

# Analyzing Sister Village Plan to be implemented on Small Volcanic Island: Case Study of Siau Island

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## Introduction

Siau Island is a small volcanic island in Northern Sulawesi, Indonesia. The said district faces constant risk of volcanic hazard from one of the most active volcanoes in Indonesia, namely the Karangetang Volcano. Hence, developing more informed responses to managing volcano risk is essential (Rampengan et al., 2015). Knowing how successful the Sister Village mitigation plan works in big island such as Java and Bali, this research aims to analyze the possibility of implementing The Sister Village mitigation plan in small volcanic island, namely Siau Island.

## Methodology

This research is a literature-based qualitative research. This research collects data from various academic journals, government issued map: Map of Geology and Disaster-prone Area of Karangetang Volcano (Peta Geologi dan Rawan Bencana Gunung Karangetang), government-issued map of Peta Rupa Bumi Indonesia, and also statistic data from BPS (Statistical Center Body). This data will later be analyzed using SWOT analysis by comparing the situation on Siau Island (Karangetang Volcano) with the implementation of Sister Village mitigation plan on Java (Merapi Volcano) and Bali Island (Agung Volcano). Furthermore, the data will be analyzed by categorizing them to 5 levels based on the criterias to be applied in the Sister Village mitigation plan.

## Results

These are some of the existing condition of Merapi Volcano, Agung Volcano, and Karangetang Volcano.

| 100 Years Period               | Merapi Volcano | Agung Volcano | Karangetang Volcano |
|--------------------------------|----------------|---------------|---------------------|
| Height (AMSL)                  | 2910           | 2997          | 1797                |
| Average VEI                    | 2.0            | 4.0           | 1.8                 |
| Number of Eruptions            | 21             | 2             | 44                  |
| Highest VEI                    | 4              | 5             | 3                   |
| Disaster Prone Area III Radius | 3 km           | 6 km          | 1 km                |

The criteria of a good Sister Village was divided into 5 thematic areas such as Governance, Risk Assessment, Knowledge and Education, Risk Management and Vulnerability Reduction, and Disaster Preparedness and Response (Twigg, 2009). Based on the criteria, SWOT

analysis of Merapi, Agung, and Karangetang Volcano was made.

These are the SWOT (Strength, Weakness, Opportunity, and Threat) analysis of The Sister Village Mitigation Plan if it was implemented on Siau Island.

| Strength  | Weakness   |
|---|--|
| The current infrastructure for evacuation is in good condition<br>Citizens are experienced in volcanic mitigation plan<br>Beliefs about the supernatural still exist, thus people comply to the norms and preserve the nature<br>Risk assessments in Karangetang Volcano is detailed and accurate<br>Citizens are well educated | There are currently no legal and regulatory system in Siau Island regarding the Sister Village mitigation plan<br>Karangetang volcano is a very active volcano with very little time between each eruption<br>Number of volunteers available are low<br>Health facilities are in bad condition |
| Opportunity   | Threat   |
| The volcanic eruption provides minerals resulting to a very rich soil suitable for agriculture<br>Mitigation plan can be improved to accelerate the recovery from the destruction created by volcanic eruptions<br>The people are ready to help each other during a volcanic eruption   | Tsunami is a possibility on the coastal area of Siau Island<br>Karangetang volcano is very unpredictable and the duration of the eruptions vary from a just few hours to some years  |

These are the SWOT (Strength, Weakness, Opportunity, and Threat) analysis of The Sister Village Mitigation Plan if it was implemented on Merapi Volcano.

| Strength  | Weakness   |
|---|--|
| The mitigation plan in Merapi Volcano is very sophisticated<br>The current infrastructure for evacuation is in good condition<br>There is a legal and regulatory system regarding the Sister Village mitigation plan<br>Citizens are experienced and well educated in volcanic mitigation plan<br>Risk assessments in Merapi Volcano is detailed and accurate<br>Early Warning System in Merapi Volcano are very applicable and effective<br>Volunteers are available and ready to help<br>Government officials and citizens are prepared for volcanic eruption | Merapi volcano is a very active volcano with very little time between each eruption  |
| Opportunity   | Threat   |
| The volcanic eruption provides minerals resulting to a very rich soil suitable for agriculture<br>The people are ready to help each other during a volcanic eruption  | Merapi volcano is very unpredictable and the duration of the eruptions vary from a just few hours to some years<br>Many tourist come to Merapi Volcano thus a volcanic eruption decrease the source of income for local citizens |

These are the SWOT (Strength, Weakness, Opportunity, and Threat) analysis of The Sister Village Mitigation Plan if it was implemented on Agung Volcano.

| Strength  | Weakness   |
|---|--|
| <p>The current infrastructure for evacuation is in good condition<br/>           Citizens are well educated in volcanic mitigation plan<br/>           Citizens follow their cultures, thus people comply to the norms and preserve the nature<br/>           Risk assessments in Agung Volcano is detailed and accurate<br/>           Citizens have high awareness of the volcanic hazards<br/>           Early Warning System in Agung Volcano are very applicable and effective</p> | <p>There are currently no legal and regulatory system in Agung Island regarding the Sister Village mitigation plan</p>   |
| Opportunity   | Threat   |
| <p>The volcanic eruption provides minerals resulting to a very rich soil suitable for agriculture<br/>           The scenery of the volcano is very beautiful thus suitable for tourism<br/>           Mitigation plan can be improved to accelerate the recovery from the destruction created by volcanic eruptions<br/>           The people are ready to help each other during a volcanic eruption</p>  | <p>Agung volcano is very unpredictable and the scale of the eruptions are relatively big<br/>           Many tourist come to Agung Volcano thus a volcanic eruption decrease the source of income for local citizens</p> |

From the SWOT analysis above, it can be seen that the conditions of Siau Island (Karangetang Volcano) is similar to the condition of Java (Merapi Volcano) and Bali Island (Agung Volcano), thus implementing The Sister Village Plan on small volcanic island specifically on Siau Island is possible.

## Conclusion

Based on the information from the data that was collected, the conditions on Siau Island fulfils the criteria to implement sister village mitigation plan, as implemented at Merapi and Agung in Java and Bali Island respectively. Furthermore, the current condition of Siau Island is similar to the condition of the sister village implemented on Java and Bali Island thus implementing The Sister Village mitigation plan is a possibility in the near future. However, there are some improvements that need to be fulfilled to produce the perfect result of the mitigation plan, namely The Sister Village Mitigation Plan.

## References

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