

SMART RECOVERY ACEH MODEL: INTEGRATING EMERGENCY EDUCATION AND MSME EMPOWERMENT FOR COMMUNITY- BASED POST-DISASTER RECOVERY

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Abstract

The flood disaster that occurred in North Aceh on November 26, 2025, significantly disrupted the social and economic conditions of affected communities, particularly in Keude Geudong Village. This study aims to examine the effectiveness of a community-based post-disaster recovery model that integrates emergency education and micro, small, and medium enterprise (MSME) empowerment. A community-based participatory approach was employed, involving two main target groups: school-aged children and MSME actors. Data were collected through observations, interviews, and program documentation, and analyzed using descriptive quantitative and qualitative methods. The results show that the social intervention successfully restored access to education, achieving over 80% participation and improving children's learning motivation and psychosocial well-being. In the economic sector, MSMEs experienced a 40–60% increase in production capacity and a 25–35% increase in income, supported by improved financial management and digital marketing adoption. The integration of appropriate technology and continuous mentoring further enhanced program effectiveness and sustainability. This study highlights that combining social and economic interventions within a community-based framework can generate synergistic impacts and strengthen post-disaster resilience. The proposed model offers a practical and replicable approach for sustainable recovery in disaster-affected communities.

Keywords: *Post-disaster recovery; community-based approach; emergency education; MSMEs empowerment; digital transformation; community resilience*

INTRODUCTION

The flood disaster that occurred on November 26, 2025, in the North Aceh region had a significant impact on the social and economic conditions of the community, particularly in Keude Geudong Village, Samudera District. The disaster caused damage to infrastructure, disrupted educational activities, and reduced the economic productivity of the community. In the post-disaster period, the recovery process has not yet been fully optimal. This is partly due to limitations in the distribution of assistance from regional governments to village authorities, which affects local fiscal capacity in supporting recovery efforts (Aldrich & Meyer, 2015; Shaw, 2014). This condition highlights the need for community empowerment-based interventions that not only focus on emergency aid but also emphasize sustainable recovery. Therefore, the village government collaborated with university students to implement a post-disaster recovery program aimed at improving community welfare, strengthening the local economy, and restoring basic services (UNDP, 2020).

Based on field identification results, the target beneficiaries of this program are divided into two main groups: non-productive community members (school-aged children) and productive community members (MSME actors). In the non-productive group, the main problems include disruption of the learning process due to damaged educational facilities and an uncondusive learning environment. In addition, children experience psychological distress after disasters, which affects their learning motivation and social interaction. This is consistent with previous studies indicating that children are among the most vulnerable groups in post-disaster situations and require both educational interventions and psychosocial support (Peek, 2008; Masten & Narayan, 2012). In the productive community group, the main problems include decreased income due to disrupted production processes, damaged business facilities, weak financial management, and limited market access. Low digital literacy also poses a barrier

to utilizing technology as a marketing tool. This finding aligns with research showing that MSMEs in post-disaster contexts tend to experience a decline in production capacity and limited access to markets (Tierney, 2007; Eggers, 2020). Nevertheless, this area has considerable potential, such as a high number of school-aged children and the presence of active local MSMEs with development potential. The problems faced by the community are closely related to the creative economy sector and post-disaster economic recovery, which aligns with regional development priorities, particularly in MSME-based recovery, education improvement, and strengthening social resilience (OECD, 2021).

Furthermore, this program was implemented through two main aspects: social/community and economic interventions. In the social/community aspect, activities focused on organizing community-based emergency schools and restoring children's psychological well-being through creative, educational, and trauma-healing-based learning activities. These efforts aim to restore access to education, increase learning participation, and improve emotional stability among children as a vulnerable group (Nicolai & Triplehorn, 2003). In the economic aspect, activities focused on strengthening MSMEs through assistance in restoring production processes, training in business management and basic financial bookkeeping, and developing digital marketing through e-commerce platforms. These activities aim to enhance business capacity, expand market access, and promote sustainable economic recovery (Rose, 2007; UNDP, 2020). Through these two integrated approaches, the program seeks to increase the level of community empowerment, both socially and economically, so that the affected population not only recovers from the impacts of the disaster but also develops the capacity to grow independently and sustainably.

LITERATURE REVIEW

Post-disaster recovery has increasingly shifted from a purely humanitarian response toward a more integrated, community-based development approach. Effective recovery is no longer limited to physical reconstruction but must also address social resilience and economic revitalization simultaneously. Community-based approaches have been widely recognized as essential in ensuring sustainable recovery, as they promote local participation, ownership, and long-term resilience (Aldrich & Meyer, 2015; Shaw, 2014). One of the most vulnerable groups in post-disaster settings is children, particularly in terms of disrupted access to education and psychological well-being. Disasters often cause prolonged interruptions in learning due to damaged infrastructure and limited educational resources. Moreover, children frequently experience psychological distress, including trauma, anxiety, and reduced social interaction, which significantly affects their learning motivation and cognitive development (Peek, 2008; Masten & Narayan, 2012). Therefore, post-disaster educational interventions should not only restore access to schooling but also incorporate psychosocial support through adaptive and engaging learning approaches, such as creative, play-based, and trauma-informed education (Nicolai & Triplehorn, 2003).

In addition to social impacts, disasters severely affect local economies, particularly micro, small, and medium enterprises (MSMEs). MSMEs are highly vulnerable due to their limited resources, lack of financial resilience, and dependence on local markets. Studies show that post-disaster MSMEs often experience declines in production capacity, disrupted supply chains, and loss of capital, which hinder their recovery process (Tierney, 2007; Rose, 2007). Furthermore, weak financial management and low levels of digital literacy exacerbate these challenges, making it difficult for MSMEs to adapt to changing market conditions (Eggers, 2020). As a result, strengthening MSMEs through integrated interventions—such as production recovery, financial literacy training, and digital marketing adoption—has become a key strategy for accelerating economic recovery.

The role of appropriate technology in post-disaster recovery has also been increasingly emphasized. Simple and context-appropriate technologies can significantly enhance both educational and economic outcomes. In the education sector, digital tools such as projectors and multimedia learning platforms have been shown to improve student engagement and learning effectiveness, especially in resource-constrained environments (Trucano, 2016). In the economic sector, the adoption of small-scale production technologies and packaging innovations can improve efficiency, product quality, and competitiveness of MSMEs (Humphrey & Schmitz, 2002). Moreover, digital transformation plays a crucial role in strengthening resilience in post-disaster contexts. The use of digital platforms, including social media and e-commerce, allows MSMEs to expand market reach beyond geographically affected areas. This is particularly important when traditional markets and infrastructure are disrupted. However, successful digital adoption depends on the availability of training and continuous mentoring to improve digital literacy among small business actors (UNDP, 2020; OECD, 2021). Despite the growing body of literature on post-disaster recovery, most studies tend to focus on either social recovery (such as education and psychosocial support) or economic recovery (such as MSME development) separately. There is still limited research that integrates both aspects within a unified, community-based framework. This gap highlights the need for a holistic approach that simultaneously

addresses the multidimensional impacts of disasters. Therefore, a community-based recovery model that integrates emergency education and MSME empowerment represents a promising strategy for sustainable post-disaster recovery. By combining social and economic interventions with appropriate technology and participatory approaches, such models can enhance community resilience, restore livelihoods, and support long-term development in disaster-affected areas.

METHOD

This study employed a community-based participatory approach to support post-disaster recovery in Keude Geudong Village, Samudera District, North Aceh, Indonesia. This approach emphasizes the active involvement of community members in all stages of the program, from needs identification to implementation and evaluation, to ensure relevance, ownership, and sustainability of outcomes. The program targeted two main groups: (1) non-productive community members, specifically school-aged children affected by the disaster, and (2) productive community members, particularly micro, small, and medium enterprise (MSME) actors. A total of approximately 300 children participated in educational recovery activities, while 10 MSMEs were involved in economic recovery interventions.

Data were collected using a combination of qualitative and quantitative methods, including field observations, semi-structured interviews with community members and stakeholders, and program documentation. Quantitative data were obtained from participation rates, production outputs, income changes, and adoption rates of financial and digital practices. Qualitative data were used to assess changes in learning motivation, psychosocial conditions, and community engagement.

The intervention was implemented through five main stages:

- **Socialization**
Initial engagement with local stakeholders, including village authorities and community members, to introduce the program and identify priority needs.
- **Training**
Capacity-building activities were conducted for both target groups. For children, training focused on adaptive and creative learning methods integrated with psychosocial support. For MSMEs, training covered business management, basic financial recording, and digital marketing strategies.
- **Technology Implementation**
Appropriate technologies were introduced to support both sectors. In education, tools such as a smart projector and a generator were used to facilitate interactive learning. In the economic sector, MSMEs were supported with production tools such as a stand mixer, food chopper, and vacuum sealer, as well as access to digital platforms for marketing.
- **Assistance and Evaluation**
Continuous mentoring was provided to ensure effective implementation of the training and technology adoption. Monitoring and evaluation were conducted through regular field visits and performance tracking based on predefined indicators, such as participation rates, production capacity, financial management practices, and digital adoption.
- **Sustainability Strategy**
To ensure long-term impact, the program strengthened the role of local stakeholders, including village authorities and community groups, and transferred the use of technologies and learning systems to the community. Recommendations for future development were also formulated.

Quantitative data were analyzed using descriptive statistics to measure changes in participation, production capacity, income, and adoption rates. Qualitative data were analyzed using thematic analysis to identify patterns related to learning motivation, psychosocial recovery, and community empowerment. The integration of these methods allowed for a comprehensive assessment of both social and economic impacts of the program.

RESULTS AND DISCUSSION

This section presents the findings of the study and discusses their implications in relation to existing literature on post-disaster recovery. The results are analyzed based on two main dimensions of the intervention, namely social recovery through education and psychosocial support, and economic recovery through MSME empowerment. In addition, this section highlights the role of technology integration and community participation in enhancing the

effectiveness and sustainability of the program. By combining quantitative outcomes and qualitative insights, the discussion aims to provide a comprehensive understanding of how the implemented model contributes to community resilience in post-disaster contexts.

1. Social Recovery: Educational Access and Psychosocial Improvement

The implementation of community-based emergency education showed significant improvements in both access to learning and psychosocial conditions among children affected by the disaster. The program successfully engaged approximately 300 out of 460 school-aged children, achieving a participation rate of over 80%. Active engagement levels reached more than 75%, indicating a substantial recovery in learning motivation and student involvement.

The use of adaptive learning methods combined with psychosocial support, such as creative activities, group interaction, and trauma-informed approaches, contributed to improvements in children's emotional stability and social interaction. The integration of visual learning tools, including a smart projector supported by a generator, enhanced student engagement and comprehension, particularly in a post-disaster context where conventional learning environments were disrupted. These findings are consistent with previous studies highlighting the importance of integrating psychosocial support into post-disaster education to restore both cognitive and emotional development (Masten & Narayan, 2012). The results also reinforce the argument that community-based education models can effectively bridge gaps in formal education systems during emergencies, while simultaneously promoting resilience among vulnerable groups.



Picture 1. Educational Access and Psychosocial Improvement

2. Economic Recovery: MSME Capacity and Productivity Enhancement

The economic intervention demonstrated measurable improvements in MSME performance, particularly in terms of production capacity, efficiency, and income generation. The introduction of appropriate technologies, such as stand mixers, food choppers, and vacuum sealers, contributed to a 40–60% increase in production capacity and up to 50% improvement in time efficiency. In addition, MSMEs showed significant progress in business management practices. Approximately 70% of participating MSMEs were able to implement basic financial recording systems, while 60% adopted digital marketing strategies through social media and e-commerce platforms. These changes were associated with an increase in revenue ranging from 25% to 35%, indicating a positive impact on economic recovery.

The findings align with previous research suggesting that technology adoption and capacity-building interventions are critical in enhancing MSME resilience in post-disaster contexts (Eggers, 2020). Furthermore, the

integration of financial literacy and digital marketing supports long-term business sustainability by improving decision-making and expanding market access.



Picture 2. MSME Capacity and Productivity Enhancement

3. Integration of Social and Economic Interventions

One of the key contributions of this study lies in the integration of social and economic recovery within a single community-based framework. Unlike many post-disaster programs that focus on a single sector, this approach simultaneously addressed educational disruption and economic decline. The results indicate that such integration creates a synergistic effect. Improved psychosocial conditions among children contribute to stronger social cohesion, while economic recovery among MSMEs enhances household stability and community resilience. This holistic approach supports the argument that post-disaster recovery should be multidimensional, addressing interconnected social and economic challenges. This finding fills a gap in the existing literature, where most studies treat social and economic recovery as separate domains. By demonstrating the effectiveness of an integrated model, this study contributes to the development of more comprehensive post-disaster recovery strategies.

4. Role of Technology and Digital Transformation

The implementation of both hard and soft technologies played a crucial role in enhancing program effectiveness. In the education sector, digital tools improved learning quality and engagement, while in the economic sector, production technologies increased efficiency and product quality. Moreover, digital transformation through the adoption of e-commerce and social media platforms enabled MSMEs to expand beyond local markets, which is particularly important in post-disaster situations where physical infrastructure is disrupted. However, the success of digital adoption was closely linked to continuous mentoring and capacity building, highlighting the importance of human support alongside technological intervention.

These findings are in line with studies emphasizing that technology alone is insufficient without adequate training and user adaptation (OECD, 2021). Therefore, the combination of technology provision and continuous assistance is essential for achieving sustainable outcomes.

5. Implications for Community-Based Recovery Models

The results of this study provide important implications for the design of post-disaster recovery programs. First, community participation is a critical factor in ensuring program relevance and sustainability. Second, integrating social and economic interventions can produce more comprehensive and long-lasting impacts. Third, the use of appropriate and accessible technology enhances both efficiency and scalability of interventions. Overall, the findings suggest that the SMART Recovery Aceh model represents a viable and replicable approach for post-disaster recovery in similar contexts. By combining community empowerment, technological support, and integrated interventions, the model contributes to building more resilient and self-sustaining communities.

CONCLUSION

This study demonstrates that a community-based approach integrating social and economic interventions can effectively support post-disaster recovery. The implementation of emergency education combined with psychosocial support successfully restored children's access to learning, increased participation rates, and improved emotional stability. At the same time, the empowerment of MSMEs through production support, financial management training, and digital marketing adoption contributed to significant improvements in production capacity, efficiency, and income. The findings highlight the importance of combining appropriate technology with continuous mentoring to ensure sustainable outcomes. The use of simple, context-appropriate technologies enhanced both educational and economic activities, while capacity-building efforts enabled the community to effectively utilize these resources. Moreover, the integration of social and economic recovery created a synergistic effect, strengthening overall community resilience. Overall, the results suggest that the SMART Recovery Aceh model provides a practical and replicable framework for post-disaster recovery, particularly in communities with limited resources. Future studies are recommended to explore the long-term impacts of such integrated approaches and to examine their applicability in different socio-economic and disaster contexts.

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