed using Cronbach alpha, which yielded a coefficient of 0.83, indicating that the instrument was reliable.

Ethical considerations. Formal approval from an institutional ethics review committee was not sought for this study, as it was a low-risk, anonymous questionnaire survey that collected no personal identifying or sensitive health information. The study was conducted within the schools, and followed the principles of voluntary participation, anonymity and confidentiality. Permission to administer the questionnaire was obtained from the principals of the four participating schools before data collection. Verbal assent to participate was obtained from the students themselves, in addition to the permission granted by their school principals acting *in loco parentis*. Participation was voluntary and anonymous, no identifying information was collected, and responses were kept confidential and used only for research purposes.

Data were analysed using mean and standard deviation to answer the research questions, with a criterion mean of 2.50 as the benchmark for decision-making: items with a mean of 2.50 and above were regarded as “Agreed,” while those below 2.50 were regarded as “Disagreed.” The two null hypotheses were tested using the independent samples t-test at the 0.05 level of significance. These tests compare the ratings of male and female students; they do not test whether flooding itself influences attendance or academic performance. The mean difference, its 95% confidence interval and Cohen’s *d* are also reported.

RESULTS

Research Question 1: To what extent do senior secondary school students perceive that flood disruption influences their school attendance?

Table 1: Mean and standard deviation of students’ perceptions of the extent to which flood disruption influences school attendance

S/N	Items	Mean ($\bar{x}$)	SD	Remark
1	Flooding disrupts my ability to attend school regularly during the rainy season.	3.51	0.72	Agreed
2	Flood-damaged roads and bridges prevent me from reaching school on time.	3.36	0.81	Agreed
3	I have missed continuous assessment tests because of flood-related absence.	3.35	0.76	Agreed

4	My concentration in class is reduced when my home has recently been flooded.	3.40	0.79	Agreed
5	I lose study materials (books, uniforms) to flooding, which affects my preparation for lessons.	3.46	0.75	Agreed
6	Flood displacement forces my family to relocate temporarily, interrupting my schooling.	3.24	0.85	Agreed
7	Teachers are also absent from school during periods of severe flooding.	3.42	0.72	Agreed
8	My school building itself becomes inaccessible or unsafe during flood periods.	3.44	0.74	Agreed
	Grand Mean	3.40	0.77	Agreed

Table 1 shows that students perceive flood disruption as having a considerable negative influence on their school attendance and participation in school activities. The grand mean of 3.40 with a standard deviation of 0.77 indicates that respondents generally agreed with the statements on the effects of flooding. The highest mean (3.51) was recorded for the statement that flooding disrupts students' ability to attend school regularly during the rainy season, followed by loss of study materials ($\bar{x} = 3.46$) and school buildings becoming inaccessible or unsafe ($\bar{x} = 3.44$). The lowest mean (3.24) was recorded for temporary family relocation due to flood displacement, although the item was still agreed upon. The standard deviations, ranging from 0.72 to 0.85, indicate relatively low variation in respondents' opinions. Overall, students' responses suggest that, in their experience, flooding disrupts attendance by affecting access to school, learning materials, safety and continuity of schooling.

H₀₁: There is no significant difference in the mean ratings of male and female students on the influence of flood disruption on school attendance.

Table 2: Independent samples t-test of male and female students' ratings of the influence of flood disruption on school attendance

Group	N	Mean	SD	Df	t-cal	t-crit	Sig.	Decision
Male students (Attendance)	135	3.38	0.74	268	0.43	1.97	0.670	Not Sig.
Female students (Attendance)	135	3.42	0.80					

Table 2 shows that male students had a mean rating of 3.38 (SD = 0.74) and female students a mean rating of 3.42 (SD = 0.80) on the influence of flood disruption on school attendance. The calculated t-value of 0.43 is less than the critical t-value of 1.97 at 268 degrees of freedom and the 0.05 level of significance ($p = .670$). Therefore, the null hypothesis (H_{01}) was retained. The mean difference of 0.04 (95% CI [-0.14, 0.22]; Cohen's $d = 0.05$) shows that no statistically significant difference was detected between male and female students' ratings. This test concerns gender differences in ratings only; it does not assess whether flooding influences attendance.

Research Question 2: To what extent do senior secondary school students perceive that flood disruption influences their academic performance?

Table 3: Mean and standard deviation of students' perceptions of the extent to which flood disruption influences academic performance

S/N	Items	Mean ($\bar{x}$)	SD	Remark
1	My academic performance declines in terms after severe flooding events.	3.41	0.78	Agreed
2	I find it difficult to catch up with missed lessons after flood-related absences.	3.32	0.80	Agreed
3	Flooding increases my stress and anxiety about schoolwork.	3.43	0.81	Agreed
4	My school introduces make-up classes to help students recover lost time after floods.	2.61	1.02	Agreed
5	I receive support from teachers to catch up on missed work after flood disruptions.	2.55	1.00	Agreed
6	Repeated flooding has made me consider dropping out of school.	2.21	1.05	Disagreed
	Grand Mean	3.09	0.86	Agreed

Table 3 shows that students perceive flood disruption as having a considerable influence on their academic performance. The grand mean of 3.09 with a standard deviation of 0.86 indicates that respondents generally agreed with the statements relating to the influence of flooding on their academic performance. The highest mean (3.43) was recorded for the statement that flooding increases students' stress and anxiety about schoolwork, followed by the perceived decline in academic performance after severe flooding events ($\bar{x} = 3.41$). Respondents indicated moderate agreement that their schools introduce make-up classes ($\bar{x} = 2.61$) and that they receive teacher support to catch up on missed work ($\bar{x} = 2.55$). The only item not accepted was that repeated flooding had made students consider dropping out of school ($\bar{x} = 2.21$). The standard deviations, ranging from 0.78 to 1.05, indicate some variation in respondents' views. Overall, students' responses suggest that they experience flooding as harmful to their academic performance, particularly through missed lessons, difficulty catching up with schoolwork and increased stress and anxiety.

H₀₂: There is no significant difference in the mean ratings of male and female students on the influence of flood disruption on academic performance.

Table 4: Independent samples t-test of male and female students' ratings of the influence of flood disruption on academic performance

Group	N	Mean	SD	Df	t-cal	t-crit	Sig.	Decision
Male students (Performance)	135	3.05	0.83	268	0.76	1.97	0.446	Not Sig.
Female students (Performance)	135	3.13	0.89					

Table 4 shows that male students recorded a mean rating of 3.05 (SD = 0.83) and female students a mean rating of 3.13 (SD = 0.89) on the influence of flood disruption on academic performance. The calculated t-value of 0.76 is less than the critical t-value of 1.97 at 268 degrees of freedom and the 0.05 level of significance ($p = .446$). Therefore, the null hypothesis (H_{02}) was retained. The mean difference of 0.08 (95% CI [-0.13, 0.29]; Cohen's $d = 0.09$) shows that no statistically significant difference was detected between male and female students' ratings. As with Table 2, this test concerns gender differences only.

DISCUSSION OF THE FINDINGS

The findings indicate that students perceive flood disruption as substantially affecting school attendance and continuity of learning. Table 1 shows a grand mean of 3.40 (SD = 0.77) above the criterion mean of 2.50, with agreement on all items. Flooding makes roads and school premises inaccessible, causes temporary displacement, damages learning materials and interrupts normal school activities. The highest-rated item was Item 1 ($\bar{x} = 3.51$) that flooding disrupts ability to attend school regularly during rainy season, followed by loss of study materials (Item 5, $\bar{x} = 3.46$) and school building becoming inaccessible or unsafe (Item 8, $\bar{x} = 3.44$). This is consistent with Oruonye (2015) and Nwankwoala and Emenike (2022) who found seasonal flooding in the Niger Delta leads to prolonged closures and irregular attendance, and with Lassa et al. (2023) who reported disruption of learning opportunities through loss of books, cancellation of lessons and difficulties completing planned academic activities. Umeji (2024) in Awka North also found flooding damaged infrastructure and materials and contributed to reduced enrolment and interruptions in learning, while Wahab (2023) showed interrupted schooling was widespread among flood-affected households, especially in the Niger Delta. Beyond physical access, students reported pedagogical consequences. Item 3 ($\bar{x} = 3.35$) - missing continuous assessment tests - is critical in Nigeria where CA contributes to promotion and preparation for WAEC and NECO. Item 5 ($\bar{x} = 3.46$) indicates students return unprepared, compounding gaps. This supports UNESCO (2020) that disaster-related loss of materials disproportionately affects low-income households. Items 4 ($\bar{x} = 3.40$) reduced concentration when home has been flooded and 6 ($\bar{x} = 3.24$) temporary family relocation reveal a psychosocial dimension. Attendance is not only presence but readiness to learn. A displaced student is physically absent; a present student whose home is flooded is cognitively distracted. Item 7 ($\bar{x} = 3.42$) - teacher absence during severe flooding - shows disruption is systemic, affecting both demand and supply of education. Low SDs (0.72-0.85) indicate high consensus, suggesting shared lived experience rather than isolated cases. Because present data are self-reports, they show what students experience rather than measured changes in attendance, which would require attendance registers. Table 3 shows students perceive flood disruption as having considerable influence on academic performance, with grand mean 3.09 (SD = 0.86). The pattern of means is revealing. The highest rated was Item 3 ($\bar{x} = 3.43$) - flooding increases stress and anxiety about schoolwork - followed by Item 1 ($\bar{x} = 3.41$) perceived decline in performance after severe flooding, and Item 2 ($\bar{x} = 3.32$) difficulty catching up with missed lessons. This aligns with Etukudo and Eze (2025) who found lower mathematics achievement among secondary students in Rivers State during flooding than before and after, and Okoroafor, Ucheje and Ipalibo-Wokoma (2025) whose principals indicated negative effect on performance in South-South Nigeria. International evidence is similar: Thamtanajit (2020) found severe flooding in Thailand negatively affected examination performance at some grade levels, and Muñoz-Morales (2025) found rainfall shocks reduced learning outcomes and increased dropout, particularly among rural students. These studies used outcome data or other respondents, whereas present study relied on students' perceptions, so results are consistent with, but cannot confirm, an effect on measured performance. The psychosocial pathway is central. Opadere et al. (2021) and Ojo and Adeyemi (2020) found flood-displaced students in coastal Nigeria reported high academic anxiety and loss of concentration. In Port Harcourt where flooding is recurrent, anxiety is anticipatory; students enter rainy season expecting disruption. Items 4 ($\bar{x} = 2.61$, SD = 1.02) and 5 ($\bar{x} = 2.55$, SD = 1.00) - schools introduce make-up classes and teacher support - though above criterion mean, are markedly lower than Items 1-3 and show high variation (SD > 1.00). This suggests recovery measures exist but are inconsistent, ad-hoc and teacher-dependent rather than systemic. This fits Federal Ministry of Education (2021) review noting absence of standardized flood-resilient calendar or remedial policy in Rivers State. It also helps explain contrasting evidence: Lassa et al. (2023) found in Indonesia most principals reported little or no effect on final examination outcomes because schools compensated through additional lessons; Llego et al. (2025) in Philippines found despite absences, university nursing students' performance improved after flood period. This suggests academic consequences depend on severity, duration, resilience of schools and families, and availability of recovery measures. Present finding of only moderate agreement on support fits this reading. Item 6 ($\bar{x} = 2.21$) - considering dropout - was disagreed. This is an important positive finding indicating academic resilience and retention intention, contrasting with Bayelsa and Anambra contexts where flood was linked to dropout, perhaps reflecting stronger parental value for secondary certification in urban Port Harcourt. Overall, students experience harm through three linked pathways: loss of instructional time -> difficulty catching up -> increased stress, with weak compensatory mechanisms. Table 2 (attendance): Male $\bar{x} = 3.38$ (SD = 0.74), Female $\bar{x} = 3.42$ (SD = 0.80), $t\text{-cal} = 0.43 < t\text{-crit} = 1.97$, $df = 268$, $p = .670$, mean diff. = 0.04, 95% CI [-0.14, 0.22], Cohen's $d = 0.05$. Table 4 (performance): Male $\bar{x} = 3.05$

(SD = 0.83), Female $\bar{x}$ = 3.13 (SD = 0.89), $t_{\text{cal}} = 0.76 < t_{\text{crit}} = 1.97$, $p = .446$, mean diff. = 0.08, 95% CI [-0.13, 0.29], $d = 0.09$. Both H01 and H02 were retained. No statistically significant difference was detected between male and female students' ratings. This should be interpreted cautiously: absence of significance does not establish equivalence, and confidence intervals do not exclude small differences. It is plausible that many flood-related barriers - impassable roads, damaged schools - affect students generally, which is consistent with Wali et al. (2023) that flood is a general community stressor in Rivers State. However, suggestion remains tentative. This test concerns gender differences in ratings only; it does not assess whether flooding influences attendance or performance. That influence is established descriptively but, because design is cross-sectional perception-based without examination scores or control group, causation cannot be inferred.

CONCLUSION

This study set out to examine senior secondary school students' perception of flood disruption on attendance and academic performance in flood-prone areas of Port Harcourt. The study concludes that, from the perspective of the students surveyed, flood disruption poses a significant challenge to their educational experience. On attendance: Students perceived that flooding disrupts regular school attendance by making roads and school premises inaccessible, causing temporary displacement of families, damaging learning materials such as books and uniforms, and interrupting normal school activities. When students are unable to attend school consistently, they miss lessons, continuous assessments, and important preparatory periods for external examinations such as WAEC and NECO. This irregularity creates learning gaps that are difficult to close, especially in a system where the academic calendar is fixed and time is limited. On academic performance: The disruption extends to academic achievement. Loss of instructional time means teachers are often forced to rush through the syllabus when schools resume, leaving students with little opportunity to fully grasp difficult concepts. Many students reported difficulty recovering missed lessons and increased stress and anxiety about schoolwork following flood events. The emotional toll of displacement, property loss and fear of future floods further reduces concentration and motivation in class. Although schools may provide measures such as make-up classes and teacher support, students' ratings suggest these interventions are often inconsistent and insufficient to overcome the effects of prolonged or severe flooding. On gender: No statistically significant differences were detected between male and female students' ratings of the effects of flooding on attendance and academic performance. This does not establish that the two groups are equally affected, but it suggests flood-related educational challenges are not confined to one gender in this sample. Both male and female students face similar barriers such as impassable roads, unsafe school buildings, loss of materials and emotional stress. This implies interventions aimed at reducing flood impact on education must be inclusive and not targeted at one gender alone. However, the extent to which flooding affects individual students may vary depending on contextual factors, including severity and duration of flooding in a particular community, accessibility of schools during the rainy season, whether the household experienced displacement, availability of learning materials after a flood, and capacity of schools to provide recovery support such as remedial teaching and psychosocial services. Students from households with fewer resources are likely to experience effects more severely. Because the study is based on self-reported, cross-sectional data, these conclusions describe perceived effects and do not establish causation. In essence, flooding in Port Harcourt is not just an environmental hazard but an educational crisis that undermines attendance, learning continuity and academic achievement. Without deliberate policies and flood-resilient strategies in the education sector, academic progress of senior secondary students in these communities will continue to be threatened each rainy season.

RECOMMENDATIONS

Based on the findings and conclusion of the study, the following recommendations are made

1. Government and relevant education authorities should prioritize the development of flood resilient school infrastructure in vulnerable communities. This involves improving flood control systems around schools by constructing and maintaining adequate drainage channels, culverts, bridges, and access roads. School buildings that are frequently submerged should be raised above flood levels or relocated to safer grounds. Where relocation is not possible, schools can be redesigned to function as multi purpose flood shelters equipped with emergency supplies. These measures will ensure that students can reach school safely during the rainy season and that learning can continue with minimal interruption.

2. The Rivers State Ministry of Education in collaboration with school administrators should also develop a flexible academic calendar and flood emergency learning continuity plans for flood prone areas. Such plans should include built in buffer weeks, rescheduling of examinations and assessments, and provision of alternative learning platforms. During periods when physical attendance is not possible, schools can use radio lessons, television broadcasts, WhatsApp groups, and other online platforms to deliver instruction. This will help to minimize loss of instructional time and keep students engaged with their studies.
3. Schools should further establish structured recovery support systems for students affected by floods. This includes organizing regular make up classes and remedial teaching to help students catch up on missed work. Teachers should also be trained to provide psychosocial support to help students cope with the stress, anxiety, and trauma caused by displacement and property loss. Guidance counselors should play a central role in identifying the most affected students and linking them with appropriate support services.
4. Government and non governmental organizations should provide emergency learning kits to students in flood prone communities before and during the flood season. These kits should be packed in waterproof bags and should contain textbooks, writing materials, and uniforms to replace items that are damaged or lost to flooding. Special attention should be given to students from low income households who may not be able to replace these materials on their own, so that their education is not delayed.
5. Community involvement should be strengthened in both flood management and education continuity. Indigenous coping strategies such as youth emergency teams, local drainage clearing, and rotational hosting of displaced students should be supported and integrated into official disaster response plans.
6. Parents and community leaders should be sensitized on the importance of maintaining children's education during floods and encouraged to organize home based study groups to keep students learning.
7. Further research should be conducted to monitor the long term effects of flooding on education and to evaluate the effectiveness of interventions put in place. Continuous data collection will help policymakers to design evidence based policies that protect the right to education for students in flood prone areas.

Limitations of the study

1. The data are students' self-reported perceptions obtained through a Likert-scale questionnaire, not attendance registers or examination scores. The findings therefore show perceived effects rather than objectively measured changes, and may have been influenced by memory recall, personal interpretation, or tendency to provide socially desirable answers.
2. The study adopted a cross-sectional survey design, taken at one point in time and without a comparison group from non-flood-prone areas. This design is suitable for examining relationships between variables but cannot establish that flooding caused any change in attendance or performance. The t-tests examined gender differences in ratings only and did not test the influence of flooding itself.
3. The study covered public senior secondary schools in flood-prone communities of one area of Port Harcourt, Rivers State. Consequently, findings cannot be generalized to other educational levels such as primary and tertiary institutions, or to other flood-prone communities outside Port Harcourt that may have different socio-economic and environmental conditions.
4. The study focused specifically on influence of flood disruption on school attendance and academic achievement. Other relevant variables such as psychological impact of flooding, loss of parental income, damage to school infrastructure, and role of government interventions were not extensively examined.
5. The study was conducted within a specific time frame and during a particular flood season. Since flood intensity, duration and government response differ from year to year, findings reflect conditions within period of study and may not fully capture long-term patterns.

Suggestions for further research

Based on the findings and limitations of this study, several areas are recommended for future research. First, the scope of future studies should be expanded to include primary and tertiary institutions, as well as other flood-prone communities outside Port Harcourt. This will help to determine whether the effects of flood disruption on school attendance and academic achievement are consistent across different educational levels and geographical contexts. Second, subsequent research should examine additional variables that were not covered in this study. These include the psychological effects of flooding on students, loss of parental income, damage to school infrastructure, and the effectiveness of government and NGO interventions. Exploring these factors will provide a more holistic understanding of how flooding impacts education. Third, longitudinal studies are recommended to assess the long-term effects of repeated flood events on students' academic progress. Such studies will help to establish patterns and causal relationships that a cross-sectional survey design cannot adequately capture. Fourth, comparative studies between flood-prone and non-flood-prone areas are suggested. This will help to isolate the specific influence of flooding on school attendance and academic performance, and to distinguish flood-related disruptions from other factors affecting education. Future research may adopt mixed-methods approaches that combine quantitative surveys with qualitative methods such as interviews and focus group discussions. This will provide deeper insights into students' lived experiences, perceptions, and coping strategies during flood periods. Exploring these areas will generate more comprehensive data that can guide policymakers, school administrators, and disaster management agencies in developing targeted interventions to protect and sustain education during periods of flooding. Future studies should also combine perception data with school attendance registers and examination records, and should use longitudinal or comparative designs. Exploring psychological, economic and infrastructural dimensions would provide more comprehensive understanding of flood impacts on education.

ACKNOWLEDGMENT

The authors express their sincere gratitude to all the scholars whose works were cited in this study. Their valuable contributions to the body of knowledge on flooding, climate change, and education provided the theoretical and empirical foundation upon which this research is built. We acknowledge and appreciate the insights of these authors, as their work has greatly enriched the literature reviewed in this study. We also extend our appreciation to the co-authors of this work for their dedication, collaboration, and intellectual input throughout the research process. Their commitment to data collection, analysis, and manuscript preparation made the completion of this study possible. Our profound gratitude goes to the editorial team and reviewers of (International journal of research and innovation in social science (IJRISS)) for their constructive feedback, professional guidance, and for providing the platform to disseminate the findings of this research to a wider academic and policy audience. Finally we acknowledge the senior secondary school students, teachers, and school administrators in the flood-prone areas of Port Harcourt who participated in this study. Their cooperation and willingness to share their experiences made this research meaningful and impactful. May the findings of this study contribute to better flood management policies and the protection of education in vulnerable communities.

REFERENCES

1. Addor, N., Jaun, S., Fundel, F., & Zappa, M. (2012). An operational hydrological ensemble prediction system for the City of Zurich (Switzerland): Assessing the added value of probabilistic forecasts. *Hydrology and Earth System Sciences*, 14, 2327–2347.
2. Adekola, O., & Lamond, J. (2018). A media framing analysis of urban flooding in Nigeria: Current narratives and implications for policy. *Regional Environmental Change*, 18(4), 1145–1159. <https://doi.org/10.1007/s10113-017-1253-y>
3. Adelekan, I. O. (2016). Flood risk management in the coastal city of Lagos, Nigeria. *Journal of Flood Risk Management*, 9(3), 255–264.
4. Adeloye, A. J., & Rustum, R. (2011). Lagos (Nigeria) flooding and influence of urban planning. *Proceedings of the Institution of Civil Engineers - Urban Design and Planning*, 164(3), 175–187.
5. Agbonkhese, O., Aka, E. G., Oholi, J., & Adekunle, M. (2014). Flood menace in Nigeria: Impacts, remedial and management strategies. *Civil and Environmental Research*, 6(4), 32–41.

6. Allan, S. (1991). *The shape of the turtle: Myth, art, and cosmos in early China*. State University of New York Press.
7. Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.
8. Brown, I., & Chikagbum, W. (2015). Planning response to water-related disasters in Nigeria: The Rivers State experience. *International Journal of Scientific and Engineering Research*, 6, 32–44.
9. Brueggemann, W. (2002). *Reverberations of faith: A theological handbook of Old Testament themes*. Westminster John Knox Press.
10. Butzer, K. W. (1976). *Early hydraulic civilization in Egypt: A study in cultural ecology*. University of Chicago Press.
11. Cirella, G. T., & Iyalomhe, F. O. (2018). Flooding conceptual review: Sustainability-focalized best practices in Nigeria. *Applied Sciences*, 8(9), 1558. <https://doi.org/10.3390/app8091558>.
12. Dalley, S. (1989). *Myths from Mesopotamia: Creation, the flood, Gilgamesh, and others*. Oxford University Press.
13. Dunning, C. M., Black, E. C. L., & Allan, R. P. (2016). The onset and cessation of seasonal rainfall over Africa. *Journal of Geophysical Research: Atmospheres*, 121(19), 11405–11424.
14. Ekpo, U. F., Hürlimann, E., Schur, N., Oluwale, A. S., Abe, E. M., Mafe, M. A., et al. (2013). Mapping and prediction of schistosomiasis in Nigeria using compiled survey data and Bayesian geospatial modelling. *Geospatial Health*, 7(2), 355–366.
15. Eliade, M. (1959). *The sacred and the profane: The nature of religion*. Harcourt.
16. Etukudo, U. E., & Eze, F. B. (2025). Assessing the impact of climate-induced flooding on mathematics achievement among secondary students in Nigeria. *Innovare Journal of Education*, 13(1), 12–17. <https://doi.org/10.22159/ijoe.2025v13i1.53252>
17. European Commission. (2015). *Towards an EU research and innovation policy agenda for nature-based solutions & re-naturing cities*. Directorate-General for Research and Innovation.
18. Eze, C. A., & Chukwu, P. O. (2021). Flood-induced school disruption and academic achievement of secondary school students in flood-prone communities in Anambra State, Nigeria. *Journal of Education in Developing Areas*, 29(2), 145–158.
19. Federal Ministry of Education. (2018). *National Policy on Education (6th ed.)*. NERDC Press.
20. Federal Ministry of Environment. (2021). *Sustainable Urban and Rural Water Supply, Sanitation and Hygiene Programme [SURWASH] Project Document*. Federal Government of Nigeria.
21. FEMA. (2012). *Hazard identification and risk assessment*. Department of Homeland Security.
22. Fohringer, J., Dransch, D., Kreibich, H., & Schröter, K. (2015). Social media as an information source for rapid flood inundation mapping. *Natural Hazards and Earth System Sciences*, 15, 2725–2738.
23. Frazer, J. G. (1922). *The golden bough: A study in magic and religion (Abridged ed.)*. Macmillan.
24. Hamilton, E. (1942). *Mythology: Timeless tales of gods and heroes*. Little, Brown and Company.
25. IPCC. (2021). *Climate Change 2021: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report*. Cambridge University Press.
26. Jha, A. K., Bloch, R., & Lamond, J. (2012). *Cities and flooding: A guide to integrated urban flood risk management for the 21st century*. The World Bank.
27. Jibril, M. (2026). Port Harcourt drainage master plan: Rivers State's flood decongestion efforts. *Nigerian Tribune*. <https://tribuneonline.ng.com/port-harcourt-drainage-master-plan-rivers-states-flood-decongestion-efforts/>
28. Komolafe, A. A., Adegboyega, S. A. A., & Akinluyi, F. O. (2015). A review of flood risk analysis in Nigeria. *American Journal of Environmental Sciences*, 11(3), 157–166.
29. Lassa, J., Petal, M., & Surjan, A. (2023). Understanding the impacts of floods on learning quality, school facilities, and educational recovery in Indonesia. *Disasters*, 47(2), 412–436. <https://doi.org/10.1111/disa.12543>.
30. Lindow, J. (2001). *Norse mythology: A guide to gods, heroes, rituals, and beliefs*. Oxford University Press.
31. Llego, J., Permison, P. E., Imbuido, N., Concepcion, M., Caneja, L. J., & Zaulda, F. J. (2025). Challenges in academic performance among nursing students during flood disasters at a university in Dagupan City. *Science Talks*, 13, Article 100418. <https://doi.org/10.1016/j.sctalk.2024.100418>

32. Manpower.ng. (n.d.). Government secondary schools in Ahoada East, Ahoada West, Abua/Odual and Ogba/Egbema/Ndoni, Rivers State. <https://www.manpower.com.ng/lists/government-secondary-schools>
33. Mbiti, J. S. (1990). *African religions and philosophy* (2nd ed.) Heinemann Educational Publishers, Nairobi.
34. Muñoz-Morales, J. S. (2025). Flooding the brains: Natural disasters, student outcomes, and the urban-rural gap in human capital. *Economic Development and Cultural Change*, 74(1). <https://doi.org/10.1086/735170>.
35. NEMA. (2023). *National Flood Emergency Preparedness and Response Plan*. National Emergency Management Agency, Nigeria.
36. NiHSA. (2022). *Annual flood outlook 2022: The flood situation in Nigeria*. Nigeria Hydrological Services Agency, Federal Ministry of Water Resources.
37. Nkeki, F. N., & Osirike, A. B. (2023). Assessment of flood risk and vulnerability of schools in the Niger Delta region of Nigeria. *International Journal of Disaster Risk Reduction*, 91, 103672. <https://doi.org/10.1016/j.ijdr.2023.103672>
38. Nwankwoala, H. O., & Emenike, C. C. (2022). Seasonal flooding and vulnerability of low-lying communities in the Niger Delta. *Journal of Environmental Geology and Flood Studies*, 4(2), 45-58.
39. OECD. (2016). *Financial management of flood risk*. OECD Publishing.
40. Ogbuene, E. B., Emeka, C., & Ogbuene, U. C. (2022). Assessment of flood vulnerability and impact on socio-economic activities in South-South Nigeria. *Journal of Environmental Hazards and Management*, 4(2), 33-47.
41. Ojo, M. A., & Adeyemi, B. A. (2020). Flood-induced anxiety and learning challenges among displaced secondary school students in Ibadan, Oyo State. *Nigerian Journal of Environmental Education*, 5(2), 67-79.
42. Okali, D. (2020). Urban flooding and adaptation in Port Harcourt, Nigeria. *International Journal of Climate Change Strategies and Management*, 12(1), 89–102.
43. Okoroafor Ucheje, O. O., & Ipalibo-Wokoma, B. (2025). The impact of environmental hazards on the academic performance of public secondary school students. *International Journal of Environment, Engineering & Education*, 7(1), 13–24. <https://doi.org/10.55151/ijeedu.v7i1.177>
44. Opadere, O. S., Agboola, J. O., & Ajayi, O. T. (2021). Psychosocial effects of flooding on secondary school students in coastal communities of Ondo State, Nigeria. *Journal of Educational and Social Research*, 11(4), 112-124.
45. Oruonye, E. D. (2015). The 2012 flooding in Nigeria: Impact and mitigation strategies. *Journal of Geography and Regional Planning*, 8(6), 123-133.
46. Oyesiku, O. O., & Akinjogbin, A. O. (2018). Effects of flooding on educational institutions in Nigeria: A case study of Ogun State. *International Journal of Educational Development*, 61, 112–120.
47. Paterson, D. L., Wright, H., & Harris, P. N. A. (2018). Health risks of flood disasters. *Clinical Infectious Diseases*.
48. Patra, K. C. (2001). *Hydrology and water resources engineering*. Alpha Science International.
49. Rivers State Government. (2024). Rivers Govt moves to tackle flooding. National Ambassador. <https://nationalambassadorng.com/rivers-govt-moves-to-tackle-flooding/>
50. Thamtanajit, K. (2020). The impacts of natural disaster on student achievement: Evidence from severe floods in Thailand. *The Journal of Developing Areas*, 54(4), 129–143. <https://doi.org/10.1353/jda.2020.0042>
51. Umeji, I. C. (2024). 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. *Pakistan Journal of Educational Research*, 7(2), 248–260. <https://doi.org/10.52337/pjer.v7i2.1079>.
52. UNDRR. (2019). *Global Assessment Report on Disaster Risk Reduction*. United Nations Office for Disaster Risk Reduction.
53. UNESCO. (2015). *Education for All 2000-2015: Achievements and Challenges*. UNESCO Publishing.
54. UNICEF. (2019). *Children and Disaster Risk Reduction: 2019 Global Review*. United Nations Children's Fund.
55. UNOCHA. (2015). *Humanitarian Bulletin Nigeria*. United Nations Office for the Coordination of Humanitarian Affairs.

56. UNOCHA. (2018). Nigeria: Humanitarian Response Plan. United Nations Office for the Coordination of Humanitarian Affairs.
57. Wahab, B. (2023). Nigeria Flood Impact Assessment 2022: Impact on access to education and housing. National Bureau of Statistics / National Emergency Management Agency.
58. Walesh, S. G. (1989). Urban surface water management. John Wiley and Sons publishers
59. Wali, R. S., Nwankwo, P. O., & Weli, E. C. (2023). Effects of flooding and flood risk reduction strategies in Ahoada East and Ogba/Egbema/Ndoni Local Government Areas of Rivers State. *Journal of Education in Developing Areas (JEDA)*, 31(3), 158-168.
60. Ward, P. J., Jongman, B., Salamon, P., Simpson, A., Bates, P., De Groeve, T., et al. (2017). Use of rapid flood modeling for risk reduction in the flood-prone areas of the world. *Natural Hazards and Earth System Sciences*, 17, 319–328.
61. Wilkinson, R. H. (2010). The complete gods and goddesses of ancient Egypt. Thames & Hudson.
62. Wilkinson, T. A. H. (2010). The rise and fall of ancient Egypt. Random House.
63. Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2004). At risk: Natural hazards, people's vulnerability and disasters (2nd ed.). Routledge.
64. WMO. (2020). Guidelines on Flood Forecasting and Early Warning Systems. World Meteorological Organization.