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RESEARCH

Strengthening Post-Disaster Basic Education Services Through Social Resilience in Majene Regency Indonesia

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Abstract

This study aims to examine the dynamics of social resilience in post-disaster basic education services in Majene Regency. The method used is a qualitative approach with an intrinsic case study design focusing on three main dimensions: coping capacity, adaptation, and transformation in shaping the educational ecosystem following the 2021 earthquake. Research data were collected through in-depth interviews, field observations, and analysis of secondary data, which were then analyzed thematically. The findings indicate that schools' social resilience is collectively shaped through the roles of local actors such as school principals, teachers, parents, and the community. Informal practices such as organizing emergency learning in residents' homes, establishing disaster response structures, and collaborating with external institutions were key factors in maintaining educational continuity. This resilience emerged from bottom-up initiatives but still faces challenges due to a lack of institutional support, technical policies, and local regulations that hinder systematic institutionalization. Based on these findings, this study proposes a model for disaster-resilient basic education consisting of three main elements: operational, institutional, and social-community resilience. This model is expected to be integrated into education and disaster policy planning at the local level. Additionally, this study recommends strengthening regulations, allocating a dedicated budget, and developing school-based disaster response standard operating procedures (SOPs) to establish an adaptive and sustainable basic education system in disaster-prone areas.

Keywords: social resilience; basic education; public services; disaster; Majene district.

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INTRODUCTION

The incidence of disasters has experienced a tremendous surge over the past five decades, and this pattern is now increasing on a global scale (Fahad & Jing, 2017; Fahad & Wang, 2018; Kawamoto et al., 2024). Disasters often result in material losses, especially in the education sector, with significant physical damage to school buildings and facilities (Mirzaei et al., 2019). For example, poorly designed school facilities can be severely impacted by disasters, not only threatening physical safety but also disrupting the overall education process through disruptions that can last for long periods of time (Ahmed, 2024; Dwiningrum, 2017). The empirical study of Parvin et al. (2021) shows that in 30 primary schools in Shyamnagar Upazila (sub-district), Satkhira District, 90% of the schools were severely damaged by Cyclone Aila (Parvin et al., 2022).

The psychological impact of disasters on students and staff should not be overlooked. Schools serve not only as educational institutions but also as safe havens for children (Mirzaei et al., 2021). Disasters can induce stress, anxiety, and trauma in students, causing long-term psychological consequences that affect learning and development (Yuwanto et al., 2017). A study showed that educators equipped with psychological first aid training can better support students in emotional recovery after disasters, highlighting the need for trauma-sensitive approaches in educational settings (Yuwanto et al., 2017). In addition, a case study showed that improving teacher preparedness in disaster response can strengthen a more resilient school community (Johnson et al., 2014).

In the context of post-disaster recovery in the education sector, it is important to emphasize that successful recovery focuses not only on the readiness of physical infrastructure and individual capacities, but also on social resilience within the school community. Social resilience refers to the collective ability of a community to withstand, adapt to, and recover from stresses, including natural disasters (Walsh et al., 2015). Research shows that social resilience contributes to enhancing local capacity and strengthening social support networks (Maini et al., 2017; Tang et al., 2017). By increasing community engagement and effectively mobilizing resources, schools can create inclusive, resilient, and adaptive educational environments (Gupta et al., 2019). In research on social resilience, particularly in the context of educational institutions facing disasters, Keck and Sakdapolrak's (2013) framework offers three main dimensions: coping capacity, adaptive capacity, and transformative capacity (Keck & Sakdapolrak, 2013).

Basic education, which generally refers to the foundational level of formal education encompassing primary and lower secondary schooling, plays a crucial role in shaping essential knowledge, skills, and character development. In the Indonesian context, basic education has distinct characteristics, particularly its strong integration of national curriculum standards, character education, and community-based values, as well as its wide geographical distribution across diverse and disaster-prone regions. These characteristics make the resilience of basic education systems in Indonesia both highly complex and critically important.

In Indonesia, initiatives in building social resilience in the education sector have been reflected through the Disaster Safe Education Unit (SPAB) program of the Ministry of Education, Culture, Research and Technology and BNPB (Handayani et al., 2024). Through SPAB, schools are expected to integrate disaster preparedness education into their curriculum and provide safer facilities (Husniawati et al., 2023; Pahleviannur & Hafida, 2022). Ramadhani et al. showed that the implementation of Disaster Safe Schools in East Kalimantan has helped create a safe learning environment for students and teachers, while providing training and education on disaster preparedness (Ramadhani et al., 2020). The SPAB program is regulated in Permendikbud No. 33 of

2019 which supports social resilience and preparedness in the school environment (Noviani et al., 2023; Pramesti et al., 2023). Practically, this program has the full support of UNICEF and Save the Children (Pandya et al., 2024). In addition, the Disaster Resilient Village (DESTANA) program by BNPB also supports social resilience at the local level involving schools (Najib & Rahmat, 2021; Saputra et al., 2021).

Although various programs have been launched, the implementation of social resilience in education in Indonesia has not been fully effective. A 2023 report by the National Disaster Management Agency (BNPB) revealed that only around 20% of schools in disaster-prone areas in Indonesia have successfully implemented the Disaster Safe Education Unit (SPAB) program, covering aspects of infrastructure, curriculum, and preparedness training (Ningsih et al., 2024). A study by UNDRR and UNICEF (2022) in Central Sulawesi found that many teachers and students lacked basic knowledge of evacuation procedures and post-earthquake psychosocial support (Ibrahim et al., 2025; UNICEF, 2022). In addition, the evaluation results of the DESTANA program show that community participation in planning and decision-making is still low. Inequalities also occur in 3T (underdeveloped, frontier, and outermost) areas that often face technical and psychological challenges (Nisa & Maharani, 2025).

Weak integration among government actors and lack of coordination across sectors have been significant constraining factors in strengthening social resilience at the school level. In addition, the lack of training for teachers in psychosocial aspects and disaster management, as well as the absence of consistent monitoring and evaluation mechanisms, exacerbate this situation. For example, the evaluation report of the SPAB program in East Nusa Tenggara Province states that only 8 out of 35 schools were able to continue disaster risk reduction (DRR) activities independently a year after the mentoring ended (Fu & Zhang, 2024). The dependence on donor funding and the absence of fixed budget allocations for DRR activities in schools indicate that social resilience has not been a systemic priority in national education and disaster policies (Nisa & Maharani, 2025; Pandya et al., 2024). As a result, schools in disaster-prone areas remain physically and socially vulnerable in the face of crisis (Abedin & Shaw, 2015; Asri et al., 2023).

Given the limited effectiveness of social resilience implementation in Indonesia, this research seeks to make a new contribution to disaster studies in the education sector. Didham & Ofei-Manu (2020) highlighted the importance of the link between quality education, ESD, and DRR through the application of adaptive capacity in the school environment. Cvetković et al. (2021) showed that demographic and socioeconomic factors influence community resilience. Meanwhile, Höfler (2014) emphasized that psychological resilience can be a key strategy in building social resilience. In addition, Chen et al. (2019) highlighted the importance of infrastructure and institutional resilience in promoting cities' resilience to disasters. These findings reinforce the urgency of social resilience approaches in education as part of sustainable disaster recovery and risk reduction strategies.

In contrast to previous research that tends to focus on infrastructure, psychological, or demographic factors, this research uses a social resilience approach as the main concept to understand the dynamics of post-disaster education recovery. This concept was chosen because it is able to integrate physical, psychological, institutional, and social dimensions in a collective framework that focuses on coping capacity, adaptation, and transformation. In this context, schools are positioned as strategic actors in building social resilience in disaster-affected communities. To examine this further, this research is centered in Majene District, a disaster-prone area, which also shows strong potential in building resilience through school community participation.

According to a report from the Majene Regional Disaster Management Agency (BPBD), the earthquake in Majene caused major damage to educational infrastructure, with many schools partially or completely destroyed. Specifically, it was reported that around 77 educational facilities were damaged, affecting thousands of students and disrupting their learning process (Khaerah & Nur, 2022). In terms of financial implications, the cost of reconstructing and repairing damaged schools is estimated to reach millions of Rupiah. For example, the costs associated with rebuilding and rehabilitating these educational institutions are projected to exceed Rp10 billion (approximately USD 700,000), highlighting the enormous financial burden placed on local governments and communities (Khaerah & Nur, 2022).

Given the high complexity of the disaster, Majene needs to be proactive in providing effective education as one of Indonesia's public services. This can be achieved by improving the resilience of schools, especially elementary schools, after a disaster. Schools play an important role in promoting psychosocial resilience among students and their families. Research shows that many students and educators do not receive adequate information about disaster response protocols, which further exacerbates the challenges faced after such events (Atkinson & Fowler, 2023). In addition, many students, especially in elementary schools, do not understand how to save themselves when a disaster occurs (Dwiningrum et al., 2022) and do not have evacuation equipment such as fire extinguishers. This phenomenon has prompted researchers to conduct research that will answer the question of how the government is working to build social resilience in resilient basic education in Majene District.

RESEARCH METHODS

Study Context: Disaster and Education in Majene

Majene Regency, located in West Sulawesi, Indonesia, is highly vulnerable to natural disasters due to its position along an active tectonic plate boundary. This vulnerability was evident when Majene experienced a devastating earthquake on February 14-15, 2021, coinciding with the COVID-19 pandemic, which had a significant impact on the region and its population (Khaerah & Nur, 2022). Approximately 99,827 people were affected by the earthquake, highlighting the urgent need for effective disaster management strategies to mitigate such impacts (Syukri et al., 2025). Over the past decade, Majene Regency has experienced a series of education disruptions caused by disasters. The most significant disaster occurred on January 15, 2021, when a magnitude 6.2 earthquake shook the Majene and Mamuju regions. Data from the National Disaster Management Agency (BNPB) recorded that more than 100 educational units were affected in West Sulawesi, with dozens of schools in Majene Regency suffering severe damage (BNPB, 2021).

The disaster not only disrupted educational facilities and infrastructure, but also weakened the basic education support system in emergency situations. Many students were forced to study in emergency tents, prayer rooms, and even open spaces for months without adequate access to proper learning facilities (Gibbs et al., 2019). Psychological impacts also arose due to the loss of safe places and post-earthquake emotional stress, which directly affected the learning motivation and mental condition of students and educators (Seyle et al., 2013). Post-earthquake educational recovery in Majene has been slow and uneven; two to three years after the disaster, several areas such as Ulumanda and Malunda subdistricts still lack permanent classrooms, and most schools have not yet returned to optimal operation.

This shows that the problems faced are not only at the technical level (infrastructure) but also in the social, economic, and disaster management dimensions of education. The inability to provide

permanent classrooms and access to adequate facilities creates an unfavorable learning environment, which is exacerbated by the lack of psychosocial support for students and teachers. A study by Atkinson and Fowler notes that the role of education in supporting resilience after a disaster is crucial, especially in the context of strengthening communities and improving preparedness for the future (Atkinson & Fowler, 2023). This highlights the need for a multifaceted approach that includes investment in educational infrastructure and sustainable disaster risk mitigation programs in order to rebuild stronger resilience in Majene Regency. To understand the extent of vulnerability and recovery dynamics in the education sector, the following is a summary of the impact of disasters over the past 10 years in Majene, particularly those that have directly affected basic education services:

Table 1. The impact of disasters on the education sector in Majene Regency

Years	Type of Disaster	Impact on Education	Description
2011-2020	-	There were no major disasters recorded that had a significant impact on the education sector in Majene	-
2021	6.2 magnitude earthquake in Majene-Mamuju	103 educational facilities damaged in West Sulawesi, 19 severely damaged, 6 moderately damaged, 21 slightly damaged in Majene	Kemendikbud, BNPB
2022	After the Majene Earthquake	Many schools in Majene still use tents/prayer rooms as classrooms.	Kompas (2022)
2023	After the Majene Earthquake	Schools in Ulumanda and Malunda have not recovered in terms of infrastructure three years after the earthquake.	Masalembo News (2023)
2024	-	No reports of major disasters impacting education	-

Source: The Author Made, 2025.

The impact of disasters on the education sector in Majene district has been recurring. This pattern shows that earthquakes are the most consistent disasters and cause significant damage to educational infrastructure. The peak in 2021 showed that many schools suffered damage to their buildings and were unable to function as learning spaces for a considerable period of time. This indicates the weakness of school infrastructure planning in terms of disaster resilience, especially in disaster-prone subdistricts such as Malunda and Ulumanda. In addition to damaging physical infrastructure, psychosocial stress and disruption to the teaching and learning process also pose major challenges. As in the 2017 and 2021 earthquakes, hundreds to thousands of students lost access to education because their schools were damaged or emergency classrooms were not available.

Delays in the availability of emergency facilities, the lack of psychosocial services after the disaster, and the lack of preparedness of teachers in providing education in emergency situations have prolonged the recovery period for education. This shows that Majene district is not yet sufficiently equipped with a disaster management system based on social and psychological preparedness in the education sector. On the other hand, reality also reveals disparities in the distribution of recovery efforts between regions. Some schools in certain subdistricts received faster recovery than others, depending on access, support from external institutions, and the internal capacity of the school community. This shows that the capacity for adaptation and social transformation, which are important parts of social resilience, is not yet evenly distributed. This means that not all schools have the community strength to support resources and recover after a disaster.

Research Design

This study uses a qualitative approach based on an intrinsic case study strategy (Beltran et al., 2022). Through this approach, researchers can analyze how various components, such as institutional policies, community involvement, and psychological well-being interact to foster resilience among stakeholders, including students and educators (Fu & Zhang, 2024). Intrinsic case studies are relevant because they allow for a deep and contextual understanding of a specific case, revealing unique examples of resilience that focus not only on outcomes, but also on the processes and relationships that connect the experiences of the various stakeholders involved (Keck & Sakdapolrak, 2013). This method also prioritizes the perspectives of stakeholders, including educators, students, and community members, enabling a holistic analysis of the various factors that contribute to resilience.

Research Approach and Analysis Strategy

This research uses two types of data, namely primary data and secondary data. Primary data was collected through in-depth interviews. The interviews were conducted from January to March 2024 with informants from the Regional Disaster Management Agency (BPBD) of Majene Regency (namely 2 BPBD staff), school principals and committees (namely from SDN No.4 Mekkatta, SDN No.18 Banua, SDN No.9 Sasende, and SDN No.12 Inpres Pettabeang, 2 people from each school), as well as the Education, Youth and Sports Agency (DISDIKPORA) (namely the Head of the DISDIKPORA Curriculum Section, 1 person) of Majene Regency. The duration of the interviews was 40-60 minutes for each informant, or depending on the depth of the conversation. If the informant was unable to attend the interview in person, the interview was conducted online via WhatsApp, Zoom, Google Meet, or another platform requested by the informant. The interviews were recorded using a recording device or mobile phone with the informant's permission. In addition to interviews, observations were also conducted by observing school buildings, disaster signs, and school activities.

In addition, secondary data was obtained from several sources, including news media (namely through https://mediasulbar.com/daerah-sulbar/majene/, https://www.detik.com/tag/majene, and other news media), social media from Facebook and Instagram, policy and regulatory reports at the national, provincial, and district/city levels. Scientific publications were also obtained through the Google Scholar, Scopus, and Dimension databases. After the data was collected, the researchers conducted an analysis using a thematic method. This process included data transcription, categorization of findings, interpretation of meaning, and drawing conclusions. In addition, to support more attractive visualization results. Finally, the validity of the data was tested using source and technique triangulation. All of these steps involved a process that was interrelated, from the research design and the type of data used to the data analysis model (see Figure 1). Therefore, the researchers developed a framework to illustrate the flow of the research methodology.

RESULTS AND DISCUSSION

Reflection in Forming Responses to Disasters

Response capacity refers to the ability of schools, government agencies, and other local actors to reflect on and form responses to disasters. The results of the study show that response capacity is not formed from an established institutional system, but rather from the experience of dealing with the 2021 earthquake and spontaneous interactions between various actors, namely schools, communities, and external institutions. Several schools have indeed developed participatory response

mechanisms. For example, at SDN No. 9 Sasende, the principal said that an organizational structure had been formed to respond to disasters, consisting of teachers and community leaders.

> *"We formed an organization to deal with disasters that occur at school. The organization consists of teachers and even some community leaders," (Supriadi, Principal of SDN 009 Sasende).*

From the above statement, it can be seen that the school recognizes the important role of the coordinating structure at the school level as an initial response to potential disasters. The school also conducts technical training related to the local context by inviting the Regional Disaster Management Agency (BPBD). The training is not only targeted at teachers, but also involves students. Some of the material presented by BPBD included how to save oneself during a disaster, such as when an earthquake occurs, children should not approach walls but should take shelter under a table or in a safer place. This training model is very important because children are a vulnerable group who need special understanding to deal with emergency situations, not only in theory but also in practice. However, similar capacities are not evenly applied in all schools. At SDN No. 12 Inpres Pettabeang, for example, disaster training has been conducted, but it has not been followed up with the establishment of a permanent system or procedure.

> *"There are no specific procedures that have been developed for implementation in schools, only training provided yesterday by BNPB," (Principal of SDN No. 12 Inpres Pettabeang).*

Nevertheless, the spirit of resilience was still evident in the form of alternative efforts to maintain education after the disaster. One concrete step taken was door-to-door teaching by teachers. When the disaster struck, the children wanted to study because, given the situation and the academic schedule, schools had to resume activities after a long break during the emergency period. Therefore, the principal urged teachers to visit homes where emergency learning could be carried out. However, not all students' homes were targeted. Only a few homes allowed other students to gather there. This indicates that coping capacity is also present in the form of cultural and emotional adaptation to emergency situations. Institutionally, the Majene District Disaster Management Agency (BPBD) acknowledges significant limitations in supporting capacity building in schools. Activities such as socialization and formal training have not been implemented on a large scale due to budget constraints.

> *"There are no disaster risk programs or training at schools yet, but we are planning to implement them. The obstacle is the budget," (BPBD staff).*

Meanwhile, risk identification programs are still mostly focused on general areas and communities, rather than specifically on school institutions. This is reflected in the weak integration of policies across sectors. For example, BPBD once signed a Memorandum of Understanding (MoU) with the Education, Youth, and Sports Agency (DISDIKPORA). However, the MoU was not followed up due to funding issues. In other words, capacity constraints are not only technical in nature, but are also hampered by difficult administrative processes and inadequate budgets.

On the other hand, there is also an informal form of response capacity that develops through community interaction, as demonstrated by SDN No. 4 Mekkatta. The school reported immediately after the earthquake and held a coordination meeting with the committee and parents. The outcome of the coordination meeting was that after the emergency period, children could continue to study because the school worked with the committee and parents to provide a learning space for students. These learning spaces were set up in residents' homes by providing blue tarpaulins as flooring and creating partitions to separate the classes. For example, first grade was on the south side, second

grade was on the east side, and so on. Although these measures were temporary, they were a tangible example of the community's capacity to respond to institutional limitations.

From the above description, it can be concluded that disaster management capacity in elementary schools in Majene Regency is still fragmented, with a heavy reliance on direct experience and social relations at the local level. While some schools demonstrate a fairly solid coping capacity through training, local reorganization, and collective work, other schools still rely on improvisation and emergency measures without clear systemic support. The lack of policy integration, weak budgetary support, and the unavailability of standard procedures in many schools mean that this response capacity is not yet sufficient to ensure long-term resilience. Therefore, strengthening institutional capacity and standardizing emergency response procedures at the school level needs to be a priority agenda in the development of an inclusive and equitable disaster management system.

New Adjustments: Disaster Resilience Patterns

Adaptive capacity refers to the response to major changes experienced by all basic education units in Majene district as a result of the 2021 earthquake. This adaptation includes structural and cultural adjustment processes, with the schools and institutions involved beginning to form new patterns to maintain the continuity of education, even though this is not always fully facilitated by the state. One of the most effective forms of adaptation is the change in internal school policies related to the safety and serviceability of facilities. For example, the Majene district DISDIKPORA has implemented a strict policy on schools that are considered unfit for use after the disaster.

> *"We will no longer grant permission for learning and operational activities to be carried out in schools that are no longer suitable. Alternatively, certain conditions will be imposed, such as the relocation of the school building," (Head of the Curriculum Section, DISDIKPORA, Majene Regency).*

Such adaptations demonstrate institutional awareness of the importance of physical safety as a prerequisite for sustainable learning. At the school level, changes also occurred in the form of openness to collaboration with external institutions to support medium-term adaptation. As was the case at SDN No. 4 Mekkatta, the school received construction assistance, but was also able to modify emergency learning spaces with classroom partitions in the market building and schedule learning activities outside normal hours. This was possible because the school was proactive during the emergency period. The reality is that Kompas initially only targeted SDN No. 18 Banua as the recipient of development assistance. However, because SDN No. 4 Mekkatta was more agile in completing the administration and funding proposal, Kompas agreed to collaborate with SDN No. 4 Mekkatta. Adaptation also takes place in the social context of the community. Some schools, such as SDN No. 9 Sasende, not only receive assistance from the government, but also actively involve local youth organizations.

> *"There is also a local youth organization called PEMUDA PEDULI (Youth Care), which provides training to our students on how to save themselves in the event of a disaster," (Committee of SDN No. 9 Sasende).*

This community involvement indicates that adaptive capacity does not only come from above, but also grows from below through mutual cooperation and social initiatives. Interestingly, not all forms of adaptation are material in nature. In some schools, the adaptation process takes the form of mental and emotional adjustments, as well as how educational institutions respond flexibly to students' psychosocial needs. For example, at SDN No. 18 Banua, the principal explained simple preventive measures during extreme weather by adjusting learning activities:

"When I saw signs of strong winds, I sent the students home. We didn't want to put the students in danger," (Principal of SDN No. 18 Banua).

This type of adaptation demonstrates sensitivity to the environment, which is directly converted into operational decisions. In addition, several schools also utilize training as a tool for adaptive knowledge transfer. SDN No. 4 Mekkatta once received training from the Gegana and Dinas teams on emergency stretcher simulation, how to help people, and how to save oneself in the event of a disaster. The training was specifically provided to teachers, but this does not preclude the possibility that teachers also have the task of directly conveying and applying it to students. Thus, training does not only serve as a ceremonial routine, but becomes an important medium in restructuring the relationship between technical knowledge and daily school practices. However, this adaptation capacity still faces major challenges. This is because not all schools have written evacuation procedures that can be used systematically. SDN No. 18 Banua acknowledges that most adaptations are only carried out verbally and are not documented.

"There are no written emergency procedures, only direct communication from the Regional Disaster Management Agency and related parties during the training period," (Principal of SDN No. 18 Banua).

When adaptation is not accompanied by documentation and policy integration, the potential for institutionalizing good experiences becomes limited and unsustainable. Based on this phenomenon, the capacity for adaptation in elementary schools in Majene district relies on the flexibility of individuals and communities and navigating uncertainty. Adaptation does not come from an established system, but grows from the bottom up as a response to crisis. This shows that resilience does not always take the form of formal structures, but can also emerge from social relations, collective decision-making, and innovation within limitations.

Critical Reflection: Sustainable Resilience

The capacity for transformation in the context of post-disaster basic education in Majene district is still in its early stages. However, several indicators of structural and institutional change are beginning to emerge. This capacity is reflected in the ability of educational actors, both at the school and government agency levels, to engage in critical reflection and then drive major changes towards sustainable resilience. One of the most obvious indications of transformation can be seen in the way local governments have begun to integrate disaster risk into their education policy frameworks. The Majene district DISDIKPORA stated that the experience of the major disaster in 2021 prompted them to review school operational service standards.

"We have assessed the damage to school buildings and urged that vulnerable schools no longer be used. We have even implemented a policy of not granting permission to study in schools that do not meet structural safety standards," (Head of the Curriculum Section, DISDIKPORA, Majene Regency).

This marks the first step in institutional transformation, with safety aspects now explicitly included in basic education management. The transformation is also evident in changes to the governance of educational infrastructure development. Previously, the process of rebuilding schools after disasters was often top-down and unresponsive to local needs. However, in the context of Majene, the experience has been different. At SDN No. 4 Mekkatta, the school committee was actively involved in the fundraising and administrative processes for the reconstruction, even more so than other schools that were the initial targets of donors.

"The principal was very quick to complete the documents. Within two days, all the necessary files were ready. That is what made SDN No. 4 Mekkatta a priority for assistance from Kompas," (member of the SDN No. 4 Mekkatta Committee).

This indicates that transformation can occur when schools have strong administrative capacity and community participation, not solely because of physical damage. Furthermore, the transformation process also touches on the relationship between schools and external institutions. SDN No. 9 Sasende has shown initiative in establishing long-term cooperation with civil society and youth organizations. The school committee explained that cooperation with the local community does not stop at direct assistance, but is also directed at supporting future contingency planning.

"We have begun joint planning in case of another disaster. This includes discussions on evacuation routes, assembly points, and the establishment of a permanent emergency response structure at the school," (Committee of SDN No. 9 Sasende).

This initiative demonstrates a shift from mere emergency response to community-based risk planning, which is at the heart of transformational capacity. Meanwhile, in terms of institutional mentality, the Majene District Disaster Management Agency (BPBD) has indicated its commitment to expanding disaster intervention to the education sector. Although this has not yet been fully implemented due to budget constraints, it reflects an intention to redefine policy targets.

"We will encourage disaster simulations and training to target not only the general public, but also specific educational institutions. That is part of our medium-term plan," (BPBD Majene Regency staff).

This became the starting point for transformation, with local governments beginning to view schools not only as affected entities, but also as strategic actors in the disaster risk reduction system. However, this transformation capacity still faces a number of serious obstacles. The absence of technical regulations at the local level that specifically regulate disaster risk management in the education sector means that many school initiatives are voluntary and not driven by the system. This is exacerbated by the weak involvement of students in the planning process and the low capacity for documenting good practices that have already been implemented.

However, the post-earthquake experience in Majene shows that transformation does not always have to start from the top down, but can grow from the bottom up, starting with teachers, principals, committees, and communities that learn from crises and form new norms. They not only rebuild schools physically, but also instill new values such as openness, vigilance, cross-sector collaboration, and risk awareness. This is the foundation of transformational capacity in the context of resilient education.

Three Dimensions of Social Resilience in Post-Disaster Education

The results of this study show the dynamics of social resilience in basic education units in Majene district in responding to disasters, particularly the 2021 earthquake. This resilience is reflected in three main dimensions, namely response capacity, adaptation capacity, and transformation capacity, which are layered and interrelated (see Figure 1). These three dimensions show how schools not only survived but also adapted and began to build a path for change from within.

Table 2. Resilience in Post-Disaster Education

Indikator	Main Characteristic	Reality in Field
Coping Capacity	• Quick response based on local initiative • Not yet institutionalized	• SDN No. 9 Sasende formed an internal disaster response organization

	• Dependent on experience and informal communication	• SDN No. 12 Inpres Pettabeang visited students at evacuation centers to teach them
Adaptive Capacity	• Adjustments to learning methods and locations • Collaboration with external communities and organizations • Decision-making based on local and social intuition	• SDN No. 18 Banua moved learning activities to the principal's house • SDN No. 04 Mekkatta converted the market into an emergency classroom with tarpaulin partitions
Transformative Capacity	• Institutional and policy changes • Active role in the community in institutional planning and relations	• DISDIKPORA does not allow damaged schools to operate • The committee of SDN No. 4 Mekkatta quickly prepares the donation administration • SDN No. 9 Sasende designs a long-term evacuation plan.

Source: researcher, 2025.

Resilient Basic Education Service Model

The resilience of basic education in the post-disaster context in Majene district shows a complex dynamic. Affected schools acted based on initiative, experience, and community solidarity, without waiting for official orders or procedures. These actions indicate that resilience does not only depend on the availability of infrastructure or external assistance, but also on the collective capacity of schools and communities to observe the situation, make decisions, and manage risks directly in emergency conditions. In many cases, schools became the main point of initial response. Several principals and teachers tried to ensure that students could continue learning in emergency situations by teaching outside damaged classrooms and even reaching out to students at evacuation posts.

This initiative is not only due to the existence of an early warning system or institutionalized Standard Operating Procedures (SOPs), but also because of a sense of responsibility and social practices that have been formed from previous experiences of disasters. This is indeed an emergency measure and is not always structured, but it demonstrates the capacity to maintain educational functions in crisis situations. However, spontaneous responses do not always lead to institutional strengthening. When formal systems such as local government or disaster management agencies do not provide sufficient technical support, these local actions tend to be short-term. Only a few schools are able to continue emergency practices and develop them into more adaptive approaches. Examples include participatory risk planning or involving the community in rebuilding learning spaces.

In other words, sustainability is largely determined by the school's internal capacity to learn from experience and collectively organize renewal. This condition also shows that social resilience is not evenly distributed. Schools with proactive principals, strong social networks, and active community support are better able to maintain educational continuity and devise alternative solutions. Conversely, schools that lack social capital or administrative capacity tend to lag behind, both in terms of initial response and medium-term recovery. This shows that successful survival in a disaster depends not only on the level of damage or scale of impact, but also on social structures and local leadership.

On the other hand, some local government actors have shown awareness of the importance of incorporating disaster risk into education planning. However, this awareness has not yet been fully realized in the form of technical policies, special budgets, or systematic training programs. The absence of local regulations (PERDA) that specifically regulate educational units in the context of

disasters means that schools' capacity to prepare for and respond to crises remains highly dependent on individual initiatives. This poses a major challenge to the integration between formal structures and local social forces, which have been the mainstay in emergency situations. This reality indicates that social resilience in the education sector cannot be approached solely from a technocratic or structural perspective.

Resilience is not always directly proportional to the existence of policies or procedures, but arises from social interactions, informal leadership, and collective values that grow from crisis experiences. However, if not institutionalized, these good practices will remain fragmented and dependent on the existence of certain figures. Therefore, it is important for local governments and relevant institutions to not only facilitate the physical needs of schools after a disaster, but also to build a system that enables schools to develop systemic resilience. This includes the development of disaster SOPs based on educational units, strengthening the role of school committees, and regular training involving the entire education ecosystem. Without this kind of institutional transformation, schools will continue to repeat emergency survival patterns without significant progress in long-term resilience.

In response to field findings that reveal the strength of local action and the weakness of structural support in the context of post-disaster education, this study proposes a model for resilient basic education services. This model is constructed by considering the three main dimensions of social resilience as described in the framework of Keck & Sakdapolrak (2013), but is further developed so that it can be operationalized in the context of local policy and institutions. This approach places schools not only as objects of policy, but as key actors with internal and external potential to build resilience.

The proposed model is called the Disaster Resilient Basic Education Model, which consists of three main pillars, namely operational resilience, institutional resilience, and social-community resilience. All three are supported and linked to key actors from the education and disaster management sectors at the local level. The following is a visualization of the model:

Figure 2. Disaster Resilient Basic Education Service Model

Source: researcher, 2025.

This model emphasizes that resilience is not built partially, but rather through cross-level and cross-actor integration. The pillar of operational resilience is the basic foundation for schools to respond immediately when a disaster occurs, with minimum procedural and logistical preparedness. Above that, the pillar of institutional resilience requires a planned and documented system, so that

past experiences can be used as a basis for more systematic planning. Finally, social-community resilience reminds us that schools do not work alone; the involvement of parents, community leaders, and external partners such as BPBD and NGOs is crucial to the success of disaster resilience programs.

With this integrated approach, schools are not only physical shelters, but also centers for community organization in the face of risk. This model is flexible, so it can be applied in different geographical and social contexts, as long as the principles of collaboration, participation, and reflection are upheld. The practical implications of this model are the need for cross-sector policy synchronization, the formulation of regional regulations that support educational resilience, and consistent and transparent funding for school-based disaster risk reduction efforts.

CONCLUSION

This study shows that the social resilience of basic education in facing disasters in Majene Regency grows more from the strength of the community and local actors than from formal institutional support. Schools, teachers, principals, and local residents have demonstrated remarkable capacity to respond quickly to crises, even without standard procedures or systematic facilitation from relevant institutions. This resilience stems from empirical experience, a sense of responsibility, and strong social solidarity at the local level. However, these responses are largely spontaneous and not yet institutionalized. Policy inconsistencies, the absence of minimum preparedness standards, and weak cross-sectoral coordination have prevented schools from developing into a uniform adaptive system. This bottom-up resilience risks becoming unsustainable if it is not responded to with structural changes that favor the education sector as one of the sectors most affected in emergency situations.

Thus, one of the main contributions of this study is the proposal of an integrated disaster-resilient basic education service model that combines operational, institutional, and socio-community dimensions. This model is designed to serve as a collaborative framework between schools, local governments, and communities to strengthen the resilience of the education system in a more comprehensive and sustainable manner. As a follow-up to these findings, it is recommended that local governments develop regulations specifically governing education management in disaster situations, including the preparation of school-based emergency SOPs, regular training, and the provision of contingency budgets.

The education agency and BPBD need to form a functional partnership in disaster training tailored to the context of elementary schools. Meanwhile, active community participation, which has been the backbone of local resilience needs to be continuously facilitated and strengthened within a supportive institutional framework. Educational resilience cannot be built solely through bureaucratic directives. It must grow from a combination of supportive policies, adaptive structures, and empowered communities. If these three elements can be brought together, then basic education in disaster-prone areas will not only be able to survive, but also become the driving force for post-disaster recovery and social transformation.

Declaration of Competing Interest

The authors declare no conflicts of interest.

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Use of Artificial Intelligence (AI)-Assisted Technology

The author states that artificial intelligence (AI) technology was used to a limited extent in the preparation of this manuscript, primarily to assist with technical aspects such as language editing and structural improvements. However, the entire substance of the research including the formulation of ideas, data collection, analysis, interpretation, and drawing of conclusions is entirely the result of the author's own thinking and remains the author's sole responsibility.

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