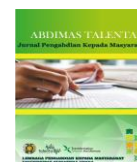




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Strengthening the Resilience of the Siponjot Village Community through Non-Formal Education and Planting Productive Trees for Disaster Mitigation and Welfare Improvement

Muhammadin Hamid^{*1}, Syahrul Humaidi¹, Nursal², Noor Haida Mohd Kaus³, Nazwa Armi¹, Utami Ahda Surya¹, Zahwan Asrof Zahirul Ubaid¹

¹Physics Department, Faculty of Mathematics and Natural Sciences, Universitas Sumatera Utara, Medan, 20155, North Sumatra, Indonesia

²Biology Department, Faculty of Mathematics and Natural Sciences, Universitas Sumatera Utara, Medan, 20155, North Sumatra, Indonesia

³School of Chemical Sciences, Universiti Sains Malaysia, 11800, Pulau Pinang, Malaysia

*Corresponding Author: muhammadin.hamid@usu.ac.id

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ABSTRACT

This Focus Group Discussion (FGD) aims to formulate strategies to strengthen the resilience of the Siponjot Village community through non-formal education and the planting of productive trees as efforts toward disaster mitigation and welfare improvement. Siponjot Village faces potential vulnerability to natural disasters such as landslides and floods, influenced by its geographical conditions and land-use patterns. Through the FGD, which involved village authorities, community leaders, farmer groups, and youth representatives, the need to enhance community capacity in environmental management through participatory educational approaches was identified. Non-formal education initiatives were designed to improve knowledge of disaster mitigation, land conservation, and skills in cultivating and managing productive trees. The planting of productive trees was selected as an integrated strategy because it strengthens soil structure, reduces disaster risks, and provides long-term economic benefits. The results of the FGD indicate increased collective awareness, collaborative commitment among stakeholders, and the development of a community-based action plan. Therefore, integrating non-formal education with productive tree planting represents a sustainable empowerment model to enhance both community resilience and rural welfare.

Keyword: Focus Group Discussion (FGD), Community Resilience, Non-Formal Education, Productive Tree Planting, Disaster Mitigation, Village Community Empowerment



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1. Introduction

Community resilience has become a key framework in disaster risk reduction (DRR), particularly in rural areas that face recurring environmental hazards such as floods, landslides, and climate-related disturbances. Resilience is not only defined by physical infrastructure but also by social capacity, adaptive knowledge, and collective action mechanisms within communities. Recent research emphasizes that community-based resilience models are more sustainable because they incorporate local participation, shared learning, and contextual problem-solving strategies [1]. Participatory approaches such as Focus Group Discussions (FGD) are widely recognized as effective tools in strengthening community engagement. FGDs create inclusive forums where stakeholders can identify local risks, discuss vulnerabilities, and co-design mitigation strategies. Studies on disaster-resilient villages show that participatory dialogue significantly improves social cohesion, trust, and collaborative planning among community members [2].

Furthermore, structured community discussions have been proven to enhance collective awareness and improve risk communication mechanisms at the grassroots level [3]. Non-formal education plays a strategic role in supporting resilience-building efforts. Unlike formal systems, non-formal education is flexible, contextual, and directly responsive to community needs. Community-based disaster education programs have demonstrated measurable improvements in preparedness levels, early warning understanding, and adaptive behavior among rural populations [4]. In addition, participatory training and socialization activities encourage empowerment, strengthen leadership capacity, and foster shared responsibility in disaster mitigation [5].

Nature-based solutions, particularly productive tree planting, have increasingly been promoted as sustainable disaster mitigation strategies. Tree planting contributes to slope stabilization, flood reduction, erosion control, and microclimate regulation. Research indicates that agroforestry-based mitigation not only reduces environmental risks but also improves economic resilience through diversified income sources and food security enhancement [6]. Mangrove and inland vegetation restoration programs similarly show strong correlations between ecosystem recovery and reduced disaster vulnerability [7]. Integrating participatory education with environmental action has been identified as a holistic model for strengthening socio-ecological resilience. Community-driven initiatives that combine FGD, disaster literacy education, and practical ecological measures produce more sustainable outcomes compared to single-intervention programs [8].

To address these challenges, the Community Service Team from the Universitas Sumatera Utara (LPPM USU), in collaboration with the residents of Siponjot Village, implemented a program entitled Focus Group Discussion (FGD) on Strengthening Community Resilience through Non-Formal Education and Productive Tree Planting. This program was designed as a participatory and sustainable initiative to enhance community capacity in disaster mitigation and welfare improvement through structured discussions and non-formal educational activities that encourage villagers to identify local risks, develop adaptive strategies, and strengthen collective awareness. Furthermore, the planting of productive trees serves as a practical environmental action that supports disaster risk reduction by preventing soil erosion and reducing flood potential, while simultaneously providing long-term economic benefits through additional household income and improved food security. Thus, this program presents an integrated and multi-layered solution that reinforces environmental sustainability, strengthens social resilience, and improves the overall wellbeing of the village community.

2. Methods

2.1. Research Methodology

The implementation of this community service program in Siponjot Village employed a participatory and collaborative approach integrating non-formal education, Focus Group Discussions (FGD), and a data-based village development roadmap. This approach was designed to strengthen community capacity in disaster mitigation, local policy formulation, and digital-based resilience and welfare improvement.

2.2. Community Service Location

The community service activity was carried out in Siponjot Village. The location was selected due to its vulnerability to environmental hazards and its potential for community-based resilience development through non-formal education and environmental initiatives. Siponjot Village is located approximately 271 km from the Universitas Sumatera Utara.



Figure 1. Siponjot Village



Figure 2. Location map of partner network from the Universitas Sumatera Utara

2.3. Integrated Method: Non-Formal Education, FGD, and Digital Village Roadmap

a. Community-Based Non-Formal Education

The first stage focused on strengthening community capacity through non-formal education. Activities were carried out using participatory learning methods such as interactive discussions, contextual lectures, and group reflections tailored to the village's environmental and socio-economic conditions. Educational materials emphasized disaster literacy, environmental awareness, community resilience, and the importance of collective action. The learning process encouraged active participation, experience sharing, and problem-solving based on real local challenges. Through this stage, community members improved their understanding of disaster mitigation and developed greater awareness of their roles in building village resilience.

b. Focus Group Discussion (FGD) and Policy Formulation

The second stage involved conducting structured Focus Group Discussions (FGDs) with village officials, community leaders, farmer groups, women's representatives, and youth organizations. The FGD process aimed to identify priority issues, validate field findings, and formulate strategic recommendations. Discussions were guided systematically to ensure that outputs were solution-oriented and policy-relevant. The results of the FGD were compiled into a policy brief to support village-level planning and decision-making. This stage strengthened participatory governance, enhanced communication among stakeholders, and built collective agreement on resilience and welfare strategies.

c. Digital-Based Village Roadmap Development

The third stage focused on developing a digital-based village roadmap to transform village data into strategic planning instruments. Data collection, classification, and analysis were conducted to map hazard-prone areas, identify vulnerable groups, and document village assets and potentials. Based on this evidence-based approach, short-, medium-, and long-term action plans were formulated, integrating resilience indicators and welfare improvement targets. The roadmap serves as a structured guideline for sustainable village development, ensuring that disaster mitigation, environmental management, and socio-economic empowerment are systematically integrated into future village policies.

3. Results and Discussion

Technology and participatory approaches are increasingly recognized as essential instruments for strengthening community resilience, particularly in rural areas that are vulnerable to natural disasters and economic instability. In Siponjot Village, various environmental challenges such as unpredictable weather patterns, land degradation, and limited economic diversification have affected both community welfare and disaster preparedness. To address these issues, a Focus Group Discussion (FGD) initiative was conducted under the program entitled "Strengthening the Resilience of the Siponjot Village Community through Non-Formal Education and Planting Productive Trees for Disaster Mitigation and Welfare Improvement." This program integrates community-based learning with practical environmental action, aiming to enhance local capacity, reduce disaster risks, and improve long-term economic sustainability. The implementation process began with the organization of Focus Group Discussions involving village officials, community leaders, farmer groups, youth representatives, and women's groups. The FGD served as a participatory forum to identify key

local vulnerabilities, map disaster risks, and explore potential community-driven solutions. Through structured dialogue and collaborative analysis, participants discussed past disaster experiences, existing environmental conditions, and available local resources. The results of these discussions indicated that land erosion, reduced vegetation cover, and limited knowledge of disaster mitigation strategies were among the primary concerns.

Based on the FGD findings, the program continued with non-formal education sessions designed to strengthen community knowledge and skills. These educational activities included training on disaster risk reduction, sustainable land management, agroforestry practices, and household economic diversification. The learning approach was interactive and contextual, using real cases and local experiences to ensure relevance and practical understanding. Participants were encouraged to actively share their insights, fostering collective awareness and mutual learning within the community. A key practical component of the program was the planting of productive trees as a strategy for both disaster mitigation and welfare improvement. The selected tree species were those with economic value such as fruit trees and multipurpose trees while also providing ecological benefits, including soil stabilization, water absorption, and erosion control. The planting process was conducted collaboratively on community land, riverbanks, and other vulnerable areas identified during the FGD. This activity not only contributed to environmental restoration but also strengthened social cohesion through collective action. Over time, the planted productive trees are expected to function as a natural buffer against environmental hazards, particularly landslides and flooding. Their root systems help bind the soil, reduce surface runoff, and improve overall land resilience. At the same time, the economic value of the trees offers long-term benefits for households. Once harvested, the products can be consumed or sold, thereby providing an additional source of income and enhancing economic stability.



Figure 4. Focus Group Discussion (FGD) via zoom



Figure 5. Presentation of material by the speaker

The integration of non-formal education and environmental action has demonstrated a holistic approach to community resilience. The FGD process fostered participatory decision-making and strengthened local

ownership of the program. Meanwhile, the educational component enhanced knowledge and preparedness, and the tree-planting initiative provided tangible environmental and economic benefits. Overall, this program has shown that strengthening resilience is most effective when it combines awareness-building, skill development, and practical environmental interventions. The Siponjot Village community benefits not only from improved disaster preparedness and environmental quality but also from increased economic opportunities and strengthened social solidarity. Through this integrated strategy, resilience becomes not merely a concept, but a sustainable practice embedded within daily community life.

4. Conclusion

The Smart Waste Management program in Bekiung Village, Kuala District, Langkat Regency, successfully demonstrated that livestock and palm oil waste can be processed into high-quality organic fertilizer through a simple yet effective process. This community service activity not only reduces the negative impact of waste on the environment but also provides tangible benefits to the community in the form of increased soil fertility, reduced dependence on chemical fertilizers, and reduced agricultural cost efficiency.

Furthermore, direct community involvement through training and mentoring makes this program sustainable and encourages village independence in waste management. Thus, Smart Waste Management is a relevant solution to support sustainable agriculture while improving the welfare of the Bekiung Village community. By integrating waste management, renewable energy utilization, and community empowerment, this program has been proven to support the creation of a healthier village environment, more productive agriculture, and improved socio-economic well-being. Therefore, Smart Waste Management is a worthy model for sustainable waste management that can be replicated in other rural areas.

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