Evaluation of Community-Based Mitigation Education in Disaster Risk Reduction Organizations: The Penta Helix Approach

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Abstract. If community resilience initiatives are not balanced with the high chance of disaster, numerous losses will ensue. The function of organisations dedicated to disaster risk reduction (OPRB) in bolstering community resilience through the acquisition of thorough studies on catastrophe mitigation. This study's four primary variables are the following: solidarity and commitment are latent constructs that are endogenous intervening latent constructs, while the other two variables—collective action and collective identity—are exogenous latent constructs (independent variables). The dependent variable is en-dogenous. The study's sample size of 100 OPRB actors in Magelang Regency was rounded up because the min-imum sample size identified in the structural equation modelling (SEM) analysis was 100. The research subjects were community members in the OPRB who were in every sub-district in the regency, which had a population of 387. Instruments for gathering data include surveys, documentation, and observation. With the aid of the Smart PLS programme, data analysis techniques included the Geographic Information System (GIS), Structural Equation Modelling (SEM), and Analytical Hierarchy Process (AHP). The study's findings were as follows: 1) 273 severe winds, 220 landslides, and 54 fires were the most common disaster events. The highest monthly incident intensity was recorded in January (152 events), followed by March (111 incidents) and April (56 incidents). In the meantime, there were 13 significantly damaged houses, 37 damaged dwellings, and 670 slightly damaged buildings. Over the past year, eight people have perished and eleven people have been injured in catastrophic situations. 2) The dedication of OPRB volunteers in Magelang Regency is directly impacted by the findings of the SEM PLS study of collective action and collective identity.Collective action does not significantly affect the commitment of volunteers from Disaster Risk Reduction Organizations (OPRB) in Magelang Regency through collective identity. Through solidarity performances, collective action has a great impact on the dedication of volunteers from the Disaster Risk Reduction Organisation (OPRB) in Magelang Regency. Volunteers' dedication to Disaster Risk Reduction Organisations (OPRB) in Magelang Regency is greatly influenced by their collective identity through solidarity. Through collective identity, collective action significantly affects volunteer solidarity for Disaster Risk Reduction Organisations (OPRB) in Magelang Regency. 3) Government policies rank highest

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among the criteria for building community resilience through OPRB and institutional human resource development, according to AHP study. The supply of information, promotion, and assurance facilities for OPRB volunteers, along with the provision of essential rescue equipment, rank as the highest priority choice under the Community Resilience Development Strategy (weight value = 0.133).

Keywords: Community Resilience, Collective Action, Risk Reduction, Disaster Cluster

1 Introduction

Community resilience is part of disaster recovery, which directs communities to recover to normal conditions before the disaster occurs. Previous research on community resilience is as follows [1] Natural disaster mitigation focuses on collective action on the Tsunami disaster early warning system. The importance of group effort in enhancing climate change adaptation [2]. Social Support Attitudes and Flood Survivor Stress Resilience Levels [3]. Resilience of Communities for Victims of the Mount Kelud Eruption [5], OPRB's ethnographic investigation of women's role in disaster risk reduction [6], and the ability of fishing communities to adapt to climate change (4), Long-term hamlet adaptation in terms of communal resilience following an earthquake [7], Level of Community Resilience in Disaster Prone Areas [8], Community Resilience Against Floods [9], Post-Tsunami Disaster Resilience [10], The Samarinda Community's Adaptability to the COVID-19 Pandemic and Its Causes [11], (12)Social Relations and Resilience of Farmer Communities Victims of Volcano Eruption in Relocation Areas. The relationship between social support and resiliency in Tambak Lorok Rob flood survivors [13], SEFT-based resilience training [14], resilience and altruism towards natural disaster volunteers [15] In the middle of the COVID-19 epidemic, community resilience [16], social capital's contribution to tsunami-prone communities' resilience [17], Community Resilience and Vulnerability Food in Rural Aceh [18], The Competition of Religious Coaches in Building Communities' Resilience to Multiple Disasters During the COVID-19 Pandemic [19].

Based on previous research studies, disaster resilience has yet to explore the role of the community in society, especially disaster risk reduction organizations, especially in collective action. The findings targeted in this study examine collective action in the form of community resilience strategies. In order to maximize the potential of surrounding villages and rural regions, especially in organizations that reduce catastrophe risk, representatives from the government, academia, corporate groups or actors, communities, and the media come together and plan using the Penta Helix approach, which is a multistakeholder concept. The methods used are questionnaires, observation, and documentation. Then the data obtained by conducting quantitative Geographic Information System (GIS)-assisted descriptive analysis, Structural Equation Modeling (SEM) analysis made possible by the Smart PLS program, Analytical Hierarchy Process (AHP) method is a decision model comprehensive decision-taking into account qualitative and quantitative matters. Community resilience strategy research through disaster risk reduction organization (OPRB) clusters in Magelang Regency: Penta Helix Approach

will answer the problem formulation: 1) How is the distribution of OPRB in Magelang Regency based on the characteristics of collective identity, solidarity, and commitment? 2) What is the Magelang district's approach to building community resilience? 3) How might social capital, as measured by a socio-cultural perspective, promote community resilience through collective action performance?.

Disasters, whether brought on by natural, artificial, or human forces, are very vulnerable to Indonesia's geographic, geological, hydrological, and demographic characteristics. Human casualties, environmental harm, property loss, and non-material and psychological harm are frequently the major effects of catastrophes. However, Indonesian development planning has been created to improve human welfare, reduce environmental damage, and defend society from the possibility of disaster. However, non-systemic and uncoordinated handling efforts still need to improve their implementation. To answer this problem, research activities considered necessary for disaster risk reduction include several things, both at the level of providing technology products and increasing the capacity of the community and related stakeholders. This needs to be developed for disaster mitigation and recovery after a disaster, BU-2.1 Disaster mitigation with T-2.1.5 Community preparedness and social intervention for disasters.

Determine the relationship between the long-term community and community resilience in surviving earthquakes by doing quantitative research on the Klaten people after the earthquake. The result positively correlates with community resilience and post-earthquake management, $r = .57$, $p < .001$ (7). Additionally, a qualitative study under Community Resilience in Dealing with Tempe Lake Disaster in South Sulawesi was conducted. The results showed that the community held the Maccera Tappareng ritual when the water overflowed, causing flooding, as a request to the ruler of the lake [20]. The house is well-bonded, so it does not float away. However, during the floods, the community gets the blessing of catching fish.

Catastrophe management is broadly defined as the sum of all actions, programs, and procedures that may be implemented before, during, and following a catastrophe to prevent one, lessen its effects, or recover from its losses [21]. To find solutions to disaster problems which are public problems, disaster management is needed so that the negative impacts of disasters can be reduced [22]. Risk management is a science that discusses how an organization applies measurements in mapping problems by placing a comprehensive and systematic management approach [23]. Meanwhile, the risk can be referred to as the spread or deviation of the actual results from the expected results [24].

Collective action can be measured by three indicators consisting: (1) The level of collective action (collective activity intensity), namely the number of actions taken collectively by the community to attain shared objectives as measured by the level of household participation in village development planning and the intensity cooperation with other people for the public interest in their village. (2) Types of collective activities, namely activities carried out jointly by community members to achieve common goals. (3) Willingness to participate, namely measuring the extent to which environmental conditions (general spirit of participation in the community) support the willingness of household members to participate in village development activities and create peace in the community, The Case of Housing Development and Increasing Family

Income in Several Villages in Aceh Besar District: The Role of Social Capital in Post-Tsunami Village Development, n. d.

Snow explained that collective identity is a feeling of 'we-ness' and an institution (collective agency) [25]. This in-group feeling later became the basis for the emergence of social movement actions. This essay uses the above framework to examine what collective identity arises in Solidarity Action. There have been many studies on social movements related to the issue of collective action. See the KISPA movement in support of Palestine, looking at resource mobilization strategies in movement organizations [26]. However, studies on collective identity still need to be completed. The limitations of the study of collective identity make this article essential to discuss; moreover, analyzing what causes the union of various variants of movement elements can provide another perspective in viewing the informal relations of society.

According to Durkheim, less developed cultures have a more lively collective consciousness or an awareness of common values and beliefs. The collective awareness shrank as a result of the growing division of labour. In contrast to societies sustained by organic solidarity, societies supported by mechanical solidarity exhibit more evidence of collective consciousness. Instead of surviving in collective awareness, modern civilization is more likely to exist with a division of labour and the need for functions that belong to others. Consequently, organic society is a weak structure that does not provide for personal development, even though it has a collective awareness [27].

Emile Durkheim, a sociologist, developed the idea of solidarity described in summary above. In general, the researcher will use the concept formulated by Durkheim as a rationale for researching forms of solidarity in Melikan Village. Based on the strong links of sentiments and ideas held together, bolstered by shared emotional experiences, researchers can conclude that social solidarity refers to a condition of the interaction between people and individuals, individuals and groups, or groups and groups in society. The idea of sharing and easing one another's workloads is called solidarity. The study came to the further conclusion that social solidarity comes in two flavours: mechanical and organic. Low individuality, an unclear division of labour, and exclusivity to rural communities are the key traits of mechanical solidarity. While the following are the primary traits of organic solidarity: There is already a distinct division of labour, seen in contemporary or complex civilizations, but there is a lack of collective consciousness.

Organizational dedication According to Grusky, organizational commitment is the way that individuals of an organization interact with the system as a whole [28]. Organizational commitment is a firm belief in believing in and embracing corporate ideals, a willingness to put in a lot of effort, and maintaining membership in the organization. This indicates that members strongly desire to stay in the organization or have a psychological connection to it [29].

2 Method

Primary and secondary data are the two data sources used in this study. Researchers (or officers) directly gather primary data from the source. Regarding the study's main data

source, the data on the characteristics and performance of OPRB were obtained from OPRB actors in Magelang Regency and data on the preparation of the marketing development strategy was obtained from the key person. Additionally, secondary data is information gathered for objectives beyond resolving the issue. This information is easily accessible. Publications, literary works, articles, journals, and websites on the internet that are related to the research being done were consulted for this study. The population in this study were disaster risk reduction organization (OPRB) volunteers with a total of 387 volunteers; the calculations used the Slovin formula above, so the sample obtained was 80 OPRB actors. However, because the minimum requirement specified in the Structural Equation Modeling (SEM) analysis is at least 100, The study's sample size is 100 OPRB actors in the Magelang Regency, rounded up.

In this investigation, proportionate random sampling was used as the sampling method. Prioritizing community resilience development strategies in Magelang district selected key persons or informants using a purposive sampling technique totaling five people. This non-probability sampling is a method in which the researcher selects key persons who know about the variable or problem under study. The key persons in this study used the Penta Helix Academics, Business, Government, Community, and Media approach as follows: 1) Academics: Disaster expert lecturers, providing input and validation about the role of OPRB in disaster mitigation efforts at the village level; 2) Development: Lecturer in government science, provides validation on the role of government in optimizing OPRB at the village level and building community resilience; 3) Government: BPBD Magelang Regency, providing validation on the performance of OPRB at the village level and alignment with the mitigation programs handled by BPBD; 4) Community: NGOs and civil society organizations vouch for the OPRB's contribution to social resilience development. Information is gathered regarding the social duties performed by the OPRB through community and non-governmental groups; 5) Media: Digital and Conventional Media dig up information about the roles and functions of OPRB in disseminating information, validating information, and clarifying the information in society.

3 Result

Collective Identity, Solidarity, and Commitment were identified as manifest and latent variables, respectively, in analyzing the factors affecting community resilience in the Magelang Regency.

a. Collective action exogenous latent variable (X1) has six manifest variables (indicators), namely structural drivers (X11), structural tensions (X12), growth and dissemination of general trust (X13), trigger factors (X14), mobilization of actors (X15), the working of social control (X16).
b. Collective identity endogenous latent variable (X2) has six manifest variables (indicators), namely race (X21), gender (X22), sexuality (X23), religion (X24), culture (X25), and nationality (X26).
c. Solidarity endogenous latent variable (Z) has eight manifest variables (indicators), namely having sympathy and empathy (Z1), helping fellow human beings

(Z2), respecting differences between individuals (Z3), mutual respect (Z4), greeting each other (Z5), Realizing that humans are social beings (Z6), Living in harmony (Z7), Sharing knowledge (Z8).

d. There are four manifest variables (indicators) for the endogenous latent variable of commitment (Y), namely a solid desire to remain as a member (Y1), the desire to try hard at work (Y2), acceptance of organizational values (Y3), acceptance of organizational goals (Y4). Based on the elaboration of the manifest variables (indicators) of each exogenous and endogenous variable, a structural model can be designed as follows.

Assessment of the measurement model's outer model. The measurement model is tested to see how well the relationship between latent variables and their indicators is specified. The four procedures that make up the examination of the measurement model are convergent validity testing, discriminant validity testing (Fig. 1), Cronbach's Alpha reliability testing, and composite reliability testing.

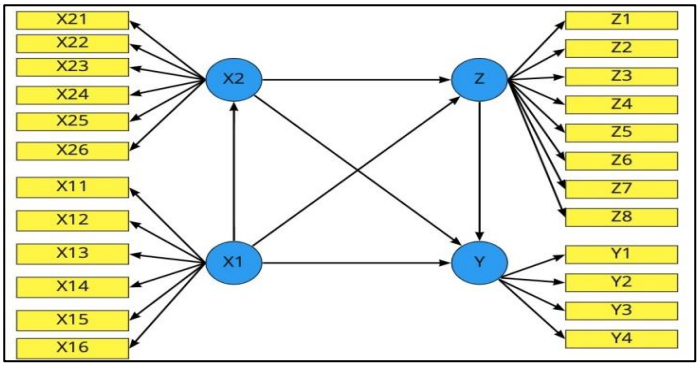


Fig. 1. Structural Model Design.

Source: Processed primary data output, 2022

Test for Convergent Validity. The Convergent Validity technique was used to conduct the initial data validity test, and indications were evaluated based on the relationship between item score and component score. The association between the indicator and concept scores can be used to validate reflective indicators. When other construct-specific indicators change, reflective indicator measurements show changes in the indicator for one particular construct. If the loading factor value is less than 0.5 [30], convergent validity may be accepted, or the data may be certified valid. Including all indices for each variable Given that every indication has a loading factor value larger than 0.5, it may be claimed that every indicator satisfies the requirement for convergent validity. Fig. 2 shows the output loading factor for this research model as follows:

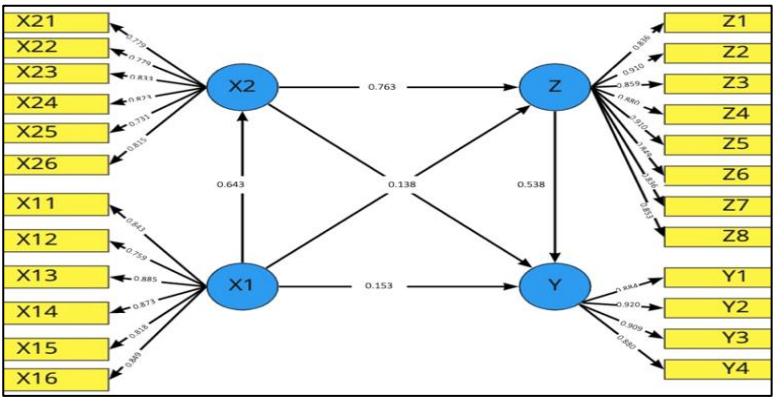


Fig. 2. Output Loading Factor in Research Modeling

Source: Processed primary data output, 2022

Test the validity of discrimination. To evaluate the discriminant validity of reflecting indicators, it is necessary to compare the Average Variance Extracted (AVE) value of the average variance extracted and the correlation involving these latent variables. The model has outstanding discriminant validity if the AVE root value of each latent variable is greater than the correlation between the latent variables and other latent variables in the model. Preferably, the AVE value should be greater than 0.50. [30].

Table 1. Comparison of AVE Values and Inter-Variable Correlation.

	X1	X2	Y	Z
X1	0.82			
X2	0.64	0.79		
Y	0.55	0.64	0.87	
Z	0.63	0.85	0.71	0.87

Source: Processed primary data output, 2022

Table 1 demonstrates that the Average Variance Extracted (AVE) value of the average variance extracted for each variable is greater than 0.5 and that the correlation value between the latent variables and other latent variables in the model is greater, allowing discriminant validity in the model to be concluded to be satisfied.

Test of Cronbach's Alpha Reliability. A construct reliability test is required to evaluate the questionnaire's consistency. When a respondent's responses to a questionnaire are consistent or constant over time, the questionnaire is dependable [31]. A construct or variable is considered trustworthy for reliability testing if its Cronbach's Alpha value exceeds 0.70 [32]. The findings of this study's Cronbach's Alpha reliability test.

Table 2. Results of the Cronbach's Alpha Reliability Test.

Construct	*Cronbach's Alpha*	Keterangan
Collective action (X1)	0.920	Reliable
Collective identity (X2)	0.910	Reliable

Solidarity (Z)	0.950	Reliable
Commitment (Y)	0.940	Reliable

Source: Processed primary data output, 2022

Table 2 shows that all of the model's constructs have Cronbach's Alpha values of more than 0.70, indicating that all of the model's constructs are trustworthy.

Composite Reliability Test (Combined Reliability Test), composite reliability testing is used to demonstrate an indicator's internal consistency in latent variables. The composite dependability rating is typically more important than Cronbach's Alpha. According to Nunnally and Bernstein (1994), an indicator is trustworthy if the composite reliability value is more than 0.70. Table 3 displays the findings of the composite reliability test as follows:

Table 3 demonstrates that all model constructs have composite reliability values of more than 0.70, indicating that all indicators are reliable.

Table 3. Combined Reliability Test Results (Composite Reliability).

Construct	***Cronbach's Alpha***	**Keterangan**
Collective action (X1)	0.940	Reliable
Collective identity (X2)	0.930	Reliable
Solidarity (Z)	0.960	Reliable
Commitment (Y)	0.950	Reliable

Source: Processed primary data output, 2022

Evaluation of the Structural Model (Inner Model), R-squared (R2) test, Goodness of Fit (GoF), and significance test using route coefficient calculation is used to evaluate the structural model in SEM with PLS. R-square (R2) test: The prediction ability of a structural model may be evaluated using RSquare (R2). There is a special impact when R-Square (R2) describes how some exogenous latent factors affect endogenous latent variables. The R-Square value (R2) indicates that the model is strong, moderate, and weak, with scores of 0.67, 0.33, and 0.19 [34]. Table 4 in this study's results shows the R-Square value (R2) in the following manner.

Table 4. R-Square Test Results (R^2).

Construct	**R-square**	**R-Square Adjusted**
Collective identity (X2)	0.413	0.410
Commitment (Y)	0.519	0.500
Solidarity (Z)	0.736	0.730

Source: Processed primary data output, 2022

Based on Table 4. it is clear that the competitive advantage variable's R-Square value is 0.519. The variable collective action, collective identity, and solidarity towards commitment are shown by this value to be 51.9%. Because the result of 0.513 is close to 0.33, this number suggests that the model used in this study meets the moderate criterion.

In the PLS Path Modelling analysis, the goodness of Fit (GoF) can identify global optimization criteria to determine the Goodness of Fit index. The Goodness of Fit or GoF index was developed to evaluate measurement and structural models [33]. In addition, it provides a simple measure of the overall predictability of the model. The GoF score criteria are 0.10, 0.25 and 0.36, which shows that GoF is small, GoF Medium, and GoF Large (34). The Golf value in this research model can be seen in Table 5 as follows:

Table 5. Hasil Uji Goodness of Fit (GoF)

Construct	*R-Square*	Communality
Collective action (X1)	-	0.680
Collective identity (X2)	0.413	0.620
Solidarity (Z)	0.736	0.760
Commitment (Y)	0.519	0.760
Mean	0.556	0.713

Source: Processed primary data output, 2022

Based on Table 5, the GoF value with the square root value of the average communality index and average R-squares can be calculated(34) as follows:

$$GoF = \sqrt{\text{Com x R2}}$$

$$GoF = \sqrt{0{,}713 \text{ x } 0{,}556}$$

$$\text{GoF} = 0{,}629$$

The model used in this study meets the GoF Large requirement by having a GoF value of 0.629, which can be calculated using the formula above.

Test of Significance (Bootstrapping), By paying attention to the significant value between construct-t-statistics and p-values, one may determine whether a hypothesis can be accepted or rejected. This method bases measurement estimates and standard error calculations on actual data rather than statistical hypotheses. The significance value (two-tailed) t-value employed in this study's bootstrap resampling approach is 1.985 (significance level = 5%), given that the statistic value is higher than 1.985. By using the bootstrapping procedure, the PLS-SEM approach does hypothesis testing.

Table 6. Research Data Bootstrapping Calculation Results.

Hypothesis	Construct	*Original Sample Estimate*	*Sample Mean*	*Standard Deviation*	*T Statistic*	*P-Values*	Keterangan
Pengaruh Langsung Antar Variabel (*Direct Effect)*							
H1a	X1 → X2	0,640	0,650	0,070	7,680	0,000	Significant
H1b	X1 → Z	0,140	0,140	0,090	1,540	0,120	Not significant
H1c	X1 → Y	0,150	0,160	0,100	1,580	0,110	Not significant

H2a	X2 → Z	0,760	0,763	0,080	9,150	0,000	Signifi-cant
H2b	X2 → Y	0,480	0,480	0,150	2,590	0,040	Signifi-cant
H3	Z → Y	0,540	0,550	0,130	4,080	0,000	Signifi-cant
Pengaruh Tidak Langsung Antar Variabel (*Indirect Effect)*							
H4	X1 → X2 → Z	0,490	0,500	0,080	5,220	0,000	Signifi-cant
H5	X1 → X2 → Y	0,060	0,050	0,100	0,570	0,568	Not sig-nificant
H6	X1 → Z → Y	0,370	0,375	0,05	2,520	0,030	Signifi-cant
H7	X2 → Z → Y	0,410	0,420	0,120	3,510	0,000	Signifi-cant

Source: Processed primary data output, 2022

Based on Table 6 then, the hypothesis test can be carried out as follows:

3.1 Direct Effect Between Variables (Direct Effect)

H1a: collective action has a significant effect on the collective identity of volunteers from the Disaster Risk Reduction Organization (OPRB) in Magelang District

Based on the estimation results of the PLS-SEM, the statistical t-value of the effect of collective action (X1) on collective identity (X2) is 7.680 > 1.984 (t count). The p-value is 0.000 <0.05 (alpha 5%), so it can be concluded that H1a is accepted, which means that collective action has a significant influence on the collective identity of volunteers for Disaster Risk Reduction Organization (OPRB) volunteers in Magelang Regency. The original sample estimate value shows several 0.640, which indicates that the relationship between collective action and collective identity variables has a positive direction.

H1b: collective action significantly affects solidarity among volunteers from the Disaster Risk Reduction Organization (OPRB) in Magelang Regency. Based on the results of the PLS-SEM estimation, the statistical t-value of the effect of collective action (X1) on solidarity (Z) was 1.540 < 1.984 (t count). The p-value was 0.120 > 0.05 (alpha 5%), so it can be concluded that H1b is rejected, which means that collective action does not have a significant effect on the volunteer solidarity of the Disaster Risk Reduction Organization (OPRB) in Magelang Regency. The original sample estimate value shows several 0.140, which shows that the relationship between collective action and solidarity variables has a positive direction.

H1c: collective action significantly affects the commitment to compete in Disaster Risk Reduction Organization (OPRB) volunteers in Magelang Regency. Based on the results of the PLS-SEM estimation, the t statistical effect of the effect of collective action (X1) on commitment (Y) is 1.580 < 1.984 (t count). The p-value is 0.110 > 0.05 (alpha 5%), so it can be concluded that H1c is rejected, which means that collective action does not have a significant effect on the commitment of volunteers to Disaster

Risk Reduction Organizations (OPRB) in Magelang Regency. The original sample estimate value shows several 0.150, which indicates that the relationship between collective action and commitment variables has a positive direction.

H2a: collective identity significantly affects solidarity among Disaster Risk Reduction Organization (OPRB) volunteers in Magelang District. Based on the results of the PLS-SEM estimation, the statistical t-value of the effect of collective identity (X2) on solidarity (Z) is 9.150 > 1.984 (t count). The p-value is 0.000 <0.05 (alpha 5%), so it can be concluded that H2a has accepted means that collective identity has a significant influence on volunteer solidarity for Disaster Risk Reduction Organizations (OPRB) in Magelang Regency. The original sample estimate value shows several 0.760, which shows that the relationship between collective identity and solidarity variables has a positive direction.

H2b: collective identity significantly affects a commitment to volunteers for Disaster Risk Reduction Organizations (OPRB) in Magelang District. Based on the results of the PLS-SEM estimation, the t statistical effect of the effect of collective identity (X2) on commitment (Y) is 2.590 > 1.984 (t count). The p-value is 0.040 <0.05 (alpha 5%), so it can be concluded that H2b is accepted means that collective identity has a significant influence on a commitment to volunteers for Disaster Risk Reduction Organizations (OPRB) in Magelang Regency. The original sample estimate value shows several 0.480, which shows that the relationship between collective identity and commitment variables has a positive direction.

H3: solidarity significantly affects a commitment to volunteers for Disaster Risk Reduction Organizations (OPRB) in Magelang Regency. The PLS-SEM estimate yielded a t statistic of 4.080 > 1.984 (t count) for the impact of solidarity (Z) on commitment (Y). Since H3 is accepted and the p-value was 0.000 0.05 (alpha 5%), it is clear that solidarity has a major impact on the dedication of volunteers from disaster risk reduction organizations (OPRB) in the Magelang District. The original sample estimate value is in the range of 0.540, indicating a positive direction in the association between the variables measuring commitment and solidarity.

3.2 Indirect Effect Between Variables (Indirect Effect)

H4: collective action has a significant effect on solidarity among volunteers from the Disaster Risk Reduction Organization (OPRB) in Magelang Regency through collective identity. The statistical t value of the influence of collective action (X1) on solidarity (Z) through collective identity (X2) is 5.220 > 1.984 (t count), according to the findings of the PLS-SEM calculation. Given that H4 is accepted and the p-value is 0.000 0.05 (alpha 5%), it is clear that collective action substantially impacts the sense of community among volunteers for disaster risk reduction organizations (OPRB) in Magelang Regency. The original sample estimate value ranges from approximately 0.490, demonstrating a positive link between group activity and solidarity fostered by a shared identity.

H5: Collective action significantly affects a commitment to volunteers for Disaster Risk Reduction Organizations (OPRB) in Magelang Regency through collective iden-

tity. Based on the results of the PLS-SEM estimation, the t statistical value of the influence of collective action (X1) on commitment (Y) through collective identity (X2) is 0.570 < 1.984 (t count), and the p-value is 0.568 > 0.05 (alpha 5%) so that it can be concluded that H5 is rejected, which means that collective action does not have a significant effect on the commitment of volunteers for Disaster Risk Reduction Organizations (OPRB) in Magelang Regency through collective identity. The original sample estimate value shows several 0.060, which shows that the relationship between collective action variables and commitment through social media collective identity has a positive direction.

H6: Collective action significantly affects a commitment to volunteers for Disaster Risk Reduction Organizations (OPRB) in Magelang Regency through solidarity. Based on the results of the PLS-SEM estimation, the t statistical value of the effect of collective action (X1) on commitment (Y) through solidarity (Z) is 2.520 > 1.984 (t count). The p-value is 0.030 <0.05 (alpha 5%), so it can be concluded that H6 is accepted, which means that collective action has a significant influence on the commitment of volunteers to Disaster Risk Reduction Organizations (OPRB) in Magelang Regency through solidarity performance. The original sample estimate value shows several 0.370, which indicates that the relationship between collective action and commitment through solidarity has a positive direction.

H7: collective identity significantly affects a commitment to volunteers for Disaster Risk Reduction Organizations (OPRB) in Magelang Regency through solidarity. Based on the results of the PLS-SEM estimation, the t statistical effect of the effect of collective identity (X2) on commitment (Y) through solidarity (Z) is 3.510 > 1.984 (t count). The p-value is 0.000 <0.05 (alpha 5%), so it can be concluded that H7 is accepted, which means that collective identity has a significant influence on the commitment of volunteers to Disaster Risk Reduction Organizations (OPRB) in Magelang Regency through solidarity. The original sample estimate value shows several 0.410, which shows that the relationship between the collective identity variable and commitment through solidarity has a positive direction.

Results of the Priority Strategy in Community Resilience Development through the Disaster Risk Reduction Organization Disaster Cluster (OPRB) in Magelang Regency:

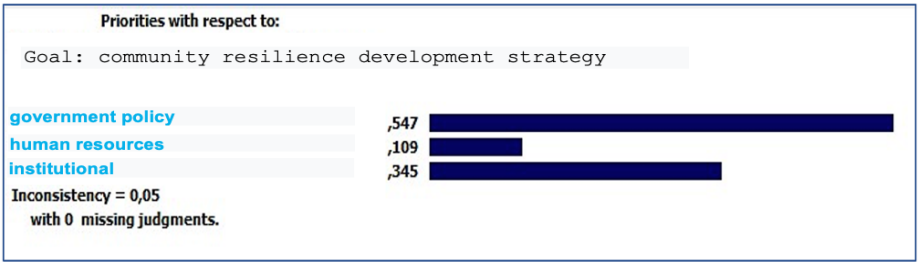
In this study, the Disaster Risk Reduction Organization Cluster (OPRB) in Magelang Regency is used to select solutions for enhancing community resilience using the Analytical Hierarchy Process (AHP). The criteria and options used for the AHP analysis in this study are based on the findings of a literature review, earlier studies, and interviews with key figures with expertise in disaster risk reduction.

In this study, the Disaster Risk Reduction Organization Cluster (OPRB) in Magelang Regency is used to select solutions for enhancing community resilience using the Analytical Hierarchy Process (AHP). The criteria and options used for the AHP analysis in this study are based on the findings of a literature review, earlier studies, and interviews with key figures with expertise in disaster risk reduction.

Eleven major participants from the Magelang Village government, the Regional Disaster Management Agency (BPBD), disaster volunteers, OPRB, and academics made up the group. The outcomes of the analytical hierarchy procedure employing the expert choice 11 programs are shown below:

General AHP Analysis Calculation Results for All Criteria in the OPRB Community Resilience Development Strategy in Magelang Regency.

The following conclusions are drawn from calculations made using the expert choice 11 programs and the analytical hierarchy method for all community resilience criteria for Disaster Risk Reduction Organizations (OPRB) in Magelang Regency:



Source: Primary data processed, 2022

Fig. 3. AHP Output All Criteria for OPRB Resilience Development in Magelang Regency

Government policy, with a weight value of 0.547, is the criterion that Magelang Regency considers most important for building OPRB community resilience. Institutional development is the next priority criterion, with a weight value of 0.345, and human resource development is the third priority criterion, with a weight value of 0.109. An inconsistency ratio of 0.05 to 0.1 is calculated using the expert choice 11 programs to calculate the Analytical Hierarchy Process (AHP) (Fig. 3), indicating that the important people's responses were consistent.

Results of AHP Analysis Calculations on Government Policy Criteria.

The following conclusions are drawn as a consequence of calculations made using the expert choice 11 program and the analytical hierarchy procedure in relation to government policy criteria.

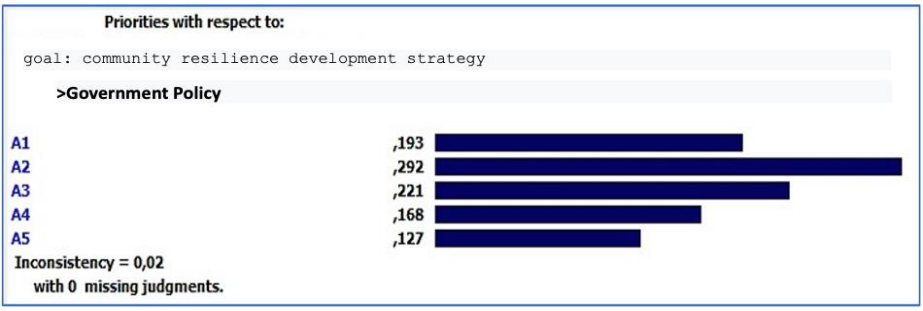


Fig. 4. Output AHP Government Policy Criteria.

Source: Primary data processed, 2022

Information: A1: Provision of business capital needs with alternative financing models; A2: Provision of information, promotion and market guarantee facilities for OPRB actors; A3: Provision of vital emergency rescue equipment; A4: Provision of easy access to information and communication technology for OPRB volunteers; A5: Provision of training, ease of licensing and procurement of goods and services Fig. 4 illustrates how the supply of information facilities, promotions, and market assurances for OPRB volunteers, which have a weight value of 0.292, are prioritized in terms of government policy criteria. The provision of essential emergency rescue equipment, with a weight value of 0.221, is the next highest priority option. At the same time, the provision of training, ease of licensing, and procurement of products and services, with a weight value of 0.127, are the alternatives that receive the lowest priority in government policy criteria. An inconsistency ratio of 0.02 0.1 is calculated using the expert choice 11 programs to calculate the Analytical Hierarchy Process (AHP), indicating that the important people's responses are consistent.

Results of AHP Analysis Calculations on Human Resources Criteria.
The following conclusions are drawn from calculations made using the analytical hierarchy approach and the expert choice 11 program's criteria for human resource development:

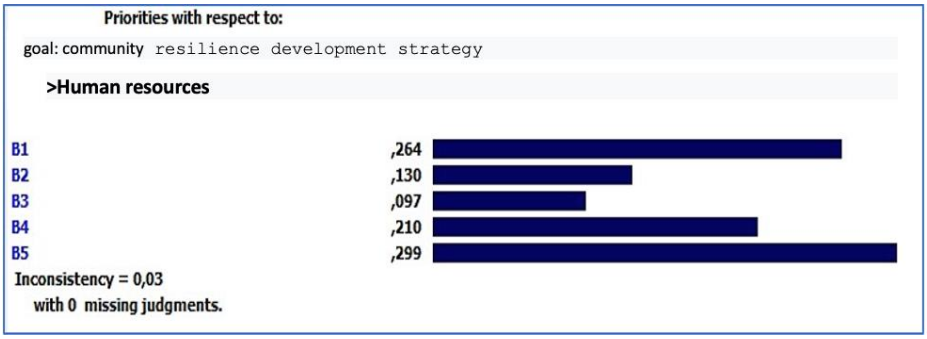


Fig. 5. AHP Output Human Resources Criteria.

Source: Primary data processed, 2022

Information: B1: Giving motivation to OPRB volunteers to improve their abilities and skills in carrying out their social duties; B2: Improvement of managerial capabilities and management of work programs; B3: Continuous coaching and training for OPRB volunteers in creating innovation; B4: Increasing the capacity of OPRB Volunteers in utilizing rescue tools based on renewable technology; B5: Promotion and marketing training using information and communication technology.

On the basis of Fig. 5, it is apparent that the human resource criteria gave promotion and marketing training a priority by leveraging ICT with a weight value of 0.299. Giving OPRB volunteers encouragement to develop their capacities and skills in carrying out their social tasks comes in as the second most important alternative, with a weight

value of 0.264. Continuous coaching and training for OPRB volunteers in innovation creation is the choice that has the lowest weight in the human resource criteria, with a weight value of 0.097. An inconsistency ratio of 0.03 0.1 is calculated using the expert choice 11 programs to calculate the Analytical Hierarchy Process (AHP), indicating that the important people's responses are consistent.

Results of AHP Analysis Calculations on Institutional Criteria.
The following conclusions are drawn from calculations made using the expert choice 11 software and institutional criteria from the analytical hierarchy process: Fig. 6. Output AHP Institutional Criteria.

Fig. 6. Output AHP Institutional Criteria

Source: Primary data processed, 2022

Information: C1: Increasing the capacity and quality of special institutions for OPRB volunteers; C2: Formation of an organization/association forum to establish cooperation between OPRB volunteers; C3: Management training and organization of OPRB volunteers; C4: Increasing business partnerships between OPRB volunteers and stakeholders.

According to Fig. 6, institutional requirements are given priority by improving the capability and standard of certain institutions for OPRB volunteers with a weight value of 0.388. Management training and OPRB volunteer organizations come in as the second most important option, with a weight value of 0.267. The establishment of an organization/association forum to foster cooperation between OPRB volunteers, with a weight value of 0.151, is the choice that has the lowest priority in the institutional requirements. An inconsistency ratio of 0.06 0.1 is calculated using the expert choice 11 programs to calculate the Analytical Hierarchy Process (AHP), indicating that the important people's responses are consistent.

Calculation Results of AHP Analysis of All Alternatives in Community Resilience Development Strategies in Magelang Regency.
The following outcomes are obtained using calculations from the analytical hierarchy

method for all different strategies to increase community resilience in Magelang Regency using the expert choice 11 programs:

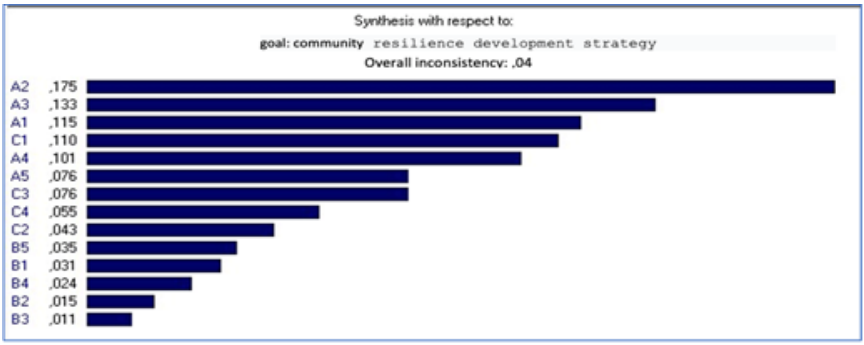


Fig. 7. AHP Output Against All Alternatives

Source: Primary data processed, 2022

Information:A1: Provision of social capital needs with an adequate financing model; A2: Provision of information facilities, promotions and market guarantees for actors; A3: Provision of vital rescue equipment; A4: Provision of easy access to information and communication technology for OPRB volunteers; A5: Provision of training, ease of licensing and procurement of goods and services; B1: Motivating volunteer actors to improve their abilities and skills in running their businesses; B2: Improvement of managerial capabilities and business management; B3: Continuous coaching and training for OPRB volunteers in creating innovation; B4: Increasing the capacity of OPRB volunteers in utilizing rescue equipment based on renewable technology; B5: Promotion and marketing training using information and communication technology; C1: Increasing the capacity and quality of special institutions for OPRB volunteers; C2: Formation of an organization/association forum to establish cooperation between OPRB volunteers; C3: Management training and organization of OPRB volunteers; C4: Increasing business partnerships between OPRB institutions and stakeholders Fig. 7 shows that, with a weight value of 0.175, the provision of information, marketing, and market assurances for OPRB volunteers is the choice that the community resilience building plan prioritizes the highest. The provision of essential rescue equipment, with a weight value of 0.133, is the next highest priority option. The fulfilment of social capital needs with an adequate alternative finance strategy and a weight value of 0.115 is the third priority choice. The final alternative, with a weight value of 0.011, is continued mentoring and training for OPRB volunteers in developing innovations.

Sensitivity Analysis in AHP Modeling.

The possibility of using respondents' opinions as a foundation for AHP decision-making is examined using this sensitivity analysis. Sensitivity analysis may be used to determine which parts or pieces of the hierarchical structure are more susceptible to weight adjustments that result in alternative alterations. By simulating different priority

criteria for the network model, the meaning sensitivity analysis examines the stability of alternate priorities. It is possible to do a sensitivity analysis for both main and supporting criteria. Sensitivity analysis examines whether or not the outcomes will remain constant if the input, such as the evaluation or priority, changes. Additionally, this study will determine if the modification will modify the alternative. The outcomes of the sensitivity analysis were as follows:

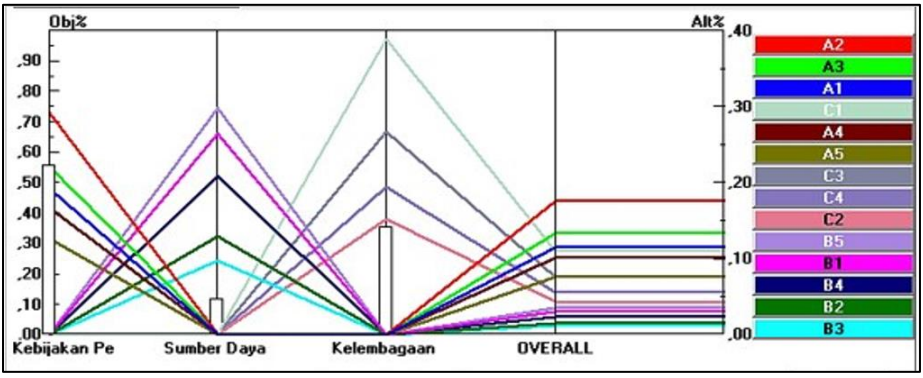


Fig. 8. Sensitivity Analysis Output on AHP Model.

Source: Primary data processed, 2022

Fig. 8. explains why the preceding alternative's priority is the same as the order of priority in the sensitivity test. This demonstrates the stability of the evaluation.

4 Discussion

They are mapping the role of the Disaster Risk Reduction Organization (OPRB)'s role in handling several disaster events from 30 August 2021 to 09 September 2022. The most frequent disaster events were 273 strong winds, 220 landslides, and 54 fires. The intensity of incidents was based on month; the highest was in January with 152 incidents, March with 111 incidents, and April with 56 incidents. Meanwhile, 670 houses were slightly damaged, 37 were damaged, and 13 were seriously damaged. Victims of disaster incidents over the past year were 11 injured, and eight died. A large number of disaster victims can threaten poverty in an area. One of the leading causes of poverty is the occurrence of natural disasters because it increases the vulnerability of the poor, and the poverty rate in general increases so that households will be trapped in a cycle of poverty and destitution. Based on data from the National Agency for Natural Disaster Management (BNPB), Indonesia is at the confluence of four tectonic plates, which causes Indonesia to have a high potential for natural disasters [35]. The Human Development Index is improving in an area, so it can provide high-quality human resources to reduce poverty in that area [36]. The Human Development Index results in increased productivity to increase the population's income; the need also increases. Magelang Regency, a predominantly agrarian society, shows that agriculture as a livelihood for

the population indicates an increased risk of possible poverty compared to residents who work in sectors other than agriculture [37]. The World Bank states that poverty impacts most of the population working in agriculture and has a solid relationship [38].

Collective action and collective identity directly have a substantial impact on the dedication of OPRB volunteers in Magelang Regency, according to the findings of the PLS-SEM research. It has also been common to employ the collective action theory (collective action theory) to describe human behaviour. The perspective of collective action is helpful in explaining a variety of phenomena, including social movements (both in the physical world and cyberspace), membership in interest groups, the functioning of international alliances, the emergence of electronic communities, the development of relationships between organizations, the establishment of standard-setting organizations, and even societal behaviour. Social movements represent people's attempts to maintain their cultural identities and traditions as well as their collective efforts to seek social equality and justice . Within the New Social

The dedication of volunteers from Disaster Risk Reduction Organisations (OPRB) in Magelang Regency is not greatly impacted by collective action through collective identity. Through solidarity performances, collective action has a great impact on the dedication of volunteers from the Disaster Risk Reduction Organisation (OPRB) in Magelang Regency. Volunteers' dedication to Disaster Risk Reduction Organisations (OPRB) in Magelang Regency is greatly influenced by their collective identity through solidarity. Through collective identity, collective action has a tremendous impact on volunteer solidarity for Disaster Risk Reduction Organisations (OPRB) in Magelang Regency.. Collective Actions of Disaster Response Social Movements Disaster response social movements are inseparable from the actions of community groups. Actions carried out jointly and with a common goal. As with research on the pattern of social movement response to disaster, the researcher states that social movement response to disaster is a collective effort for disaster management. Apart from that, in terms of social movements, researchers also emphasized that disaster response social movements will achieve common goals and these movements together through collective action in terms of disaster management (Disaster Response Social Movements (Case Study Patterns of Social Movements in CBAT Groups, MTB and Tanggul Disaster GKJW Di Sitiarjo Village), n. d.).

Government policy is the most important factor to consider while building community resilience through OPRB, according to AHP study. Urban areas' education policy on disaster mitigation. So, when a similar disaster comes again, communities, government and other sectors have to take pre-discipline steps so that panic, chaos and other social disasters after the disaster will no longer occur. Then the second priority criterion is institutional development. In this case, the Disaster Management Forum (FRB) at the village level was formed to educate and socialize disaster hazards to the people trained for disaster preparation in Pasawahan village, namely those related to Mount Merapi disasters, forest fires, floods, landslides and other disease epidemics. The same institution was formed by involving multi sectors from elements of the Village government apparatus and the Regional Disaster Management Agency, which made a Joint Agreement in the form of legality in charge of organizing training for community members consisting of women's groups, PKK, RT/RW, community leaders, youth organizations

and youth organizations. Communities include village officials, RT/RW, PKK cadres, community leaders and youth leaders. Information dissemination is essential in training as an initial approach to providing disaster-related knowledge to the community during village forums, rebuke forums, recitation and other deliberation forums Click or tap here to enter text..

The third priority criterion is the development of human resources starting from the Tangguh Disaster Village/Kelurahan, a village or kelurahan that can recognize threats in its territory and organize community resources to reduce vulnerability and simultaneously increase capacity to reduce disaster risk. This capability is manifested in development planning which includes efforts for prevention, preparedness, disaster risk reduction and capacity building for post-disaster recovery .

In the meantime, the option with the highest priority in the community resilience building strategy is the provision of information, promotion, and assurance facilities for OPRB volunteers. It is necessary to explore the linkages between ecosystems and human communities so that they can overcome vulnerabilities and promote post-disaster resilience. High resilience can support the capacity of socio-ecological systems to deal with disasters to maintain essential structures, processes and positive responses that support community sustainability [18].

Then the second priority alternative is the provision of vital rescue equipment. The equipment assistance strategy is a general plan to manage disaster relief equipment assistance. The strategy for this equipment assistance is the existence of coordination and support of equipment in implementing disaster management. The equipment assistance policy is the priority implementation of the management of disaster management equipment assistance, which includes: a. Assistance with disaster management equipment is provided to regions during a disaster emergency as needed. b. Assistance with disaster management equipment is given to disaster-prone areas as a buffer stock in the preparedness framework. c. Given to regional government/BPBD and agencies/institutions related to disaster management. d. Disaster management equipment assistance must guarantee quantity, quality, target, effectiveness, efficiency and accountability—regulation of the Head of the National Disaster Management Agency Number 05 of 2009.

The limitation of this study is that methodologically this research only reveals the perceptions of disaster volunteers and members of the Disaster Risk Reduction Organization (OPRB). This study also limitedly used questionnaires as the primary data collection tool and observation and documentation as supporting instruments.

5 Conclusion

From the results and discussion that have been provided, the following conclusions may be drawn: 1) Outlining the catastrophe Risk Reduction Organization's (OPRB) responsibility in managing various catastrophe incidents from August 30, 2021, to September 09, 2022. The most common disaster event was wind, which occurred in 273 cases of severe winds, 220 landslip incidents, and 54 fire incidents. The highest monthly incident intensity was recorded in January (152 events), followed by March (111 incidents) and April (56 incidents). In the meantime, there were 13 significantly damaged houses,

37 damaged dwellings, and 670 slightly damaged buildings. Over the past year, eight people have perished and eleven people have been injured in catastrophic situations. 2) Collective action and collective identity have a direct impact on the commitment of OPRB volunteers in Magelang Regency, according to the findings of the SEM PLS study. The dedication of volunteers from Disaster Risk Reduction Organisations (OPRB) in Magelang Regency is not greatly impacted by collective action through collective identity. Through solidarity performances, collective action has a great impact on the dedication of volunteers from the Disaster Risk Reduction Organisation (OPRB) in Magelang Regency. Volunteers' dedication to Disaster Risk Reduction Organisations (OPRB) in Magelang Regency is greatly influenced by their collective identity through solidarity. Through collective identity, collective action has a tremendous impact on volunteer solidarity for Disaster Risk Reduction Organisations (OPRB) in Magelang Regency. 3) The AHP analysis indicates that government policy has the highest importance among the OPRB criteria, with a weight value of 0.547. The next priority criterion, institutional development, has a weight value of 0.345. The third priority criterion, human resource development, has a weight value of 0.109. The option with the highest weight in the community resilience-building method is the provision of information, promotion, and assurance facilities for OPRB volunteers, with a weight value of 0.175. The next highest priority option, with a weight value of 0.133, is the availability of necessary rescue equipment.

Policy Advice and Recommendations The suggestions that can be given in this study are as follows: 1) Academics as stakeholders involved in science need to be involved in contributing ideas in developing community resilience through the Disaster Risk Reduction Organization Disaster Cluster (OPRB) in Magelang Regency. One is by providing dedication and applying appropriate technology to support community resilience. 2) The government, as the regulator and facilitator, needs to provide a forum for OPRB volunteers to gather and discuss and exchange ideas. There must be coordinating support facilities for digital platforms and computer devices and easy internet access. The government also needs to train and mentor OPRB volunteers who are still technologically illiterate. There needs to be a business matching that can bring together OPRB volunteers with partners and stakeholders. 3) The community needs to voice and promote solidarity movements and be involved in supporting OPRB volunteers in Magelang Regency so that a community that is resilient to disasters is created. Communities also need to actively participate in contributing creative ideas for developing disaster resilience.

Authors' Contributions. The author significantly influenced the study's idea and design. The author is accountable for the analysis, interpretation, and presentation of the data. The final manuscript was read and approved by the author.

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