



## The Integration of Sister Village Functions in Mount Merapi Disaster Management during the COVID-19 Pandemic

Widati<sup>(a)</sup>, Aulia Widya Sakina<sup>(a)\*</sup>, Anastasia Adiwirahayu<sup>(a)</sup>

<sup>(a)</sup> Sekolah Tinggi Pembangunan Masyarakat Desa "APMD" Yogyakarta

\* Corresponding Author, Address: Jl. Timoho No.317, Baciro, Kec. Gondokusuman, Kota Yogyakarta, Daerah Istimewa Yogyakarta 55225, Email: [aulia.widya.sakina@gmail.com](mailto:aulia.widya.sakina@gmail.com)

### ARTICLE INFO

### ABSTRACT

#### Article History

Submitted 27 August 2021

Revised 18 November 2021

Accepted 22 December 2021

#### Keywords:

Sister Village;  
Disaster  
Management;  
Merapi Eruption;  
COVID-19  
Pandemic; AGIL  
function.

This article examines the integration of the sister village program in the emergency response to the Mount Merapi disaster during the COVID-19 pandemic using the analysis of the AGIL functions-Adaptation (A), Goal attainment (G), Integration (I), and Latency (L). This study uses a descriptive narrative method. Primary and secondary data were collected through interviews, observations, documentation and FGDs in order to support and strengthen the results. The study findings show that according to the functionalism perspective, the condition of Nggargomulyo Village and Tamanaganung Village people which are bound by the MoU sister village still has not shown harmonization. The community involvement of Tamanaganung Village actively in the management of the evacuation is relatively low. Whereas community involvement in the sister village program is the basic principle of achieving the goals of this village fraternity cooperation. This condition resulted in the people of Nggargomulyo Village finding it difficult to adapt to the new refugee situation during the COVID-19 pandemic. This affects the program integration process and the functioning of the system, both internally and externally, because the program has not yet been institutionalized within the community. For this reason, it is necessary to refresh the role and function of the sister village as the main instrument in overseeing the disaster management system in Magelang Regency related to being integrative and sustainable.



## Introduction

Central Java is a province with the potential for a volcanic eruption of Mount Merapi. The Merapi eruption in 2010 was the largest eruption and had a direct impact on the communities around Merapi (Surono et al., 2012). This disaster caused loss of life, damage to nature and the environment as well as loss of assets that affected people's livelihoods (Arouri, Nguyen, & Youssef, 2015; Cho, Won, & Kim, 2016). The impact of the 2010 eruption spread across three regencies, namely Magelang, Klaten, and Boyolali. At that time, the evacuation process did not accommodate the community's needs (Jumiati & Yanuardi, 2017). This was due to the inadequate number of shelters, insufficient transportation facilities, lack of coordination between parties, and the unmapped villages included in the danger zone so that people did not understand safe evacuation routes. (BPBD Magelang, 2017; Mei et al., 2013; Rusmayanti & Fajarwati, 2016).

Learning from the past, the Magelang Regency Government, as a district with 18 Disaster Prone Areas/*Kawasan Rawan Bencana* (KRB) III villages, built a disaster management system expected to be able to reduce disaster risks and impacts (Elysia & Wihadanto, 2018) by involving stakeholders in all aspects of life and livelihood (UNDP, 2014). Based on Law no. 24 of 2007 concerning Disaster Management and the Regulation of the Regent of Magelang No. 17 of 2011 concerning the Functions of the Regional Disaster Management Agency (BPBD), a new model for handling the Merapi disaster was formulated through the sister village program or *Paseduluran Deso* (Sister Village) (Kharis, Dwinanto, Putri, & Widana Kerta, 2019).

The implementation of a sister village as an alternative to handling the emergency response situation for the Mount Merapi disaster in 2020 was held in Tamanagung Village, Muntilan District, which received refugees from its sister village, namely Ngargomulyo

Village, Dukun District. Ngargomulyo, identified as KRB III village, was given socialization and disaster mitigation training from BPBD Magelang Regency through the Village Head. When Mount Merapi erupted, the community could evacuate safely and comfortably to Tamanagung Village as a buffer village. The practice of implementing the sister village program between Ngargomulyo Village and Tamanagung Village has become a pilot project for sister village policies in Magelang Regency (Elysia & Wihadanto, 2018; UNDP, 2013). The program is a solution and anticipation for villages in the Mount Merapi KRB to be “safe from Merapi”. There are currently 19 sister village model collaborations that are disaster management models based on community local wisdom. The following is presented data on villages that have collaborated in sister villages.

No.	Sub-district	Village in Disaster Area	Buffer Village
1.	Sawangan	Wonolelo	Banyuroto (Sawangan) Pogalan (Pakis)
		Kapuhan	Mangunsari (Sawangan)
		Ketep	Podosuko, Wulunggunung (Sawangan)
			Ketudan (Pakis)
2.	Dukun	Sengi	Butuh, Tirtosari, Jati (Sawangan) Treko and Senden (Mungkid)
		Sewukan	Ambartawang (Mungkid) and Rambeanak (Mungkid)
		Paten	Gondang, Bumirejo and Paremono (Mungkid)
			Banyurojo and Mertoyudan (Mertoyudan)

No.	Sub-district	Village in Disaster Area	Buffer Village
2.	Dukun	Krinjing	Deyangan (Mertoyudan)
		Kalibening	Adikarto and Tanjung (Muntilan)
		Sumber	Pucungrejo (Muntilan)
		Ngargomulyo	Tamanagung (Muntilan)
		Keningar	Ngrajek (Mungkid)
3.	Srumbung	Kaliurang	Jamuskauman, Pakunden, and Blingo (Ngluwar)
		Kemiren	Salam (Salam)
		Ngablak	Kradenan, Kadiluwih, Somoketro, and Tirto (Salam)
		Nglumut	Sucen (Salam)
		Tegalrandu	Bringin, Pabelan (Mungkid) and Wanurejo (Borobudur)
		Mranggen	Gunungpring and Sokorini (Muntilan)
		Ngargosoko	Gulon (Salam)
		Srumbung	Baturono and Tersangede (Salam)

TABLE I. Sister Village Cooperation in Magelang Regency. *Source:* BPBD Kabupaten Magelang (2017).

The sister village model aims to unite two or more villages in a symbiotic mutualism in a planned disaster management system to reduce the risks and impacts of disasters that occur in villages in KRB III Mount Merapi. This program is supported by the buffer village as a safe village and has adequate evacuation facilities (Avianti, 2015). Currently, the emergency response situation for Mount Merapi is faced with the Covid-19 Pandemic, so this

condition determines to unfocus management disaster process among the stakeholders. On the one hand, the concentration of stakeholders in the sister village program is still focused on KRB III villages, while the preparation of buffer villages in receiving and managing refugee shelters is still 'perfunctory'. On the other hand, during the Covid-19 Pandemic, the evacuation process forced the government and the community to work hard rearranging the "design" of the sister village evacuation to comply with health protocols focused on emergency services (Gunawan, 2014). If this still occurs in the Merapi emergency response situation during the Covid-19 Pandemic, it is feared to cause increasing cases. Moreover, supporting facilities for environmental sanitation, especially toilets, and the need for clean water in refugee camps is still limited.

Community safety in disaster situations is not only determined and influenced by government policies but also community preparedness in dealing with disasters (Matsuda & Okada, 2006). Such conditions require the community to adapt to the new refugee situation by implementing strict health protocols, integrating the system collaboratively to minimize conflicts between refugees and residents also be able to maintain the values believed in the sister village program when implemented during two disasters, the natural disaster of Mount Merapi and the non-natural disaster, the Covid-19 Pandemic. The goal is that the people at the Merapi KRB are "safe from Merapi, and safe from Covid-19".

A study on the implementation of sister villages during the emergency response of Mount Merapi has never been carried out because it is a new program and was designed after the Mount Merapi eruption in 2010. Existing studies are still limited to discussing the design and program plans realized in a contingency plan not touching the practical realm in response to its Mount Merapi disaster. For example, the empirical study by Kristofolus

et al. explained the importance of the sister village program as a new model in the management of the Merapi disaster, from previous to post-disaster (Kristifolus, Setiyono, & Purwoko, 2017). The sister village is a bridge for the community in KRB III with the buffer village to cooperate and participate in the Merapi disaster management policy. Another research shows the sister village is considered an appropriate disaster mitigation model to be carried out in Magelang Regency, although further studies still need to be carried out in the implementation process (Hutagalung & Indrajat, 2020). The emphasis on the sister village function in developing a community-based Mount Merapi disaster contingency plan is essential to study. This study focus is very actual because it examines the integration of the sister village function between Ngargomulyo Village as KRB III Village and Tamanagung Village as a support village during the COVID-19 pandemic, using AGIL function analysis (Adaptation, Goal attainment, Integration, and Latency). Also, this research shows at two levels, theoretical and practical. First, it benefits to enrich the discourse on community-based disaster management systems, which are still limited, both natural and non-natural disasters. Practically, it can be used as a basis for formulating a sustainable sister village model so that it becomes a resolution to overcome social problems that occur in the community (Wardani, 2016).

### **Integration of Sister Village Functions based on Community Conceptualization**

The sister village program is a new model in mitigating the eruption of Mount Merapi that integrates disaster risk reduction (Heckman, Pinto, & Savelyev, 2020) and views planning as a process embodied in a contingency plan (Sakina, Gembong Rahmadi, & Widati, 2021; UNDP, 2014). This program was initiated post-

eruption of Mount Merapi in 2011 and was implemented when Merapi's status increased to Siaga III at the end of 2020. This concept has implemented an agreement (MoU) between KRB III villages and buffer villages (BPBD Kabupaten Magelang, 2017).

The government and the community at KRB Mount Kelud and Mount Agung have adopted the sister village program from KRB Mount Merapi. The existence of a sister village in KRB Gunung Kelud, Kediri Regency, is supported by the community and local leaders who still firmly hold on to customs, values, and traditions so that the sister village can become a model for disaster management with socio-cultural roots based on local capacity in Indonesia (Windiani, Wirawan, & Sutinah, 2018). It is in line with the existence of sister villages in the province of Bali, and it is supported by the high social solidarity of people at the buffer villages in helping the villagers of KRB Gunung Agung. The implementation of Sister village in Bali is combined with the local wisdom of "*Nguopin*", or the application of mutual cooperation with a sincere heart without receiving anything in return (Kharis et al., 2019).

Therefore, in the implementation of sister villages, the Village Information System (SID) understanding is needed to integrate and support the functioning of the sister village program so that the community knows (Sari, Priyo, Oktradiksa, & Setiawan, 2018). Both are related to eruption dynamics, early warning information, updating population data information, and information on village assets and public services (Alawiyah & Susiana, 2019).

The buffer village needs to have this system in carrying out its role as a formidable buffer from the villages in KRB III Mount Merapi (Rusmayanti & Fajarwati, 2016), so that the buffer village is expected to have proper standard operating procedures (SOP), including procedure, guidelines, and to build good relations

between refugees. These studies are the basis for conducting a study on the function of the sister village during the emergency response of Mount Merapi, which is expected to open collaborative relationships between the *paseduluran* village community and various policy actors. Especially at the level of practical policy, the approach to the program is still designed by prioritizing the top-down principle (Maarif, Pramono, Kinseng, & Sunarti, 2012).

If the sister village program functions optimally, it is expected to provide benefits in many ways, both in the form of social security to reduce disaster risk and as an effort to unite KRB villages with buffer villages located in safe areas under the disaster management (BPBD Kabupaten Magelang, 2017; Hadi, 2020). In addition, the sister village as a system is also expected to play a very strategic role in building networks with various parties outside the community (Idham Arsyad, 2015; Soetomo, 2012) so that its existence can become a social system that is functional and able to adapt to emergencies and critical condition. If the sister village is not functional, then later, the planned programs for the last ten years will not exist and be sustainable (Karman, 2015).

Therefore, the entire Mount Merapi disaster management system can run as expected, and it is necessary to refresh the sister village function to become a social buffer in a community-based disaster management system. It aims to raise awareness to be bound in a system where one community can protect other communities from vulnerability changes (Heckman et al., 2020). The integration of the sister village function should be considered based on the conceptualization of the local community by maintaining the four functions of the Parsonian sub-system, namely: Adaptation, Goal attainment, Integration, and Latency (AGIL) (Karman, 2015; Sakina et al., 2021; Sunarti, Johan, & Haryati, 2010), as seen in the following figure:



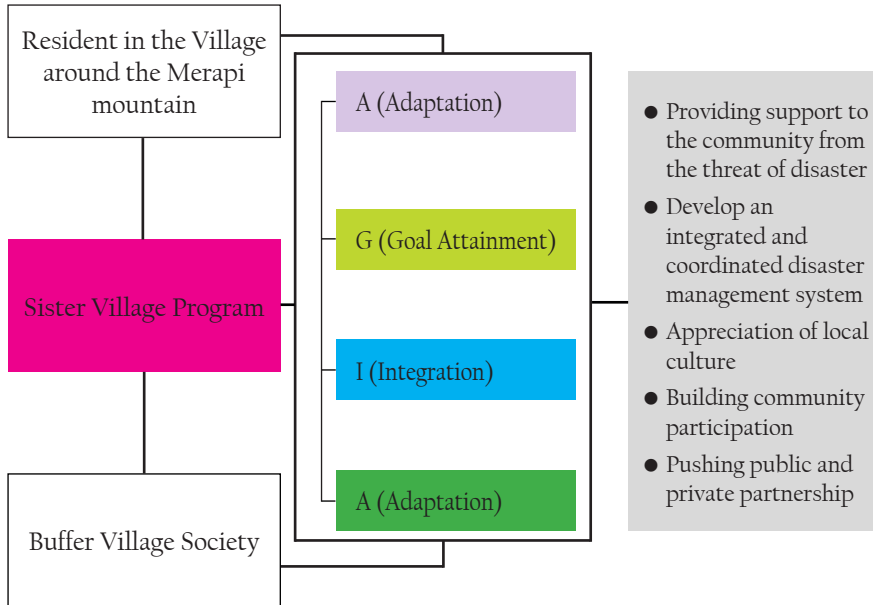


FIGURE 1. AGIL Function Analysis Framework in the Sister Village Program

The integration of the sister village function is carried out in order to protect the community from the threat of the eruption of Mount Merapi; ensure the implementation of targeted, integrated, and coordinated disaster management; respect local wisdom in the community locality (Hutagalung & Indrajat, 2020); increase community participation; and encourage public and private partnerships (BPBD Kabupaten Magelang, 2017; Jumiati & Yanuardi, 2017). The sister village institution is also expected to become an intermediary institution that always fights for actions and mediate relations between stakeholders (Mei et al., 2013). If these functions are not adequately maintained, then the social changes that occur due to the non-functioning of the sister village can affect the objectives of the disaster risk reduction system. As a result, people become vulnerable because they experience social disorders.

## Method

The approach used in this study is descriptive qualitative, which aims to find the truth holistically (Larasati & Sunartiningsih, 2020; Moleong, 2017) concerning the phenomena experienced by the subject matter, such as perceptions, motivations and actions of informants using scientific methods and systematic (Hardani & et al., 2020; Sugiyono, 2010). Primary and secondary data were analyzed using the data interactive analysis technique, according to Miles and Heberman (Harahap, 2020). The data validity test was carried out using a data triangulation technique by re-checking the results of interview data analysis, observation, documentation, and FGD to support and strengthen each other (Subandi, 2011; Yin, 2014).

## Results and Discussion

### AGIL Analysis concerning Integration of Sister Village Functions

The existence of sister villages in the community is a new social system that is expected to be part of the process of cultural reproduction because there are knowledge, values, norms, and behaviours that explain a pattern of interaction between actors and their environment, both during pre-disaster situations, during disaster and post-disaster. Sister village is expected to balance individuals in KRB III Gunung Merapi villages with different situations, conditions, and social positions in a social bond full of harmony with other individuals from the village who are their siblings.

Brother village communities whose interaction patterns are not integrated to maintain social order in the refugee camps, then the quality of disaster management carried out will not be following the objectives of the sister village. Several dimensions of disaster management are influenced by the sister village concept to solve

various collective problems during a disaster emergency response situation, positive social changes, collective awareness in handling the disasters, and improving the quality of life of the community post-disaster.

The AGIL analysis, which is related to strengthening the sister village function, was conducted to identify the institutions, values and mechanisms that underlie interactions between *paseduluran deso* and contribute to community-based disaster risk reduction efforts. The following describes the ongoing process of the sister village as a disaster risk reduction system in the community system, which is explained using the AGIL scheme.

#### **Adaptation Actions: Conformity Efforts in Caring for *Paseduluran Deso***

Tamanagung people already know about the existence of the sister village program, but it turns out that they do not fully understand its implementation. So, even though the Tamanagung Disaster Management Agency/*Lembaga Penanggulangan Bencana Tamanagung* (LPBT) has been formed, in reality, not all residents are aware of the existence of this institution. The public's ignorance about this institution is that most LPBT members are local village officials, so the purpose of establishing LPBT as a disaster management institution expected to facilitate coordination and cooperation in the sister village program is actually being degraded to the dominance of interests.

This causes the community to have not responded and not adapted well to refugees who come to their village due to the lack of openness of the Tamanagung Village Apparatus and LPBT members regarding the situation and conditions related to the sister village program. This causes the harmonious and brotherly relationship expected from this concept to be still far from the program's initial

goal, which is to build active participation from the community involved in the sister village program. However, in the future, the people of Tamanagung Village still hope that the existence of the LPBT can really be a bridge for the community so that they can adapt well when refugees come and the programs implemented are not only “ridden” by the interests of certain groups who have close relations with local government officials. LPBT is also expected to be more open in informing about the sister village program to all levels of society. It is expected to create harmonization and foster social awareness of the people of Tamanagung Village towards their brothers from Ngargomulyo Village.

Meanwhile, the adaptation pattern at the Ngargomulyo Village is carried out by comprehensively learning about the sister village concept as a disaster risk reduction system for Mount Merapi, participating in training and learning about the disaster evacuation process, logistics management and shared kitchens, character building, and collective skills, medical skills, then also carried out disaster simulations to hold a village expo in order to build chemistry and friendship.

The community of Ngargomulyo Village is also fostered to understand the physical and social environmental conditions of their sister village, realizing the social bond among the buffer village community, the accompanying rules when entering the sister village refugee environment, including compliance with the COVID-19 health protocol from the beginning of entering the shelter to the residential process, and forming a peer group to carry out joint activities by implementing strict health protocols. The activities carried out collectively by the residents of Ngargomulyo Village at the refugee post were holding health socialization and joint exercise.

The adaptation action taken by the Paseduluran Village community is a strategy in solving the refugee problem to obtain

resources from outside the environment. The more adaptation actions are taken, the higher the ability to integrate the sister village function. In addition, adaptation action is also a positive response needed by the community and its system to reduce stress and pressure caused by gaps inhabits in the new environment, including to maintain institutions, maintain integrity, improve social relations, and control the strong influence stressfully to achieve a balance in society Mount Merapi disaster mitigation and adaptation system.

### Achieving Common Goals: Representation of the Action Collaboration System

Every community has goals and plans to be achieved, with a prerequisite for the existence of resources in the form of energy, materials, and information. For residents connected to the sister village program to achieve common goals, there must be active participation and involvement of community members. In this case, the function of achieving goals is a representation of a collaborative action system in determining goals, providing motivation, and mobilizing various efforts in the achievement system.

When viewed from the quality and performance of the goals to be achieved by the people of Ngargomulyo Village and Tamanagung Village, it will affect decision making. Based on quality, goals achievement is measured by the value obtained, including appreciation, pride, and satisfaction. Based on *performance*, it can be measured from the actions taken.

Based on the presentation of Mr. Yatin, one of the initiators of the sister village program who is also the former Head of Ngargomulyo Village, the goal achieved by the people of Ngargomulyo Village when they decided to realize the sister village program as a preventive effort in the process of reducing the risk of Mount Merapi disaster. Therefore, when Mount Merapi erupted, people could feel safe and comfortable

both in the evacuation process and during their stay in refugee camps. The existence of the sister village program is expected to change the paradigm of disaster management from emergency response to being more preventive by emphasizing disaster risk reduction. It is because, in 2010, the management condition for handling refugees from the eruption of Mount Merapi was still low, which was indicated by the following: (1) There was panic because of the chaotic evacuation of residents; (2) The location of the residents' destination for evacuating is unclear; (3) Uneven distribution of basic needs and logistics for refugees, even hoarding of aid; (4) Feel uncomfortable in inadequate refugee camps; (5) Various disaster risks arise due to uncoordinated handling of refugees, such as traffic accidents during the evacuation process, disease due to unsanitary evacuation conditions, etc.

These conditions provide many experiences and valuable lessons for the parties involved. One of the valuable lessons is the many experiences of uncomfortable refugees while in refugee camps. The same experience is also felt by the officers who manage the refugee camps, even the government. This unpreparedness for handling the Mount Merapi disaster in 2010 led to the initiation of the Ngargomulyo Village together with the BPBD of Magelang Regency to formulate a sister village program aimed at handling refugees by facilitating villages in KRB III with buffer villages that are safe from the risk of Merapi eruption as refugee locations. So that when Mount Merapi erupted, the people of KRB III, in this case, the Ngargomulyo people, already had a permanent place to evacuate, namely in Tamanagung Village, which is their sister village.

The concept of handling refugees based on *Paseduluran Deso* is hoped to foster mutual cooperation and brotherhood between the two villages signed the MoU. However, in implementing the sister village in 2020, mutual cooperation has begun certain implemented because, in the *Siaga* (Standby) III situation of Mount Merapi, not

all residents of Ngargomulyo Village are required to evacuate. Only residents from three hamlets were required to evacuate, namely residents from Ngandong, Gemer, and Karanganyar villages.

Not all of the residents of Tamanagung were involved in the evacuation management because the majority of the people involved in the Tamanagung Disaster Management Agency (LPBT) were local officials or village officials. When implementing the sister village in 2020, the community did not fully respond appropriately due to the lack of openness of the village apparatus regarding the situations and conditions related to this program, especially the emergency response situation in Merapi with the COVID-19 pandemic condition, which significantly reduced the involvement and Temanggung citizens participation in managing the evacuation directly.

Although it is not perfect and cannot continue into other collaborative programs outside of disaster management, the sister village program's existence is considered to bridge the KRB III residents who fled in the buffer village to feel 'safe and comfortable.' Apart from being able to evacuate at their own relative's house, the evacuation process can also run in an orderly, safe, and not chaotic manner because the refugees already have a clear purpose for evacuating.

The sister village program is considered successful in handling refugees from the Mount Merapi disaster, experienced many positive changes, and became a leading public service program in Magelang Regency. It is because its implementation program, initiated in 2011, is considered to be able to provide a sense of security to make refugees feel comfortable compared to the 2010 refugee camps, even the goals achieved by the refugee community are generally short-term or only to be safe from the threat of Mount Merapi eruptions. Meanwhile, for the long-term goals, namely to reduce disaster risk and prevent the impacts caused, it is still not fully absorbed by the entire community,

so the community's commitment to the goals to be achieved is still very lacking.

### Integration: Building Social Bridging, Bonding, and Linking in *Paseduluran Deso*

The integration action is essential for the community's survival because it involves all AGIL variables. The four AGIL variables have a cohesiveness to build each other up so that all community members can maintain the functioning of the existing system in their environment. Like the community system in *paseduluran deso*, which has its own characteristics or uniqueness because it consists of interrelated components, causing the emergence of new characteristics resulting from integration actions in the community in strengthening relations between sister villages.

The integration action carried out by the Tamanagung people with Ngargomulyo in the sister village program seems still limited to pleasantries. Although every community member is talented enough to foster intensive interpersonal relationships, these relationships are often in low preference in some aspects of social life. Apart from social restrictions and community activities during the COVID-19 pandemic, the community's understanding of the sister village program has decreased. During the program's implementation, the village head who supervised both in Tamanagung and Ngargomulyo was a new village head who still did not fully understand the program, idealistic and still used the old paradigm to face the threat of Mount Merapi, only from the Regional Government in handling the responsibility refugees, not by the Village Government even less the community.

The unintegrated communal and private approach can provide alternative solutions to paradigmatic and technical problems in the field. It has led to a capitalistic paradigm that succeeded in breaking



down social bonds in a society formed for so long. The people of Tamanagung Village began to lose their way because they did not believe that their social solidarity could be the basis for sustainably implementing the sister village program.

The understanding of the people of Tamanagung Village about the sister village program is relatively low. They are not directly involved in the sister village program and may think this has no impact on their families. Even some of the people of Tamanagung Village have expressed objections to village officials because the presence of refugees has created new problems in their environment. The unpreparedness of Tamanagung Village as a buffer village can gradually lead to conflict if the integration of the system is not created.

In contrast to the people of Ngargomulyo Village, which tend to be homogeneous and have a relatively high level of trust, can be seen from the sense of belonging, mutual exchange of kindness, and social cohesiveness among its citizens. The attitude of mutual trust in the Ngargomulyo community includes honesty, tolerance, and generosity. The mutual trust allows them to easily establish collective relationships with other village communities, in this case, the people of Tamanagung Village, thereby contributing to the improvement of the functioning of the sister village program.

On a government scale, it can be seen how difficult it is for the government at the top level to share difficulties with the community due to the absence of social bonding. The existing policies are only from the success of the sister village program on the surface, without seeing how the process and the number of problems when implemented directly. It causes residents at the grassroots level to only bear the impact of their decisions, often blamed when the program is deemed to have failed. It makes the community “lazy” when faced with a complicated and fragmented government bureaucracy, which affects the integration of the brother village community in the

implementation of the sister village program.

There are several reasons why there is no system integration in the sister village program. Because there is no degree of inspiration, the internalized social system in the village community is involved, as concerning certain degrees, such as differences in leadership approach due to changes in village heads and leadership structures at BPBD Magelang district. However, social management is not bottom-up because policies that should be carried out in an inclusive and community-based manner are still top-down.

The gap between the community of the sister village also shows the possible difficulty of integrating relations and indicates that the new leadership power in the two villages and the government has not been able to enter all levels of society. Therefore, it is difficult to expect the leadership of the new village heads to combine and balance the community's strengths to be in line in carrying out the sister village function.

If this continues and a solution is not found immediately, it is feared that it could undermine the social bond between Tamanagung and Ngargomulyo that existed for the last nine years. Thus, although social bonding, bridging, and linking are always practiced in people's daily lives, if the actors' empathy, partisanship, intentions, and awareness are at their lowest, the existence of sister villages as community-based disaster risk reduction programs will not be sustainable.

In order to prevent this from dragging on, the conservative group from the Ngargomulyo community, which is ready to implement the sister village program, has taken the initiative to establish knowledge, values, norms, and behavior in living together between the village community and the Tamanagung Village community, which refers to the behavior setting evacuation. The decision is directed at ensuring that *paseduluran deso* community can jointly carry out their collective

interests without losing their human rights as social beings. Of course, by making various adjustments so that the refugees from their villages feel safe and comfortable being “at their relative’s house”. It will be realized quickly if the social bridging building that connects the two sister villages can stand strong, not only during the disaster emergency response period, but this collaboration can also take place in other areas of life before and after the disaster.

### Maintenance of Patterns: Functions of Social Community Control in *Paseduluran Deso*

System maintenance refers to the harmonization of the duties and functions of society as a social system. This task is related to achieving goals, integration, and maintenance patterns. The community carries out the maintenance action as a motivation or encouragement to generate enthusiasm in implementing various collective activities. Maintenance action is determined by community awareness and involvement in joint activities.

Collective maintenance actions that focus on the spirit of altruism in the Ngargomulyo community tend to be high. The community’s representation of the sister village concept tends to be positive because they view this program as a directed and organized solution when they have to evacuate. The residents considered that Tamanagung Village, used as a sister village, had been adequately prepared to accommodate them to feel comfortable in the refugee camps.

Most Ngargomulyo people assess the many benefits felt after the sister village program implemented in 2020. However, the collective maintenance action formed between the refugees from Ngargomulyo Village and the residents of Tamanagung Village has not been fully maintained because several social problems have not been solved independently by the refugee and buffer village communities. From

the beginning, some refugees stated that they did not want to be evacuated tend to find it challenging to build themselves and groups in a new physical and social environment. It is because they still have relatively closed attitudes, knowledge, and value orientations to open themselves up to other communities so that they tend to cause conflict when they are in refugee camps.

A strong maintenance function only has positive value for the villagers themselves. Thus, although many system maintenance actions have been carried out in each village, their attitudes and value orientations with the community are still relatively closed. The relationship between community members in the two villages tends to stop at the level of pleasantries. The absence of criticism or sanctions extends this if community members do not carry out the maintenance function, although sometimes there are appeals against it.

The pattern maintenance actions taken by the village can be interpreted, but this action has not yet impacted a broad positive impact when they are in the refugee camps. Therefore, it is necessary to divide the roles in the sister village community to help the maintenance function run optimally because the more maintenance actions carried out by the two communities, the better the relationship between community members.

In order for the function of the sister village in the community to be optimal, some requirement needs to increase the function by clarifying the structure division. Without a clear division of tasks and responsibilities, society's function will be disrupted and affect the more extensive system. The occurrence of dysfunction in the community will significantly impact the balance of the sister village and the harmony of the community. Based on this, the realization of pattern maintenance actions in the sister village program is the emergence of various inputs from disaster management institutions

that provide a pattern for making changes regularly and making adjustments on an ongoing basis in the Merapi emergency response situation.

The following are some inputs expressed by the community through the Disaster Risk Reduction Organization/*Organisasi Pengurangan Risiko Bencana* (OPRB) of Ngargomulyo Village and the Tamanagung Disaster Management Agency (LPBT) of Tamanagung Village in order to maintain the sustainability of the sister village program. First, for refugees: (1) refugees must maintain order, cleanliness, and good relations with the local community; (2) Refugees and community members help each other and improve coordination with the Magelang Regency BPPD; (3) refugees must cooperate with the community members of Tamanagung Village in managing refugee posts. Second, for residents and apparatus of Tamanagung Village: (1) it is necessary to build handwashing with soap and the washing facilities, sanitary conveniences facilities for refugees to no more prolonged need to share with resident people; (2) it is necessary to expand the TPA building and new construction because the capacity of the building is not sufficient to be used as a refugee model during the COVID-19 pandemic; (3) to provide refugee barracks facilities, especially with integrated health service facilities; (4) it is necessary to build a shared kitchen so that the hall is not too messy; (5) it is necessary to increase the participation of indigenous villagers to be more concerned with refugees; (6) it is necessary to socialize the program to the people living around the refugee camps in an effort to generate greater empathy and social concern; (7) need repair and maintenance of refugee buildings; (8) it is necessary to prepare facilities and infrastructure for information on the status of volcanoes to residents and information about cases of the COVID-19 pandemic in Tamanagung Village; (9) to provide facilities or places to dry the clothes of refugees; (10) aid must be evenly distributed

and not selective so that the availability of logistics for refugees and resident people must always be considered; and (11) institutional support by the Disaster Risk Reduction Organization (OPRB).

### Lesson Learned *Paseduluran Deso* between Ngargomulyo and Tamanagung Villages

Implementing the sister village provides positive benefits for efforts to reduce the risk of the Mount Merapi disaster. The things obtained from the program are: First, the community members of the KRB III village who had to evacuate when the eruption of Mount Merapi occurred were no longer confused in finding evacuation locations because the directions and objectives were clear. Second, the basic needs and logistics for prospective refugees can be measured and adjusted to the number of residents of the KRB III village. Third, the spirit of volunteers and stakeholders involved in running the disaster management system is more focused because the activities have been carried out since pre-disaster conditions. Fourth, the benefit for the Ngargomulyo Village Government is that the wheels of government can still run in the buffer village.

The obstacles in implementing the sister village are: First, infrastructure issues such as the lack of toilet facilities provided by the Tamanagung Village for refugees. The Washing Facilities, Sanitary Conveniences (Shared)/MCK facilities provided by the buffer villages are only limited to MCK facilities at the evacuation post. If all Ngargomulyo Village residents are required to evacuate, the availability of its facilities is not sufficient. Second, the provision of clean water needs has not been able to reach all the needs of refugees, especially when refugees are faced with the situation and conditions of the COVID-19 pandemic. In the COVID-19 pandemic situation, the need for clean water is not only for MCK and shared kitchens but also to support the implementation of the COVID-19

health protocol (washing hands with soap) to prevent the spread of the virus. The third obstacle is that the livestock holding capacity of Tamanagung Village can only accommodate 1,400 head of livestock, so the residents of Ngargomulyo Village still need a livestock shelter because the number of livestock owned exceeds the number of residents in the village.

Fourth, the constraints of human resources (HR). HR from the BPBD of Magelang Regency, who handled the sister village program from the beginning, had to undergo a transfer to BAPPEDA. Then the Ngargomulyo Village Head and Tamanagung Village Head also changed leadership. At the same time, the Ngargomulyo Village Secretary was transferred to the Dukun Subdistrict, and the Tamanagung Village Secretary, who also oversaw the program for the last nine years, must undergo a retirement period before implementing the program during the 2020 Merapi emergency response period. Meanwhile, the successors do not have mastery of the sister village concept and do not have totality in implementing the program. Fifth, it was extended by the friction between the residents of Ngargomulyo Village and the residents of Tamanagung Village. The refugees feel like consumers who always ask for attention, basic needs, logistics, and comfortable refuge. Meanwhile, the residents of the buffer village feel that they are operators who want the refugees to comply with the regulations and participate in the activities they organize in the refugee camps.

Not yet optimal, the sister village implementation is mainly due to the shock experienced by refugees, the inclusion and exclusion process, and inconsistency and indecision in implementing policies when carrying out procedures, giving rise to a motive for misuse of the program for personal or group gain. Another problem lies in the internal side of the community, which tends to be skeptical of the existence of people from outside the group, so there needs to

be an internal repositioning carried out to provide knowledge and reorganize the institutions involved in the sister village program. Moreover, this situation is also faced with the disaster of the COVID-19 pandemic.

Integrating sister village functions involving two sister villages will be easily achieved if cooperation is developed between sister village institutions. The communities of the two villages must be included as development agencies and the government as policy managers. However, the participation of the sister village community to perpetuate the existence of a community-based disaster risk reduction system with a well-maintained measure of its role and function is the main criterion in realizing the success of the sister village. The more active and participatory community members in the sister village program will further increase social cohesiveness between residents. Furthermore, it can also encourage the existence of disaster-resilient programs and the fulfilment of well-being conditions that can consistently improve community compliance to maintain the sustainability and functioning of *paseduluran deso*.

## Conclusion

According to the functionalism perspective, the condition of the community in two villages, namely Nggargomulyo Village and Tamanagung Village, which the *Paseduluran Deso* MoU binds, still has not been shown harmonization so that the sister village has not functioned optimally. The active involvement of the Tamanagung Village community in the management of the evacuation is still not visible. At the same time, community involvement in the sister village program is a basic principle in achieving the goals of this village fraternity cooperation. This condition resulted in the people of Ngargomulyo Village still finding it challenging to adapt to the new refugee situation and current conditions. It affects integrating the



program system, both internally and externally, because its existence has not been institutionalized entirely in the community.

The government is also still in complete control (top-down) of the planning, formulation, and implementation processes. Meanwhile, the community is only a spectator, actor, or even in some cases, only an “object of exploitation.” The government’s domination is seen in the formulation process, while there are still deviations to the community in the implementation process. In a community-based disaster management system, patterned institutions from local communities should be needed to encourage various social actions. In this case, the government should pay more attention to local wisdom, moral values, and the citizen network system in social, economic, and political institutions. It also begins to eliminate domination over society in every process.

The importance of a “mutualistic symbiotic relationship” between institutional patterns created by the government and actions taken by the community shows that society is in a voluntary (free) position so that ideas and normative orientations held collectively become meaningful when they can be accepted and recognized. Following this notion, the social structure in the community is expected to meet the need for programs that can reconstruct community-based disaster risk reduction efforts. It is hoped that the developed program can become the embodiment of action to increase institutional capacity and performance, develop community groups’ independence and productivity, and build public awareness to increase self-reliance and participation.

As a supplement to improving the sustainability and functioning of the sister village, it is necessary to refresh the role and function of the sister village as the main instrument in overseeing the disaster management system in Magelang Regency so that it runs more productively. Fundamental changes were made to improve the role

and function of sister villages; *First*, strengthening the orientation of the vision and mission. It is necessary to emphasize the main working principles of Paseduluran Village, both internally and externally, through the social mapping process. *Second*, capacity building to build, develop, and utilize the human resources of buffer villages through an empowerment process to transform all buffer villages into resilient buffer villages.

*Third*, increasing the community's ability to cooperate and collaborate actively with different stakeholders. *Fourth*, increase knowledge and ability to record and evaluate experiences communicated, utilized, and adapted by sister village "actors" in other areas. *Fifth*, increase the accountability and responsibility of stakeholders involved in the program in order to translate their respective roles and functions. If this condition can be realized, it is hoped that the sister village program can genuinely become a sustainable community-based disaster management policy.

## Acknowledgment

This research is under *Hibah Penelitian Institusi/Research Grant STPMD "APMD" Yogyakarta 2021*. We would like to thank P3M STPMD "APMD" Yogyakarta for facilitating the entire research process to be published. Also, this research really appreciates the implementers of the sister village program in Magelang Regency, namely BPBD Magelang Regency, Ngargomulyo Village, and Tamanagung Village. They have initiated the sister village program in Magelang Regency so that other disaster-prone areas can adopt it.

## Author's declaration

### Authors' contributions and responsibilities

The authors made substantial contributions to the conception and design of the study. The authors took responsibility for data analysis, interpretation

and discussion of results. The authors read and approved the final manuscript.

#### Funding

No information.

#### Availability of data and materials

All data are available from the authors.

#### Competing interests

The authors declare no competing interest.

#### Additional information

No information.

## References

- Alawiyah, F., & Susiana, S. (2019). Penanggulangan Bencana dalam Berbagai Perspektif. *Pusat Penelitian Badan Keahlian DPR RI*, 139.
- Arouri, M., Nguyen, C., & Youssef, A. Ben. (2015). Natural Disasters, Household Welfare, and Resilience: Evidence from Rural Vietnam. *World Development*, 70, 59–77. <https://doi.org/10.1016/j.worlddev.2014.12.017>
- BPBD Kabupaten Magelang. (2017). *Rencana Kontingensi Erupsi Gunung Merapi Kabupaten Magelang Tahun 2017 – 2020*.
- Cho, S. E., Won, S., & Kim, S. (2016). Living in harmony with disaster: Exploring volcanic hazard vulnerability in Indonesia. *Sustainability (Switzerland)*, 8(9), 1–13. <https://doi.org/10.3390/su8090848>
- Elysia, V., & Wihadanto, A. (2018). The Sister Village Program: Promoting Community Resilience after Merapi Eruption. *The Indonesian Journal of Planning and Development*, 3(1), 32. <https://doi.org/10.14710/ijpd.3.1.32-43>
- Gunawan. (2014). Kesiapsiagaan Masyarakat Dalam Penanggulangan Bencana: Kasus di Kecamatan Cangkringan Kabupaten Sleman DI Yogyakarta. *INFORMASI*, 19(2), 91–106. <https://doi.org/https://doi.org/10.33007/inf.v19i2.30>
- Hadi, S. (2020). *Sister Villlage Program (Indonesia Merapi Eruption)*. Kementerian PPN/Bappenas.

- Harahap, N. (2020). *Penelitian Kualitatif* (1st ed.; H. Sazali, ed.). Medan: Wal ashri Publishing.
- Hardani, & et.al. (2020). *Buku Metode Penelitian Kualitatif dan Kuantitatif* (1st ed.; A. Husnu, ed.). CV. Pustaka Ilmu.
- Heckman, J. J., Pinto, R., & Savelyev, P. A. (2020). Analysis Resilient Village of Merapi Volcano Eruption in Pusung Village, Boyolali Subdistrict, Boyolali District. *Social, Humanities, and Education Studies (SHEs): Conference Series 3 (1)* (2020) 292 – 298, 3, 292–298.
- Hutagalung, S. S., & Indrajat, H. (2020). Adoption of local wisdom in disaster management in Indonesia. *International Journal of Scientific and Technology Research*, 9(3), 48–52.
- Idham Arsyad. (2015). Membangun Jaringan Sosial dan Kemitraan. *Kementerian Desa, Pembangunan Daerah Tertinggal dan Transmigrasi*, 53(9), 29.
- Jumiati, D., & Yanuardi. (2017). *Sister Village Antara Desa Ngargomulyo Dan Desa Kabupaten Magelang Sister Village Between Ngargomulyo Village and Tamanagung Village to Disaster Mitigation of Mount Merapi in Magelang Residence*. 33–43.
- Karman. (2015). Konstruksi Realitas Sosial Sebagai Gerakan Pemikiran (Sebuah Telaah Teoretis terhadap Konstruksi Realitas Peter L. Berger). *Penelitian dan Pengembangan Komunikasi Dan Informatika*, 5(3), 11–23.
- Kharis, F. A., Dwinanto, B., Putri, M., & Widana Kerta. (2019). *Sister Village Sebagai Alternatif Penanganan Pengungsi Erupsi Gunung Agung*. 10(2).
- Kristifolus, W. G., Setiyono, B., & Purwoko. (2017). Analisis Implementasi Sister Village Sebagai Upaya penanggulangan Bencana Erupsi Gunung Merapi dalam Situasi Aktif Normal (Pra Bencana) di Kabupaten Magelang (Studi Kasus Sister Village antara Desa Ngargomulyo dengan Desa Tamanagung). *Journal of Politic and Government Studies*, 6 (03), 581-590., 6(3), 581–590.
- Larasati, Z. W., & Sunartiningsih, A. (2020). Strategi Keberlanjutan Pengelolaan Sumber Daya Berbasis Komunitas dalam Program

- Tanggung Jawab Sosial Perusahaan. *Jurnal Pemberdayaan Masyarakat: Media Pemikiran Dan Dakwah Pembangunan*, 4(1), 73–102. <https://doi.org/10.14421/jpm.2020.041-04>
- Maarif, S., Pramono, R., Kinseng, R. A., & Sunarti, E. (2012). Kontestasi Pengetahuan dan Pemaknaan Tentang Ancaman Bencana Alam (Studi Kasus Ancaman Bencana Gunung Merapi). *Jurnal Penanggulangan Bencana*, 3(1), 1–13.
- Matsuda, Y., & Okada, N. (2006). Community Diagnosis for Sustainable Disaster Preparedness. *Journal of Natural Disaster Science*, 28(1), 25–33.
- Mei, E. T. W., Lavigne, F., Picquout, A., de Bélizal, E., Brunstein, D., Grancher, D., ... Vidal, C. (2013). Lessons Learned from the 2010 Evacuations at Merapi Volcano. *Journal of Volcanology and Geothermal Research*, 261, 348–365. <https://doi.org/10.1016/j.jvolgeores.2013.03.010>
- Moleong, L. J. (2017). *Metodologi Penelitian Kualitatif (Edisi Revisi)*. Bandung: PT. Remaja Rosda Karya.
- Rusmayanti, F., & Fajarwati, A. (2016). Identifikasi Potensi Desa Tamanagung Untuk Mendukung Konsep Sister Village dalam Konteks Manajemen Bencana. *Jurnal Bumi Indonesia*, 5(3), 1–6.
- Sakina, A. W., Gembong Rahmadi, R. Y., & Widati, W. (2021). Mainstreaming Disabilitas dalam Sistem Manajemen Bencana Inklusif di Daerah Istimewa Yogyakarta. *Jurnal Academia Praja*, 4(1), 1–22. <https://doi.org/10.36859/jap.v4i1.291>
- Sari, K. P., Priyo, P., Oktradiksa, A., & Setiawan, A. (2018). Sistem Informasi Desa dalam Mitigasi Bencana (Peran Desa Penyangga dalam Implementasi Sister Village). *Jurnal Pengabdian Kepada Masyarakat MEDITEG*, 3(1). <https://doi.org/10.34128/mediteg.v3i1.27>
- Soetomo. (2012). *Keswadayaan Masyarakat Manifestasi Kapasitas Masyarakat untuk Berkembang secara Mandiri*. Yogyakarta: Pustaka Pelajar.
- Subandi. (2011). Deskripsi Kualitatif Sebagai Satu Metode dalam Penelitian Pertunjukan. *Harmonia: Journal of Arts Research and*

- Education*, 11(2), 173–179. <https://doi.org/10.15294/harmonia.v11i2.2210>
- Sugiyono. (2010). *Metode Penelitian Kuantitatif Kualitatif dan R&D* (p. 14). p. 14. Bandung: CV. Alfabeta.
- Sunarti, E., Johan, I. R., & Haryati, C. (2010). Hubungan Fungsi AGIL dengan Kesejahteraan Keluarga Nelayan yang Rawan Terkena Bencana Alam. *Jurnal Ilmu Keluarga dan Konsumen*, 3(1), 11–17. <https://doi.org/10.24156/jikk.2010.3.1.11>
- Surono, Jousset, P., Pallister, J., Boichu, M., Buongiorno, M. F., Budisantoso, A., ... Lavigne, F. (2012). The 2010 explosive eruption of Java's Merapi volcano-A "100-year" event. *Journal of Volcanology and Geothermal Research*, 241–242(May 2018), 121–135. <https://doi.org/10.1016/j.jvolgeores.2012.06.018>
- UNDP. (2013). *Indonesia The Sister Village Program for Disaster Preparedness*. Resilience and Reconstruction Unit UNDP Indonesia.
- UNDP. (2014). Institutionalizing post-disaster recovery: Learning from Mentawai tsunami and Merapi eruption. *Recovery Framework Case Study*, (September), 1–52.
- Wardani, W. (2016). Membedah Teori Sosiologi: Teori Pertukaran (Exchange Theory) George Caspar Homans. *Jurnal Studia Insania*, 4(1), 19–38. <https://doi.org/10.18592/jsi.v4i1.1111>
- Windiani, W., Wirawan, I. B., & Sutinah, S. (2018). Pengelolaan Bencana Berbasis Kapasitas Lokal di Kawasan Gunung Kelud Pasca Erupsi Tahun 2014 (Studi Etnografi di Kawasan Rawan Bencana Gunung Kelud Kabupaten Kediri). *IPTEK Journal of Proceedings Series*, 5, 111–117. <https://doi.org/10.12962/j23546026.y2018i5.4431>
- Yin, R. K. (2014). *Case Study Research Design and Methods (5th ed.)*. SAGE Publications.