Volume 11, Issue 1, January – 2026 International Journal of Innovative Science and Research Technology
ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jan1632

The Impact of Flood Disasters on School Infrastructure and Learning Continuity in Limpopo Province

Nkuna Philile Tiyiselani[1]; Mathonsi Masingita[2]; Mulovhedzi Shonisani Agnes[3]

[1,2,3] Faculty of Humanities, Social Sciences and Education.
Department of Early Childhood Education.
University of Venda, South Africa

Publication Date: 2026/02/09

Abstract: Flood disasters are increasingly recognized as a significant threat to education, particularly in rural and resource-constrained areas. In Limpopo Province, South Africa, the Mopani East Education District has been severely affected by recent floods, which have caused extensive damage to school infrastructure, disrupted access routes, and interrupted the delivery of teaching and learning. This study explored the multifaceted impact of flood events on schools in Mopani East District, focusing on both the physical destruction of infrastructure such as classrooms, sanitation facilities, and roads and the resultant disruptions to learning continuity. A qualitative research approach was employed, incorporating semi-structured interviews with school principals and teachers, as well as analysis of official government reports and media documentation of flood incidents. Data was collected through interviews, open group discussions, document analysis and observation. The population of the study was all district officials, principals and teachers in the Mopani East District. 5 district education officials, 10 Principals and 10 teachers were purposively sampled. Findings indicate that flood disasters led to the closure of at least 91 schools in January 2026 alone, with learners experiencing loss of instructional time, delayed curriculum coverage, and limited access to alternative learning platforms. The study further reveals that rural learners are disproportionately affected due to pre-existing inequalities, limited digital access, and inadequate disaster preparedness measures at school and district levels. These findings underscore the urgent need for resilient school infrastructure, comprehensive disaster risk management strategies, and alternative learning mechanisms including catch-up programs and community-based education initiatives to ensure continuity of education during extreme weather events. By highlighting these challenges and potential interventions, the study provides actionable insights for policymakers, teachers, and communities seeking to safeguard educational outcomes in flood-prone rural regions.

Keywords: *Flood Disasters, School Infrastructure, Learning Continuity, Mopani East.*

How to Cite: Nkuna Philile Tiyiselani; Mathonsi Masingita; Mulovhedzi Shonisani Agnes (2026) The Impact of Flood Disasters on School Infrastructure and Learning Continuity in Limpopo Province. *International Journal of Innovative Science and Research Technology*, 11(1), 3291-3299. https://doi.org/10.38124/ijisrt/26jan1632

I. INTRODUCTION

Flood disasters are increasingly recognised as severe environmental hazards that disrupt communities and essential public services, including education [15]. Across southern Africa, extreme rainfall events have become more frequent, placing rural infrastructure under significant stress and exposing vulnerabilities in emergency preparedness [11]. In South Africa, Limpopo Province is particularly prone to flooding during the rainy season due to its topography, river systems, and rural settlement patterns [13].

In January 2026, persistent heavy rainfall caused widespread flooding in Limpopo, particularly affecting Mopani and Vhembe districts. The South African Weather Service issued a Red Level 10 warning, signalling severe risk to infrastructure and public safety [11]. The floods damaged roads, bridges, and school buildings, and displaced residents, thereby disrupting normal daily life [13].

The Mopani East Education District was heavily affected, with the Limpopo Department of Education reporting that 91 out of 305 schools were rendered inaccessible due to submerged roads and unsafe travel conditions at the start of the academic year [12][5]. Flooding also disrupted scholar transport services, school nutrition programmes, and access to classrooms, which are essential for the wellbeing and attendance of rural learners [4]. Across the province, nearly 500 schools were closed due to flood damage,

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jan1632

highlighting the scale and severity of educational disruption [12].

Historical data indicate that floods are a recurring challenge in Limpopo. Between 2024 and 2025, heavy rains caused damage to more than 108 schools and hundreds of kilometers of roads, demonstrating the province's repeated vulnerability to extreme weather events [7]. Such recurring disasters exacerbate existing inequalities in rural education, as learners in remote areas often lack access to alternative learning platforms and rely heavily on physical classroom attendance [15].

In districts like Mopani East, flood-induced school closures result in loss of instructional time, delayed curriculum coverage, and potential long-term academic setbacks for learners. These challenges underscore the urgent need for resilient school infrastructure, effective disaster risk management strategies, and continuity planning to safeguard learning outcomes in flood-prone rural regions of Limpopo.

II. PROBLEM STATEMENT

Flooding in Mopani East has caused significant damage to school buildings, classrooms, and access infrastructure, leading to extended school closures. This has resulted in loss of instructional time, interrupted curriculum delivery, and limited access to essential school services such as nutrition and transport. Rural learners are disproportionately affected due to pre-existing educational inequalities, including limited access to digital learning tools. Despite these challenges, there is a lack of systematic strategies to ensure learning continuity during flood disasters, leaving learners exposed to educational setbacks.

III. PURPOSE OF THE STUDY

The purpose of this study is to examine the impact of flood disasters on school infrastructure and learning continuity in Mopani East schools, Limpopo Province. The study seeks to:

- Assess the extent of damage to school infrastructure caused by flooding.
- Evaluate the effect of school closures on learning continuity.
- Explore institutional responses and mitigation strategies.
- Recommend measures to improve resilience and ensure continuity of education during disasters.

IV. RESEARCH OBJECTIVES

Flooding in Mopani East has caused significant damage to school buildings, classrooms, and access infrastructure, leading to extended school closures. Based on the study' s purpose, the specific research objectives are:

- To explore the impact of flood disasters on the physical infrastructure of schools in Mopani East.
- To examine how flood-induced school closures affect learning continuity among learners.
- To identify the measures taken by education authorities and communities to mitigate the effects of floods on schools.
- To propose recommendations for improving school resilience and learning continuity in flood-prone areas.

V. RESEARCH QUESTIONS

Based on the study's purpose, the specific research objectives are:

- To explore the impact of flood disasters on the physical infrastructure of schools in Mopani East.
- To examine how flood-induced school closures affect learning continuity among learners.
- To identify the measures taken by education authorities and communities to mitigate the effects of floods on schools.
- To propose recommendations for improving school resilience and learning continuity in flood-prone areas.

VI. SIGNIFICANCE OF THE STUDY

This study is significant for multiple reasons. First, it contributes to the body of knowledge on the educational impacts of extreme weather events by providing an empirical case study of Mopani East schools in Limpopo Province, where flooding has significantly disrupted schooling. Understanding these impacts supports evidence-based planning by policymakers and education authorities to prioritise resilient infrastructure and continuity strategies (Limpopo Department of Education, 2026). Second, this research clarifies how flood disasters exacerbate existing inequalities in rural education contexts, particularly where access to alternative learning modalities remains constrained. Finally, the findings have practical relevance for school governing bodies, community stakeholders, and disaster management professionals tasked with mitigating educational disruption during future extreme weather events.

VII. THEORETICAL FRAMEWORK

The study is guided by the Disaster Risk Reduction (DRR) and Education Continuity Framework, which emphasises that vulnerability to natural hazards such as floods must be mitigated through both infrastructural resilience and systemic preparedness [15]. According to this framework, education systems should incorporate risk assessments, continuity planning, and recovery strategies into routine school and district planning. This ensures that learning continuity is preserved, even when physical school infrastructure and access routes are compromised. In the context of Mopani East, the DRR framework helps explain why schools with limited preparatory planning experience significant loss of instructional time during flood events and why adaptive practices such as phased reopening and infrastructural reinforcements are critical for sustainability.

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VIII. ORGANISATION OF PAPER

The paper is structured as follows:

- Abstract: Provides an overview of the study' s purpose, methodology, and key findings.
- Introduction: Offers contextual background on flood disasters in Limpopo and the specific focus on Mopani East schools.
- Problem Statement, Purpose, Objectives, and Research Questions: Defines the research focus and guiding questions.
- Purpose of the Study: Outlines Importance of Study
- Significance of the Study: Explains the study' s contribution to knowledge and practice.
- Theoretical Framework: Outlines the conceptual lens guiding the research.
- Research Methodology: Describes the research design, population, data collection, and analysis procedures.
- Data Analysis and Findings: Presents thematic interpretation of collected data.
- Discussion: Interprets findings in light of existing literature and proposes actionable strategies.
- Conclusion: Summarises insights and emphasises implications for education planning in flood-prone regions.
- Recommendations: Proposes actionable strategies.

IX. TRUSTWORTHINESS OF THE STUDY

To ensure the credibility, dependability, and validity of findings, several strategies were employed:

- Triangulation: Data was collected from multiple sources, including interviews with school principals, teachers, government reports, and media articles [14][4].
- Peer Review: Preliminary findings were discussed with academic colleagues for feedback and to confirm consistency.
- Audit Trail: Detailed records of data collection, coding, and analysis were maintained to allow replication or verification.
- Member Checking: Where possible, key participants were invited to review preliminary interpretations of interview data to ensure accuracy and reduce researcher bias [2].

X. SCOPE OF THE STUDY

The study focused specifically on the Mopani East Education District in Limpopo Province, South Africa. It investigated the impact of flood disasters on school infrastructure and learning continuity, covering both primary and secondary public schools that experienced flooding during January 2026. The study did not include private schools or schools outside Mopani East.

XI. LIMITATION OF THE STUDY

- Access Challenges: Flooded roads limited site visits to some schools, potentially affecting first-hand observations.
- Time Constraints: Data collection occurred shortly after the floods, limiting the study to immediate impacts rather than long-term recovery.
- Limited Sample Size: Only 10 schools were purposively selected due to resource and accessibility constraints, which may limit generalizability to the entire district.
- Data Availability: Some official reports were incomplete or pending, and the study relied on secondary sources for certain metrics [14].

XII. DEFINITION OF CONCEPTS

➢ *Flood Disaster*

A flood disaster refers to an extreme hydrological event caused by prolonged or intense rainfall, overflowing rivers, or inadequate drainage systems, resulting in significant damage to infrastructure, disruption of social and economic activities, and threats to human safety [18][19]. In the context of this study, flood disasters are events that directly or indirectly disrupt school operations and access to education.

➢ *School Infrastructure*

School infrastructure encompasses the physical and functional facilities that support teaching and learning, including classrooms, roofs, sanitation facilities, electricity supply, furniture, learning materials, and surrounding access infrastructure such as roads and bridges [8][16]. Adequate and resilient school infrastructure is essential for ensuring safe learning environments and uninterrupted educational delivery.

➢ *Learning Continuity*

Learning continuity refers to the capacity of an education system to sustain learners' academic progress during and after disruptions through alternative instructional approaches, curriculum adjustment, and recovery strategies such as catch-up programmes [15][17]. In this study, learning continuity focuses on the extent to which schooling is maintained or restored following flood-related closures.

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➢ *Mopani East Education District*

The Mopani East Education District is a rural administrative education region within Limpopo Province, South Africa, responsible for the management and oversight of public schools located in predominantly rural and flood-prone communities [3][4]. The district' s geographic and infrastructural characteristics make it particularly vulnerable to flood-related educational disruptions.

XIII. LITERATURE REVIEW

Flood disasters have emerged as one of the most disruptive natural hazards affecting education systems worldwide. Existing literature highlights that flooding affects not only physical school infrastructure but also access to education, learning continuity, and long-term educational outcomes, particularly in rural and low-resource contexts.

➢ *Global Perspectives on Flood Disasters and Education*

Globally, flood disasters are recognised as a major cause of educational disruption, especially in developing regions where infrastructure resilience is limited. Studies by international organisations indicate that floods damage classrooms, sanitation facilities, electricity systems, and learning materials, often forcing prolonged school closures (World Bank, 2020; [17]. These disruptions reduce instructional time and negatively affect learner achievement, attendance, and progression.

Empirical studies from flood-prone countries such as Bangladesh and India demonstrate that repeated flooding leads to long-term learning deficits and increased dropout rates among vulnerable learners [10]. Learners in affected areas often struggle to recover academically due to curriculum compression, inadequate remedial support, and limited access to alternative learning platforms. Global literature further suggests that flood disasters exacerbate existing inequalities, as schools in urban or affluent areas tend to recover faster than rural schools with fewer resources (World Bank, 2020).

➢ *International and African Perspectives*

At the international level, education agencies emphasise the integration of Disaster Risk Reduction (DRR) into education systems to ensure safety and learning continuity during emergencies [16]. In sub-Saharan Africa, floods frequently disrupt schooling not only through infrastructure damage but also by destroying transport networks, isolating communities, and limiting access to schools [9].

Research from African countries such as Mozambique, Malawi, and Nigeria indicate that flood-related school closures often last several weeks, resulting in significant instructional time loss [17]. These studies highlight that rural schools are disproportionately affected due to poor road networks, reliance on seasonal transport routes, and limited disaster preparedness. Furthermore, limited access to digital technologies in many African rural settings constrains the implementation of remote learning during emergencies, widening the educational gap between urban and rural learners [19].

➢ *South African Context*

In South Africa, extreme weather events such as floods have increasingly affected public infrastructure, including schools. Rural provinces such as Limpopo, KwaZulu-Natal, and the Eastern Cape are particularly vulnerable due to settlement patterns, aging infrastructure, and limited maintenance capacity [8]. Studies conducted in rural South African contexts report that flooding often results in school closures, unsafe access routes, and damaged facilities, leading to curriculum delays and lost instructional time [8].

Recent flood events have drawn national attention to the fragility of education systems in disaster-prone areas. Media and government reports indicate that flooding frequently disrupts scholar transport services and school nutrition programmes, which are essential for learner attendance and wellbeing in rural communities [4][14]. These disruptions highlight the interconnected nature of education, infrastructure, and social support systems.

➢ *Local Context: Limpopo Province and Mopani East Education District*

At the provincial level, Limpopo has experienced recurrent flooding over recent years, resulting in widespread damage to public infrastructure. Reports from 2025 indicate that floods damaged more than 100 schools across the province, illustrating the recurring nature of flood risk in the region [7]. These repeated events have exposed weaknesses in infrastructure resilience and disaster preparedness within the education sector.

Within Limpopo, the Mopani East Education District has been identified as particularly vulnerable to flood-related educational disruption. During the January 2026 floods, the Limpopo Department of Education reported that 91 schools in Mopani East were inaccessible, primarily due to flooded roads, damaged bridges, and unsafe travel conditions [4][12]. Importantly, many schools were closed despite limited structural damage, underscoring the critical role of access routes in sustaining learning continuity.

Local literature suggests that flood-induced school closures in Mopani East have cumulative effects on educational outcomes. [8] argues that repeated disruptions in rural districts contribute to chronic instructional time loss, learner disengagement, and widening achievement gaps between rural and urban schools. These challenges are compounded by limited access to digital infrastructure, unreliable electricity supply, and low internet connectivity, which restrict the use of online or blended learning approaches during emergencies.

Moreover, evidence indicates that disaster response strategies in Mopani East are largely reactive, focusing on post-flood damage assessment and phased reopening rather than proactive disaster preparedness and continuity planning [4]. This gap in preparedness reinforces the vulnerability of rural learners and highlights the need for context-specific learning continuity strategies that do not rely heavily on digital resources.

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➢ *Learning Continuity and Disaster Risk Reduction Frameworks*

Learning continuity frameworks emphasise the importance of maintaining educational delivery during and after disasters through preparedness, flexibility, and adaptive strategies. Disaster Risk Reduction (DRR) in education focuses on strengthening infrastructure, improving preparedness, and ensuring continuity of learning during emergencies [16][9].

International literature identifies strategies such as temporary learning spaces, mobile classrooms, curriculum adjustment, and community-based learning centres as effective measures for reducing learning loss during floods [19]). However, the effectiveness of these strategies depends on contextual factors such as resource availability, community involvement, and institutional capacity. In rural South African contexts such as Mopani East, the limited feasibility of digital solutions highlights the importance of low-technology, locally appropriate learning continuity interventions.

XIV. RESEARCH GAP

Existing literature shows that flood disasters significantly disrupt school infrastructure and learning continuity globally and within South Africa [10][8][16]. Recent government and media reports further document widespread school closures in Limpopo Province following the January 2026 floods [4][12].

However, there is limited context-specific, empirical research examining how flood disasters affect school infrastructure and learning continuity at district level, particularly in rural education districts such as Mopani East. Most existing studies adopt national or provincial perspectives and rely heavily on secondary data, offering limited insight into school-level experiences and local response mechanisms.

Furthermore, insufficient attention has been given to the relationship between damaged access routes, school functionality, and instructional time loss in rural settings, as well as the effectiveness of learning continuity strategies where digital resources are limited. This study addresses these gaps by providing district-focused evidence from Mopani East to inform policy and practice aimed at strengthening educational resilience in flood-prone rural areas.

XV. RESEARCH METHODOLOGY

This study adopted a qualitative research approach to explore the impact of flood disasters on school infrastructure and learning continuity in Mopani East Education District, Limpopo Province. Qualitative research was deemed suitable as it allows for an in-depth understanding of participants' experiences, perceptions, and responses to floods, particularly in a rural context where numerical data alone may not capture the full scope of educational disruption [1].

➢ *Research Approach*

A case study approach was employed to examine the experiences of schools directly affected by the January 2026 floods in Mopani East. Case studies enable detailed investigation of a phenomenon within its real-life context, which is essential for understanding how flood events influence school infrastructure, access, and learning continuity [20]. The study focused on selected schools' representative of rural and flood-prone conditions within the district.

➢ *Study Setting*

The research was conducted in the Mopani East Education District, a rural administrative region in Limpopo Province. This district was selected due to its high vulnerability to floods, the frequent disruption of school activities, and documented closures of 91 schools during the January 2026 floods [4][12]. The rural setting, characterized by limited infrastructure, poor road networks, and low technological access, made it an ideal context to investigate both the immediate and systemic effects of flooding on education.

➢ *Population and Sampling*

The study population included school principals, teachers, and district education officials from selected schools affected by floods. A purposive sampling technique was employed to select participants with direct experience of flood disruptions. This approach allowed the researcher to obtain rich, relevant data from individuals who could provide detailed insights into infrastructure damage, learning interruptions, and mitigation strategies [1]. In total, 5 district education officials, 10 school principals, and 10 teachers participated in interviews and focus group discussions.

➢ *Data Collection*

A triangulated data collection strategy was adopted to enhance the credibility and comprehensiveness of findings:

- Semi-structured Interviews: Conducted with school principals, teachers, and district officials to capture qualitative data on infrastructure damage, disruptions in learning, and institutional recovery strategies [1].
- Focus Group Discussions: Organized with teachers and learners to explore shared experiences, coping mechanisms, and perceptions of continuity strategies [6].
- Document Analysis: Official records from the Limpopo Department of Education, disaster management briefings, and national media reports were reviewed to corroborate field data and provide contextual evidence [4][14][12].
- *Observation:*

Site visits were conducted to affected schools where access was feasible. Visible signs of infrastructure damage, including classrooms, sanitation facilities, and access roads, were documented through field notes and photographs [8].

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jan1632

- *Secondary Data Review:*

Academic literature and policy documents were analysed to situate findings within the broader frameworks of Disaster Risk Reduction (DRR) and Education Continuity [15][9].

This multi-method strategy ensured data triangulation, enhancing the reliability and validity of findings.

➢ *Data Analysis*

Data were analysed using thematic content analysis, a qualitative approach that identifies recurring patterns and insights from textual and observational data. All interviews and focus group discussions were transcribed verbatim, after which responses were systematically coded under major themes: infrastructure damage, learning continuity, institutional responses, and resilience strategies. Triangulation of interview data with documents and media reports strengthened the validity of the analysis. Finally, findings were interpreted within the Disaster Risk Reduction and Education Continuity framework [15], allowing for the identification of actionable strategies to mitigate flood-related educational disruption.

XVI.PRESENTATION OF FINDINGS

The findings are presented thematically, drawing on interviews with five district education officials (DO1– DO5), ten school principals (P1– P10), and ten teachers (T1– T10) from five schools (SCH1– SCH5) in the Mopani East Education District. Documentary analysis of government reports and media sources relating to the January 2026 floods complemented the interview data. Four dominant themes emerged: damage to school infrastructure, disruption of access and school operations, impact on learning continuity, and institutional response and preparedness.

To ensure confidentiality, school-based participants were coded by role and school (e.g., *P2– SCH3; T6– SCH1*), while district officials were coded as *DO1– DO5*.

➢ *Damage to School Infrastructure*

Findings indicate that flood disasters caused varying degrees of damage to school infrastructure across Mopani East. Participants reported damage to classrooms, roofs, sanitation facilities, fences, and electrical systems. In some schools, floodwater entered classrooms, destroying furniture, textbooks, and learning materials. Sanitation facilities were particularly affected, rendering some schools unsafe for learners even after floodwaters had receded.

Although not all school buildings collapsed, respondents emphasized that partial damage significantly disrupted school functionality. These findings align with government reports confirming that infrastructure assessments were required before schools could reopen safely [4].

Participants reported extensive flood-related damage to school infrastructure across the district. Affected facilities included classrooms, roofs, sanitation systems, perimeter fencing, and electrical infrastructure. In several schools, floodwater entered classrooms, damaging furniture, textbooks, and teaching resources. Sanitation facilities were repeatedly identified as a major factor delaying school reopening.

One principal explained:

- *" Water entered most of the classrooms and damaged desks and learners' books. The school was not safe to use."* (P2– SCH1)

Another principal from a different school noted:

- *" The roof was partially damaged, and rain continued to enter the classrooms even after the floods."* (P6– SCH4)

- Teachers highlighted the impact on hygiene and safety:

- *" The toilets were flooded and collapsed, so learners could not return."* (T5– SCH2)

- *" There was no electricity because the wiring was damaged during the floods."* (T8– SCH5)

District officials confirmed that even partial damage required formal safety inspections:

- *" All affected schools had to be assessed before reopening."* (DO1)

- *" Some schools appeared intact but had serious internal damage."* (DO4)

➢ *Disruption of Access and School Operations*

A major finding of the study was that school closures were largely driven by access challenges rather than total structural collapse. Flooded roads, damaged bridges, and unsafe transport routes prevented learners and teachers from reaching schools. Participants highlighted that scholar transport services were suspended due to safety concerns, resulting in prolonged closures even where school buildings remained intact. This finding explains why 91 schools in Mopani East were inaccessible during the January 2026 floods, despite some being structurally sound [12]. School principals reported that uncertainty around reopening timelines created operational challenges, including delayed staff deployment and administrative disruptions.

Access-related challenges emerged as a major contributor to school closures. Flooded roads, collapsed bridges, and unsafe transport routes prevented learners and teachers from reaching schools. Scholar transport services were suspended, resulting in prolonged closures even where infrastructure damage was limited.

A principal stated:

- *" The school building was still usable, but the road leading to it was completely washed away."* (P4– SCH3)

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jan1632

Another principal explained the prolonged disruption:

- *" It took weeks before access roads were repaired, which delayed reopening."* (P9– SCH5)

Teachers reported the effects on learner attendance:

- *" Most learners could not attend because scholar transport was stopped."* (T1– SCH1)
- *" Parents were afraid to send learners to school because the routes were unsafe."* (T7– SCH4)

District officials acknowledged the role of access challenges:

- *" Some schools remained closed mainly because of access issues rather than building damage."* (DO3)

➢ *Impact on Learning Continuity*

The disruption of schooling had a direct impact on learning continuity. Participants reported loss of instructional time, delayed curriculum coverage, postponed assessments, and pressure to condense learning content once schools reopened. Learners preparing for examinations were reported to be particularly affected.

The study also found that no formal alternative learning mechanisms were implemented during the closure period. Limited access to digital devices, unreliable electricity supply, and poor internet connectivity prevented the use of online learning platforms. As a result, learning largely ceased during flood-related closures, widening the gap between rural learners and those in better-resourced areas.

School closures had a direct impact on learning continuity. Participants reported loss of instructional time, delayed curriculum coverage, postponed assessments, and pressure to accelerate teaching once schools reopened. Learners preparing for assessments were particularly affected.

One teacher reflected:

- *" We lost many teaching days and had to rush through the syllabus."* (T6– SCH2)

Another teacher noted learner readiness challenges:

- *" Learners returned having forgotten much of the work covered before the floods."* (T9– SCH3)

Principals described disruptions to academic planning:

- *" Assessment schedules had to be changed, affecting the whole school programme."* (P3– SCH1)

The findings further revealed that no structured alternative learning mechanisms were implemented during the closure period due to limited digital access and infrastructure constraints.

A district official explained:

- *" Remote learning was not feasible for rural schools due to lack of devices and connectivity."* (DO4)

➢ *Institutional Response and Preparedness*

Findings further revealed that disaster response mechanisms at school level were largely reactive. While district officials conducted infrastructure assessments and implemented phased reopening strategies, most schools lacked formal disaster preparedness or learning continuity plans. Participants indicated that guidance on alternative teaching arrangements during emergencies was limited, and support focused primarily on infrastructure repair rather than educational recovery.

Institutional responses to the floods were largely reactive. While district authorities conducted infrastructure assessments and implemented phased reopening strategies, most schools lacked formal disaster preparedness or learning continuity plans.

A principal admitted:

- *" We do not have a disaster management plan at school level."* (P7– SCH2)

Another principal reflected:

- *" We were not prepared for floods of this magnitude, and there was no plan for teaching during closures."* (P10– SCH5)

Teachers indicated limited guidance:

- *" We were told to wait until schools reopened, without instructions on alternative teaching."* (T2– SCH3)

District officials confirmed the focus on infrastructure safety:

- *" Our priority was ensuring the safety of buildings before reopening."* (DO2)
- *" There were no educational recovery plans in place at the time."* (DO5)

XVII. DISCUSSION OF FINDINGS

The findings of this study confirm and extend existing literature on the impact of flood disasters on education, particularly within rural and low-resource contexts. Consistent with global research, flood disasters in Mopani East resulted in damage to school infrastructure, disrupted access to education, and significant interruptions to learning continuity [10][17].

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➢ *Infrastructure Vulnerability and Rural Context*

The damage to classrooms and sanitation facilities observed in Mopani East supports previous studies indicating that rural school infrastructure is particularly vulnerable to environmental hazards due to limited maintenance and resilience planning [8]. Even where damage was not extensive, the loss of functionality rendered schools unsafe or unsuitable for learning, reinforcing the need for infrastructure standards that consider flood risk in rural areas.

➢ *Access as a Critical Barrier to Education*

A key contribution of this study is its emphasis on access routes as a central determinant of learning disruption. Unlike some international studies that focus primarily on collapsed school buildings, this study demonstrates that flooded roads and damaged bridges were the primary reasons for school closures in Mopani East. This finding supports African-focused literature which highlights transport and accessibility as critical but often overlooked dimensions of educational disruption during disasters [9].

➢ *Learning Continuity and Educational Inequality*

The absence of alternative learning arrangements during school closures mirrors findings from other rural South African studies, which report limited feasibility of remote learning due to infrastructural and socio-economic constraints [8]. The loss of instructional time experienced by Mopani East learners is likely to have long-term implications for academic performance, particularly for learners from disadvantaged households. This finding reinforces concerns raised by reference [16] regarding the exacerbation of educational inequalities during disaster-induced disruptions.

➢ *Disaster Preparedness and Policy Implications*

The largely reactive nature of institutional responses observed in this study aligns with previous research suggesting that disaster risk reduction in education is insufficiently embedded at school level in South Africa [16]. While post-disaster assessments and phased reopening' s are necessary, the findings highlight the need for proactive planning, including school-level disaster preparedness plans and context-appropriate learning continuity strategies.

XVIII. CONCLUSION

Flood disasters in Mopani East have significant implications for school infrastructure and learning continuity. The January 2026 floods highlighted the vulnerability of rural schools to environmental hazards, with 91 schools affected and thousands of learners experiencing disrupted education. The study demonstrates that physical damage, inaccessibility, and lack of contingency plans collectively exacerbate educational inequalities in rural Limpopo.

To mitigate these challenges, it is essential to strengthen school infrastructure, implement robust learning continuity strategies, and enhance community involvement in disaster preparedness. Proactive planning, informed by the Disaster Risk Reduction and Education Continuity framework, is crucial to safeguarding education in flood-prone areas, ensuring learners maintain access to quality education even during extreme weather events.

XIX. RECOMMENDATIONS

Based on the findings and discussion, the following recommendations are proposed:

- Infrastructure Resilience: The Limpopo Department of Education should prioritize flood-resistant construction and repair of schools, including elevated foundations, proper drainage systems, and reinforced roofs.
- Emergency Learning Plans: Schools in Mopani East should develop disaster-responsive learning continuity strategies, such as low-tech or offline materials, community-based study centres, and flexible timetables to reduce instructional loss during closures.
- Capacity Building for Teachers: Training programs should equip teachers with skills to implement catch-up programs and adaptive teaching methods following disaster-related disruptions.
- Community Engagement: Local communities and school governing bodies should be actively involved in disaster preparedness planning, including early-warning systems, school evacuation procedures, and post-flood recovery efforts.
- Policy Integration: Findings should inform provincial and national education policies to include disaster risk management as part of routine school planning, particularly in flood-prone districts like Mopani East.

REFERENCES

[1]. J.W. Creswell and J.D. Creswell, *Research design: qualitative, quantitative, and mixed methods approaches*, 5th ed. Thousand Oaks, CA: Sage, 2018.
[2]. J.W. Creswell and C.N. Poth, *Qualitative inquiry and research design: choosing among five approaches*, 4th ed. Thousand Oaks: Sage Publications, 2018.
[3]. Department of Basic Education, *Education district profiles: Limpopo Province*. Pretoria: DBE, 2023.
[4]. South African Government, " Limpopo education on re-opening of schools affected by flash floods," Gov.za, Jan. 13, 2026. [Online]. Available: https://www.gov.za/news/media-statements/limpopo-education-re-opening-schools-affected-flash-floods-13-jan-2026. [Accessed: Jan. 28, 2026].
[5]. IOL, " Limpopo education department plans phased school reopening after floods," Jan. 19, 2026. [Online]. Available: https://iol.co.za/saturday-star/2026-01-19-limpopo-education-department-plans-phased-school-reopening-after-floods/. [Accessed: Jan. 26, 2026].
[6]. R.A. Krueger and M.A. Casey, *Focus groups: a practical guide for applied research*, 5th ed. Thousand Oaks, CA: Sage, 2015.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26jan1632

[7]. *Limpopo Chronicle*, " Over 352 houses and 108 schools damaged due to Limpopo floods," Jan. 17, 2025. [Online]. Available: https://www.limpopochronicle.co.za/2025/01/17/over-352-houses-and-108-schools-due-to-limpopo-floods/. [Accessed: Jan. 26, 2026].
[8]. T. Nkosi, " The impact of natural disasters on rural education in South Africa," *Journal of Education and Development*, vol. 5, no. 3, pp. 45– 56, 2020.
[9]. Oxfam, *Education in emergencies: lessons from disasters in Africa*. Oxford: Oxfam International, 2020.
[10]. S. Panday and R. Sharma, " Floods and education disruption in South Asia: implications for learning outcomes," *Asian Journal of Education*, vol. 7, no. 2, pp. 23– 37, 2019.
[11]. SAnews, " Minister urges communities to remain vigilant amid further weather warnings," Jan. 16, 2026. [Online]. Available: https://www.sanews.gov.za/south-africa/minister-urges-communities-remain-vigilant-amid-further-weather-warnings. [Accessed: Jan. 28, 2026].
[12]. *Sowetan*, " Almost 500 Limpopo schools closed due to flood damage," Jan. 21, 2026. [Online]. Available: https://www.sowetan.co.za/news/2026-01-21-almost-500-limpopo-school-closed-due-to-flood-damage/. [Accessed: Jan. 27, 2026].
[13]. *The Post*, " South Africa faces national disaster as devastating floods wreak havoc," Jan. 23, 2026. [Online]. Available: https://thepost.co.za/news/weather/2026-01-23-south-africa-faces-national-disaster-as-devastating-floods-wreak-havoc/. [Accessed: Jan. 28, 2026].
[14]. *TimesLive*, " Almost 500 Limpopo schools closed due to flood damage," Jan. 21, 2026. [Online]. Available: https://www.timeslive.co.za/news/south-africa/2026-01-21-almost-500-limpopo-schools-closed-due-to-flood-damage/. [Accessed: Jan. 27, 2026].
[15]. UNESCO, *Education in emergencies: preparedness and response*. Paris: UNESCO, 2018.
[16]. UNESCO, *Education and disasters: building resilience for learning continuity*. Paris: UNESCO, 2021.
[17]. UNICEF, *Education under threat: the impact of climate change and disasters on education*. New York: UNICEF, 2021.
[18]. UNISDR, *Terminology on disaster risk reduction*. Geneva: United Nations, 2015.
[19]. World Bank, *The impact of disasters on education systems*. Washington, DC: World Bank, 2020.
[20]. R.K. Yin, *Case study research and applications: design and methods*, 6th ed. Thousand Oaks, CA: Sage, 2018.