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Kampus Sultan Abdul Jalil Shah



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A SUSTAINABILITY STRATEGY FOR SCHOOL ADAPTATION TO VOLCANIC ERUPTION DISASTER (SAVED) IN MOUNT MERAPI, INDONESIA



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THESIS PRESENTED TO QUALIFY FOR A DOCTOR OF PHILOSOPHY

FACULTY OF HUMAN SCIENCES
SULTAN IDRIS EDUCATION UNIVERSITY

2024



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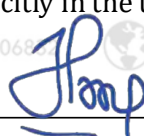
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ABSTRACT

Many school students are victims of disasters, particularly the eruption of Mount Merapi. The vulnerability of students in facing disasters is further exacerbated by the amount of time they spend at school. Therefore, this research aims to identify sustainability indicators for school adaptation to volcanic eruption disasters, evaluate the current level of school adaptation in coping with volcanic eruption disasters, examine the most significant sustainability indicators for school adaptation to volcanic eruption disasters and propose a sustainability strategy for school adaptation to volcanic eruption disasters. An explanatory sequential mixed-method approach was used as the methodology for this research. The study involved 364 student respondents and 53 teacher respondents for the quantitative process and 54 informants for the qualitative process. These respondents and informants were from three disaster-prone areas around Mount Merapi. Data were collected using questionnaires, interviews, documentation and observation, with regression analysis and the Relative Importance Index (RII) used for quantitative analysis and thematic cross-case analysis for qualitative analysis. The research results show that the strategy was divided into five dimensions (social, economic, environmental, cultural and organizational) with 23 indicators and 46 strategies for achieving sustainable adaptation in dealing with eruption disasters. The level of school adaptation to disasters was relatively high (index 3.98), but psychological adaptation needs improvement. Overall, the most significant sustainability indicator in disaster adaptation was building design. The indicators analyzed were validated by academics and disaster experts, resulting in 19 indicators and 41 validated strategies. The findings of this study can certainly provide valuable guidance in the process of developing disaster-safe schools in the future.



STRATEGI KELESTARIAN UNTUK PENYESUAIAN SEKOLAH TERHADAP BENCANA LETUSAN GUNUNG BERAPI DI GUNUNG MERAPI, INDONESIA

ABSTRAK

Terdapat ramai pelajar sekolah yang menjadi mangsa bencana terutamanya letusan Gunung Merapi. Kelemahan pelajar dalam menghadapi bencana diburukkan lagi dengan tempoh masa pelajar berada di sekolah. Oleh itu, penyelidikan ini mempunyai objektif berikut iaitu mengenal pasti petunjuk kelestarian untuk adaptasi sekolah terhadap bencana letusan gunung berapi, menilai tahap adaptasi sekolah semasa dalam menghadapi bencana letusan gunung berapi, mengkaji petunjuk kelestarian yang paling penting untuk adaptasi sekolah kepada bencana letusan gunung berapi serta mencadangkan strategi kelestarian untuk penyesuaian sekolah kepada bencana letusan gunung berapi. Kaedah campuran berurutan telah digunakan sebagai asas bagi metodologi dalam penyelidikan ini. Kajian ini menggunakan 364 pelajar dan 53 responden guru untuk proses kuantitatif, dan 54 informan untuk proses kualitatif. Responden dan informan dibahagikan kepada tiga kawasan yang terdedah kepada bencana letusan Gunung Merapi. Untuk mendapatkan data kajian, pengkaji menggunakan soal selidik, temu bual, dokumentasi dan pemerhatian dengan regresi dan Indeks Kepentingan Relatif (RII) untuk analisis kuantitatif serta kes silang tematik untuk analisis kualitatif. Hasil kajian menunjukkan bahawa rangka kerja dibahagikan kepada lima dimensi (sosial, ekonomi, alam sekitar, budaya dan organisasi) dengan 23 petunjuk dan 46 strategi untuk mencapai adaptasi mampan dalam menangani bencana letusan. Tahap adaptasi sekolah dalam menangani bencana agak tinggi (indeks 3.98) dalam menangani bencana letusan, tetapi adaptasi psikologi perlu diperbaiki. Secara umumnya, petunjuk kelestarian yang paling penting dalam adaptasi bencana ialah reka bentuk bangunan. Indikator yang telah dianalisis disahkan oleh ahli akademik dan pakar bencana, menghasilkan 19 indikator dan 41 strategi yang disahkan. Hasil kajian ini tentunya dapat memberi panduan dalam proses membangunkan sekolah selamat bencana pada masa hadapan.

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LIST OF ABBREVIATIONS

APBD	<i>Anggaran Pendapatan dan Belanja Daerah</i> Regional Revenue and Expenditure Budget
APBN	<i>Anggaran Pendapatan dan Belanja Negara</i> National Revenue and Expenditure Budget
APG	<i>Awan Panas Guguran</i> Hot Cloud Fall
ASSI	ASEAN Safe School Initiative
BNPB	<i>Badan Nasional Penanggulangan Bencana</i> National Disaster Management Agency
BPBD	<i>Badan Penanggulangan Bencana Daerah</i> Regional Disaster Management Agency
CSSF	Comprehensive Safety School Framework
DIBI	<i>Data dan Informasi Bencana Indonesia</i> Indonesian Disaster Data and Information Management Database
DPA	<i>Disaster Prone Areas</i>
EMDAT	Emergency Events Database
GADDRESS	Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector
HFA	Hyogo Framework for Action
MDG	Millenium Development Goals
NDMP	National Disaster Management Plan (India)
PRB	<i>Penilaian Risiko Bencana</i> Disaster Risk Assessment
RDI	Resilience Development Initiative
RENKON	<i>Rencana Kontingensi</i> Contingency Plan

RENOPS	<i>Rencana Operasional</i> Disaster Emergency Operation Plan
RPB	<i>Rencana Penanggulangan Bencana</i> Disaster Management Plan
RPJMN	<i>Rencana Pembangunan Jangka Menengah Nasional</i> National Medium Term Development Plan
RPJPN	<i>Rencana Pembangunan Jangka Panjang Nasional</i> National Long Term Development Plan
RPKB	<i>Kerangka Nasional Penanggulangan Bencana Darurat</i> National Disaster Emergency Management Framework
SAVED	School Adaptation to Volcanic Eruption Disaster
SDG	Sustainable Development Goals
SKPDB	<i>Sistem Komando Penanggulangan Bencana</i> Disaster Emergency Management Command System
SOP	Standard Operating Procedure
UNDRR	United Nations for Disaster Risk Reduction
USAR	Urban Search and Rescue (USAR) (South Africa)

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G	Student Respondent Data in Disaster Prone Areas 3
H	Teacher Respondent Data in Disaster Prone Areas 1
I	Teacher Respondent Data in Disaster Prone Areas 2
J	Teacher Respondent Data in Disaster Prone Areas 3



CHAPTER 1

INTRODUCTION



This chapter explains the research background, in-depth explanation of the problems that become the topic of research and gaps, research objectives, research questions, limitations of the study, and thesis structure.

The volcano disaster was one of the geological hazards that was difficult to avoid. The catastrophic eruption only occurred in the region that was in the confluence of lithosphere plate, where this region would cause a rise in the hot liquid melt (magma) above the earth's surface (Fuady, Munadi, and Fuady 2021; Terry et al. 2022). In 2023, volcanic eruptions still be quite a frequent disaster. According to IFRC data, there are around 7.3% of eruption incidents worldwide (International Federation of Red Cross and Red Crescent Societies 2023).





The volcanic eruption was one of the most damaging disasters on the surface of the earth. Volcanic eruption disasters not only impact on human deaths or damage to infrastructure, but the eruption disaster can also affect global climate conditions. Volcanic eruptions affect climate variability due to the presence of sulfuric acid reaching the stratosphere, which will result in decreased climate conditions (cold temperature) (Cooper et al. 2018; Stovall et al. 2019). Some of the biggest volcanic eruption impacts in history are the eruption of the Tambora (1815) and Krakatau volcano (1883), which are located in Indonesia. The explosion can affect climate conditions globally, not only in Indonesia but also throughout the world (Pyle in Fearnley et al. 2018). Tambora volcano eruption can cause a decrease in temperature in the northern hemisphere and crop failure resulting in starving in Europe; even, 1815 was known as a year without sunlight (Wilson et al. 2020). The Krakatau volcano eruption can cause tsunamis in several regions around the world and cause the death of 36,000 people (Mutaqin et al. 2019).

Volcanic eruption disasters are often examined physically (volcanic material or the process of volcanic development), only few studies that discuss adaptation to volcanic eruption disasters. This research focuses on the form and capacity of school adaptation in dealing with volcanic eruption disasters in Indonesia. The problem of adaptation to disasters was one of the essential and considered topics because there are still many victims of disasters, especially children. It was because the adaptive capacity of the children's school-age has not yet formed to the surrounding disaster conditions. A focus on volcanic adaptation capacity can encourage the realization of knowledge about the long-term impacts of volcanic activity. It can facilitate school-age children to



identify the efforts that must be made during the mitigation and prevention processes (Masten 2021).

The researcher was interested in analyzing aspects of disasters around the slopes of the volcano. Previously, the researcher has conducted a research related to the management of community radio infrastructure in increasing disaster preparedness towards Merapi volcano eruption. Community radio infrastructure was closely related to the adaptability of each individual in a volcanic disasters-prone area. Without the ability to adapt with disasters, each individual will difficult to accept any changes that occur around him. Therefore, the researcher are interest in observing the adaptive capacity of schools in dealing with the Merapi volcano eruption. The school's adaptive capacity will improve safe and comfortable school management, especially around the

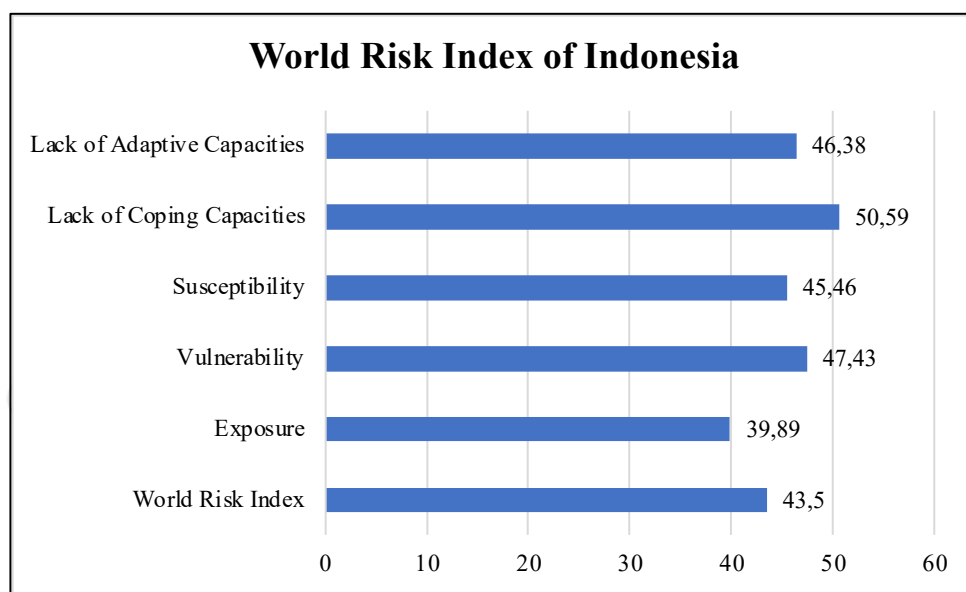
1.2 Background of Research

In the last few decades, Indonesia had experienced many challenges, particularly related to disasters that caused fatalities. According to the Indonesian Disaster Information Data (DIBI), (2023) from National Agency for Disaster Management (BNPB), there were around 2.765 disaster events in 2023 and 2.403 disaster events in 2022. There was an increase in disaster events by 15.06% in the 2022-2023 period. Indonesia was a disaster 'market'. In accordance with the calculation of the disaster index by Maplecroft in 2010, which stated that Indonesia was one of the most vulnerable to natural hazard countries after Bangladesh (Indonesian Disaster Information Data (DIBI) 2023). This

report indicated that natural hazards seriously endanger Indonesia. Another report that published by the Institute for International Law of Peace and Armed Conflict (IFHV) of the Ruhr-University Bochum stated that Indonesia has a high disaster risk index, with an index value of 7.52 – 10.61 (Frege et al. 2023), as shown in Figure 1.1.

Figure 1.1

World Risk Index



Source: Frege et al. (2023)

Disasters occur since the beginning of human existence; however, the impact of disasters has become more significant in recent decades. It was due to the increasing number of human populations. Increasing number of population causes higher levels of hazard exposure to the community (Davies et al. 2018; Ahmadalipour et al. 2019; Andreastuti et al. 2023). Based on IFHV data, Indonesia has a very high level of hazard exposure compared to other countries (Frege et al. 2023) (Figure 1). It shows that Indonesian people are very vulnerable to becoming victims of natural disasters.



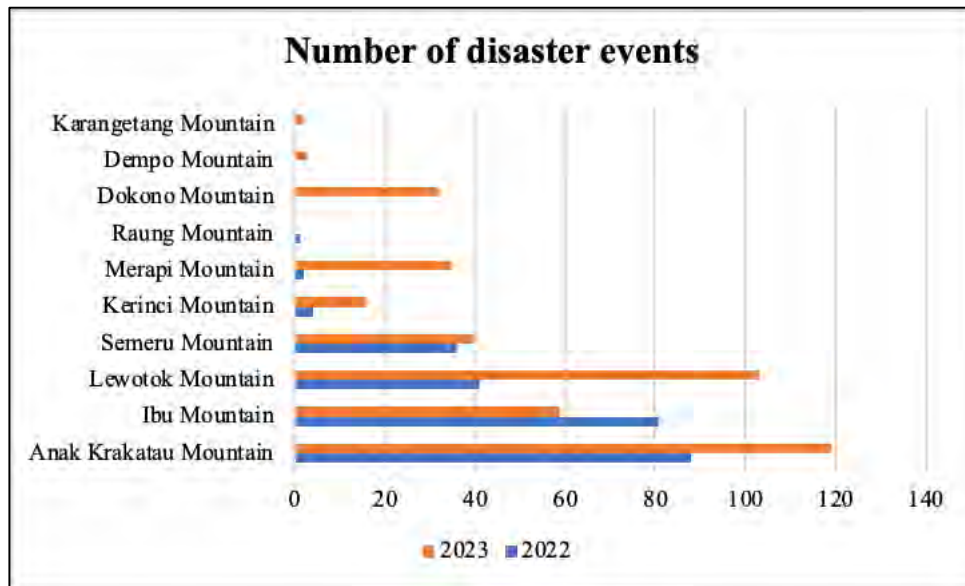
Disasters are events that lead to increased fatalities, loss of livelihoods, damage to infrastructure, loss of biodiversity, and the destruction of the socio-economic system in the community (Mutasa and Coetzee 2019). Therefore, understanding disasters are very important for the community. Disasters can inhibit the sustainability of development due to physical losses caused by disasters that disrupt livelihoods, education, health access and so on. These impacts will lead to the emergence of secondary impacts, such as a decrease in GDP (Gross Domestic Product) and a budget deficit (Benali, Abdelkafi, and Feki 2018).

Disasters that occur in Indonesia include floods, landslides, abrasion, tornadoes, drought, forest and land fires, earthquakes, tsunamis, and volcanic eruptions. Indonesia was located on meeting point of three tectonic plates, so there are many active volcanoes in each region. During 2022, there were about 4 catastrophic volcanic eruptions (Indonesian Disaster Information Data (DIBI) 2023). There are about 10% of Indonesia's population live around the slopes of the volcano (Hariyono and Liliarsari 2018). Figure 2 shows the increasing number of eruption events in 2022 compare to the 2023, there was a 33,3% increase in the incidence of eruptions. This circumstances cannot be neglected as the eruption disaster was a geological disaster and difficult to be avoided by the community.



Figure 1.2

Numbers of Eruption Disaster in Indonesia



Source: <https://magma.esdm.go.id/v1>

One of the catastrophic volcanic eruption events came from Mount Merapi

(Figure 1.2). Mount Merapi was one of the active volcanoes in Java, Indonesia, located between Boyolali Regency, Magelang Regency, Klaten Regency, and Sleman Regency. Merapi Volcano has a cycle of eruptions in 4 - 6 years (Budiyanto 2021; Darmawan et al. 2018; Lathifah et al. 2019). In 2023, Mount Merapi still have status III (alert), there will be an increase in seismicity which was supported by other volcanic monitoring, and this condition will be followed by a main eruption. Given the frequent occurrence of disasters in the Mount Merapi, the community should have a better understanding of disasters because disasters can bring along trauma effects on all age groups, without exception (Almazan et al. 2019).



1.2.1 The Need for Increasing Adaptive Capacity of Volcano Disaster

The area of Merapi volcano was divided into 3; disaster-prone areas I, II, and III. Disaster-prone area I was the area with the least impact from the eruption, disaster-prone area II with a moderate risk of danger caused by volcanic eruptions, while disaster-prone region III was area with the highest risk of danger. Many people live in disaster-prone areas approximately 100.000 people (disaster-prone areas III) and 140.000 people (disaster-prone areas II) (Widodo, Nugroho, and Asteria 2018; Indonesian Statistic Agency (BPS) 2023). The community refuses to move from the disaster-prone II of Merapi Volcano and chooses to continue their lives by farming and developing nature tourism in the high-risk areas (Dewanti, Ayuwat, and Yongvanit 2019). The existence of volcanoes provides benefits to the community and also becomes a time 'bomb' to them due to its nature process (López-Saavedra, Martí, and Planagumà 2023). When the volcano was active, people can observe the possibility of the disaster, but it was difficult to make decisions because of their limited knowledge.

The community tends to surrender and accept whatever was given by nature so that people perceive the disaster as an unavoidable destiny (Prihatin 2018). This assumption shows that the level of vulnerability of the community in dealing with disasters was very high. The level of a vulnerability was influenced by the lack of capacity to cope with disasters and the lack of adaptive capacity in the community. Indonesia was a 'market' of disasters so, there was an obligation to increase the capacity to reduce disaster vulnerability for the community. If the community cannot cope with disasters or adapt to disasters, the number of victims due to disasters will keep increasing.



The vulnerability of disasters that occur in the Merapi Volcano related to the lack of infrastructures, such as dams, bridges, public bathing, and shelters (Putra et al. 2022). These deficiencies can be a problem if not balanced with good adaptability. Communities with high adaptability can develop their ability to create the local infrastructure that can be used to reduce disaster risks so that the impact of disasters can be minimized. The shortage must be able to be completed by the community so they become resistant to the eruption of Mount Merapi. When the community was resistant to disasters, they can live safely and be able to carry out their activities better without fear.

1.2.2 The Need of Volcanoes Disaster Adaptation in School

Children are the most vulnerable group in the event of a disaster (Roszik-Volovik et al. 2023; Naushad et al. 2019). Children's vulnerability to disasters was triggered by a factor of limited understanding about risks around them, which results in a lack of preparedness in the cope of disasters (Hermon et al. 2019). Children are very dependent on the adults due to lack of knowledge and experience so, during a disaster situation, children cannot control and prepare themselves in a disaster situation. In addition to being victims of death, children are also more vulnerable to psychological and emotional trauma during a natural disaster (Bhebhe, Runhare, and Monobe 2019). To reduce the number of children victims, it was necessary to provide disaster adaptation to children. Schools have an important role in developing knowledge to build community resilience, and it was also important to continue to provide disaster education to children (Mutch 2018).

Volcano disaster adaptation in schools was a new phenomenon. Education was a common element in disaster adaptation: from formal learning to non-formal; and from local contexts to national and international contexts (Findayani 2018). Education was a key mechanism in which children can participate in disaster adaptation towards risk reduction (Hoffmann and Blecha 2020). When children have sufficient knowledge and skills, children can protect themselves, save others from danger, and be able to drive significant changes in society in efforts to reduce disaster risk (Oktari et al. 2018; Sakurai et al. 2018).

Students need to understand that the level of disaster risk can be significantly reduced according to the ability of the community to adapt it (Shah et al. 2020). Volcanoes disaster in school will help students to perceive their role in the context of disaster management because in reality students in the school have low disaster knowledge (Irawan, Ayuni, and Sumarmi 2018; Pujianto, Prabowo, and Wasis 2018). In addition, the existence of disaster education provided to students in disaster-prone areas can make effective efforts to reduce disaster risk (Hermon et al. 2019). The involvement of disaster adaptation into all elements in society can reduce 40-60% of losses due to disasters (Catalano, Forni, and Pezzolla 2020; Pilli-Sihvola, Harjanne, and Haavisto 2018).

Based on data from the Indonesian Ministry of Education and Culture (2020), there are around 497.576 schools in 34 provinces, and around 250.000 schools (more than 50% of the total number of schools) are located in disaster-prone area. This data was supported by the statement of Wulandari et al. (2020) that there are more than 62,687 schools located in potential disaster areas. Schools have become the most

vulnerable public facilities to disasters. In 2023, there were around 1.736 schools damaged by the natural disaster (Indonesian Disaster Information Data (DIBI) 2023). Damaged schools will have affected students insofar children and young people get disrupted in their education.

Schools must be able to create situations and conditions that are safe and comfortable for students because education aims to prosper and encourage students. If the school cannot fulfill this aim, then student safety will not be achieved. Safe schools must be able to balance physical and psychological safety so that a positive learning environment was created.

The impact of the Merapi Volcano Eruption also leads to schools in the slope of Merapi Volcano. There are about 132 kindergartens, 169 elementary schools, 27 junior high schools, 15 senior high schools (high schools and vocational schools) and three state and private universities/colleges in the slopes of the Mount Merapi. Besides, there are also 5 Special Education Schools, 18 Islamic Boarding Schools, 39 Madrasah Diniyah (elementary level), and 1 Seminary school (BAPPENAS and BNPB 2011). The number of schools in the slope of Merapi Volcano must be balanced with good adaptation efforts. Without the adaptation of schools to disasters, schools will become one of the most vulnerable public facilities during disaster situations. When schools are unable to create a safe environment, children will be the victims of the disaster. School adaptation in disasters must be catered to support the sustainability of disaster management efforts in school.

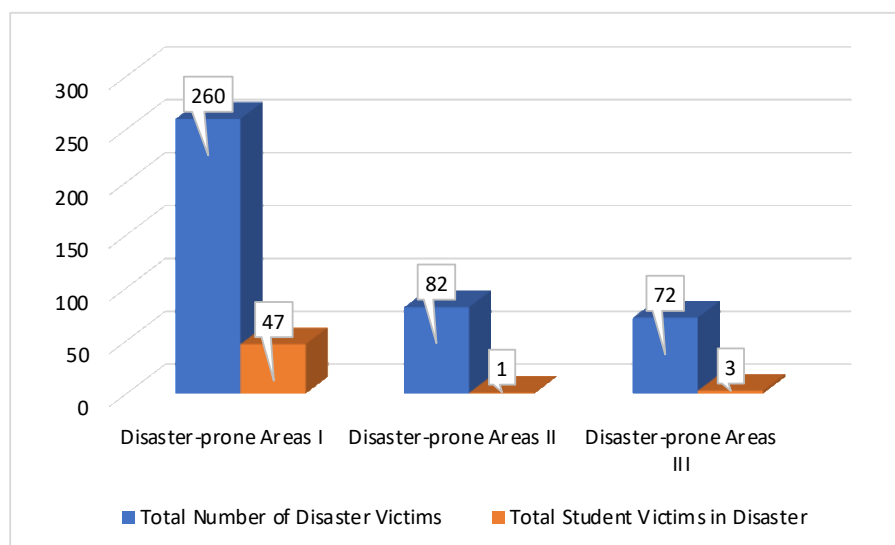
1.3 Problem Statement

There are many schools located on the slopes of Merapi Volcano; there are 15 senior high schools in disaster-prone areas. Due to the high vulnerable location, the schools ideally should have a high level of adaptive capacity to the volcanoes disaster to have better disaster resilience. Children spend around 35% -40% of their time at school (Shah et al. 2018). The OECD/Organization for Economic Cooperation and Development also releases information on the length of time for each children in school, for senior high school students will spend 924 hours in one year. Children who are in school will be the most vulnerable victims during a disaster situation.

Middle school students will spend more time at school compared to other students. This will increase the vulnerability of school-age children in facing eruption disasters because eruption disasters can occur any time. Middle schools have obstacles in creating a safe learning environment for their students (Kittelman et al. 2018), because they require an understanding of strategies that are appropriate to the conditions of the region. Around 8.285 students of senior high school (Figure 3) are located in disaster-prone areas III and II, which are spread in four regencies; Magelang, Sleman, Boyolali, and Klaten Regency (Indonesian Statistic Agency (BPS) 2023). These students are potential to become victims of the eruption disaster of Merapi. Based on data from Sari (2017), it was known that there were 51 fatalities during the 2010 Merapi eruption. This number shows that around 12.32% of students have become victims of the Mount Merapi eruption (Figure 1.3).

Figure 1.3

Total Student Victims in the 2010 Merapi Eruption



Source: Adapted from Sari (2017)

(Adhikari, Baral, and Nitschke 2018; Berrang-Ford et al. 2021; Brink and Wamsler 2018; Cinner et al. 2018; Ensor et al. 2019; Nyahunda and Tirivangasi 2019; Thomas et al. 2019). Yet, there was no study that discusses schools' adaptation to the volcanic eruption disaster. This becomes the given notion for the preparation of this study because children are a vulnerable group who barely receive disaster training. Whereas on the other hand, children are also agents of disaster information in their families so, when children have a good understanding and ability to adapt to disasters, their families will be able to gain a good understanding of disasters too. Sharing information, especially with those experiencing problems (disasters), can help multiply the benefits and goals in a bigger direction (Harahap 2020).



Studies on disaster have been carried out by many researchers, but the focus studied was always related to disaster science, preparedness, prevention, response, and recovery (Shi et al. 2020). Only some publications on disaster adaptation; however, there was no such thing as school adaptation to disaster. Most of publications are focusing on the community adaptation towards climate change and the publication only focuses on the general community (Berrang-Ford et al. 2021; Nyahunda and Tirivangasi 2019; Sridarran, Keraminiyage, and Amaratunga 2018). In addition, the existing publications have only discussed climate change adaptation, even though many disasters have occurred around us, volcano eruption, for instance. Therefore, the sustainability of school adaptation in the eruption disaster was very vital. The sustainability of school adaptation to disasters can encourage the realization of the disaster safe school and disaster-resilient generation.



Understanding of disaster risk reduction was always seen in the Sendai Framework and the 2030 Agenda of Sustainable Development Goals (SDGs), although the discussion on adaptation was still very limited. Both frameworks only focus on disaster risk reduction without looking at adaptation aspects, whereas adaptation in the long-term compared to disaster risk reduction, which was short-term. So far, disaster risk reduction efforts for children only have a short shelf-life so the sustainability of disaster risk reduction was still not visible (Pfefferbaum, Pfefferbaum, and Van Horn 2018). The concept of disaster risk reduction was seen in the Guiding Principle (GP) of the Sendai Framework 1, 8, and 10 (Appendix 1). Each GP discusses how to reduce disaster risk in all disaster-prone areas. The discussion of the mountainous region as disaster-prone areas has not received particular attention, only in the Sendai framework,





the discussion of the mountainous region was little discussed during the discussion of environmental issues (United Nation 2015).

For this reason, this research seeks to overcome these problems by developing a sustainability strategy for school adaptation to volcano eruption disaster. Sustainability aspects will be integrated into the strategy as suggested by the Hyogo Framework and Sendai Framework as the most ideal guideline for disaster adaptation (Maly and Suppasri 2020). The problem statement of this study can be summarized as follows;

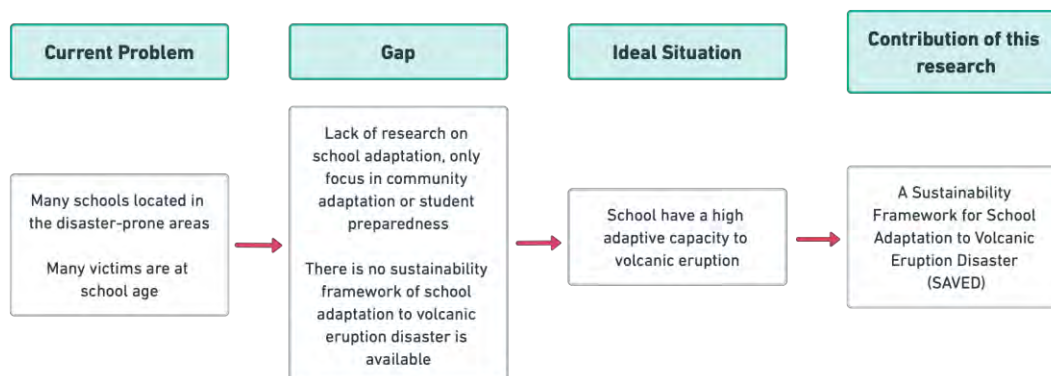
‘There are many schools are vulnerable to volcano disasters in Indonesia, in which a high adaptive capacity is crucially needed. School children spent most of their time in school. Education policies encourage each child to spend an average of six hours per day at school. This causes schools to become the second ‘home’ for children. School community adaptation for volcano disaster is not known. Unfortunately, research about school adaptation to volcano disasters is very limited, existing research has focused on disaster preparedness and response. Adaptability is needed as an effort to reduce disaster risk in the long term so, can minimize the number of school children who are victims of disasters. Volcano eruption disaster can not be predicted and with the ability to adapt, students will know what to do and how to avoid it, without relying on adults. There is no specific guideline available for school community for volcano disaster adaptation so, need to develop a sustainability strategy for school adaptation to volcano eruption disaster in order to improve their adaptive capacity and resilience to disaster.’

The research problem is graphically presented in Figure 1.4.



Figure 1.4

Problem Statement



1.4 Objective of the Study

This research aim was to develop a sustainability strategy for school adaptation to volcanic eruption disaster. To achieve the researchs aim of the study, the following four research objectives are developed;

- To identify the sustainability indicators for school adaptation to volcanic eruption disaster.
- To evaluate the school community (teachers and students) adaptation level in coping with volcanic eruption disaster.
- To examine the most significant indicators of school adaptation to volcanic eruption disasters from the school community (teachers and students).
- To propose a sustainability strategy for the school community (teachers and students) adapt to volcanic eruption disasters.

1.5 Research Question

There are four research questions to achieve the objective of this study as follows;

1. What are the sustainability indicators of school adaptation to volcanic eruption disaster?
2. To what extent is the school community (teachers and students) able to adapt with volcanic eruption disasters?
3. What are the most significant indicators of school adaptation to volcanic eruption disasters from the school community (teachers and students)?
4. How does the school community (teachers and students) adapt to volcanic eruption disasters?

1.6 Research Hypothesis

The hypothesis in the research is specifically used to answer the second research objective (RO 2), that is to evaluate the current school adaptation level in coping with volcanic eruption disaster. To find out the hypothesis, the independent variable in this research is adaptation strategy (with social, economic, environmental, cultural and institutional indicators), while the dependent variable used is adaptation capacity (behavioral adaptation and psychological adaptation). The hypotheses in this research include:

1. Is there a relationship between psychological adaptation and teacher behavioral adaptation in facing the Mount Merapi eruption disaster?

- a. Ha: There is a relationship between psychological adaptation and teacher behavioral adaptation in facing the Mount Merapi eruption disaster
- b. H0: There is no relationship between psychological adaptation and teacher behavioral adaptation in facing the Mount Merapi eruption disaster

2. Is there a relationship between psychological adaptation and student behavioral adaptation in facing the Mount Merapi eruption disaster?

- a. Ha: There is a relationship between psychological adaptation and student behavioral adaptation in facing the Mount Merapi eruption disaster
- b. H0: There is no relationship between psychological adaptation and students' behavioral adaptation in facing the Mount Merapi eruption disaster

3. Is there a relationship between teachers' psychological adaptation and students' psychological adaptation in facing the Mount Merapi eruption disaster?

- a. Ha: There is a relationship between teachers' psychological adaptation and students' psychological adaptation in facing the Mount Merapi eruption disaster
- b. H0: There is no relationship between teachers' psychological adaptation and students' psychological adaptation in facing the Mount Merapi eruption disaster



4. Is there a relationship between the adaptation of teacher behavior and the adaptation of student behavior in facing the Mount Merapi eruption disaster?

- a. Ha: There is a relationship between the adaptation of teacher behavior and the adaptation of student behavior in facing the Mount Merapi eruption disaster
- b. H0: There is no relationship between the adaptation of teacher behavior and the adaptation of student behavior in dealing with the Mount Merapi eruption disaster

5. Is there a relationship between behavioral adaptation and the adaptation strategies carried out to deal with the eruption of Mount Merapi?

- a. Ha: There is a relationship between behavioral adaptation and adaptation strategies carried out to deal with the eruption of Mount Merapi
- b. H0: There is no relationship between behavioral adaptation and the adaptation strategies carried out to deal with the eruption of Mount Merapi

6. Is there a relationship between psychological adaptation and the adaptation strategies carried out to deal with the eruption of Mount Merapi?

- a. Ha: There is a relationship between psychological adaptation and the adaptation strategies carried out to deal with the eruption of Mount Merapi
- b. H0: There is no relationship between psychological adaptation and the adaptation strategies carried out to deal with the eruption of Mount Merapi



7. Is there a relationship between adaptive capacity and the adaptation strategies carried out to deal with the eruption of Mount Merapi?

- a. Ha: There is a relationship between adaptive capacity and the adaptation strategies carried out to deal with the eruption of Mount Merapi
- b. H0: There is no relationship between adaptive capacity and the adaptation strategies carried out to deal with the eruption of Mount Merapi

1.7 Conceptual Framework

The research was prepared during the preliminary study. The framework will guide schools to realize the sustainability of disaster adaptation in schools. Disaster adaptation in schools should be implemented so that students do not become victims of disasters and can increase disaster resilience among the younger generation.

From the existing sub-chapters, it is finally known that there are information gaps in preparing the sustainability of school adaptation in dealing with eruption disasters. Many researchers and research publications discuss the sustainability of development and also the community adaptation to disasters; however, there is a lack of researchers that linking the sustainability of development, adaptation to eruption disaster, and schools. School is one of the places where children spend most of their time, while the catastrophic eruption event cannot be known exactly when it happened. The preliminary study phase is carried out to identify and develop a strategy to link these three aspects (sustainability, adaptation to the eruption, and school disasters).



In compiling the literature review, researcher know that the problem to be studied is closely related to several previous theories. These theories must be analyzed and adjusted to the research problem; in this adjustment process, a researcher must be able to see the agreement and disagreement between one theory and another. This process will influence directly or indirectly on the research that will be carried out. A conceptual framework must be able to analyze the relationship between every aspect that exists in theory so that it will be easier to conduct research. The conceptual framework can come from the perspective of race, feminism, or others and is part of mixed research. The conceptual framework will discuss the relationship between behavior and human knowledge in their interactions with the environment (Creswell and Creswell 2018).



In preparing the conceptual framework, researcher has conducted a literature review. This literature review serves to assist researcher in developing preliminary study. The preparation of the preliminary study begins with a research problem (Figure 5); this problem will encourage researcher to explore the aspects related to the research problem. This study discusses the problem that many schools in disaster-prone areas have very limited adaptability. The problem of disasters is not only analyzed through one aspect, but it is also necessary to integrate various aspects. It is in accordance with the theory of complexity, which discusses the interrelationship of various aspects of human life in influencing an event.

Based on the results of the literature review, it is known that there are five components in supporting the sustainability of school adaptation in dealing with the eruption of Mount Merapi, including: social, economic, cultural, environmental, and





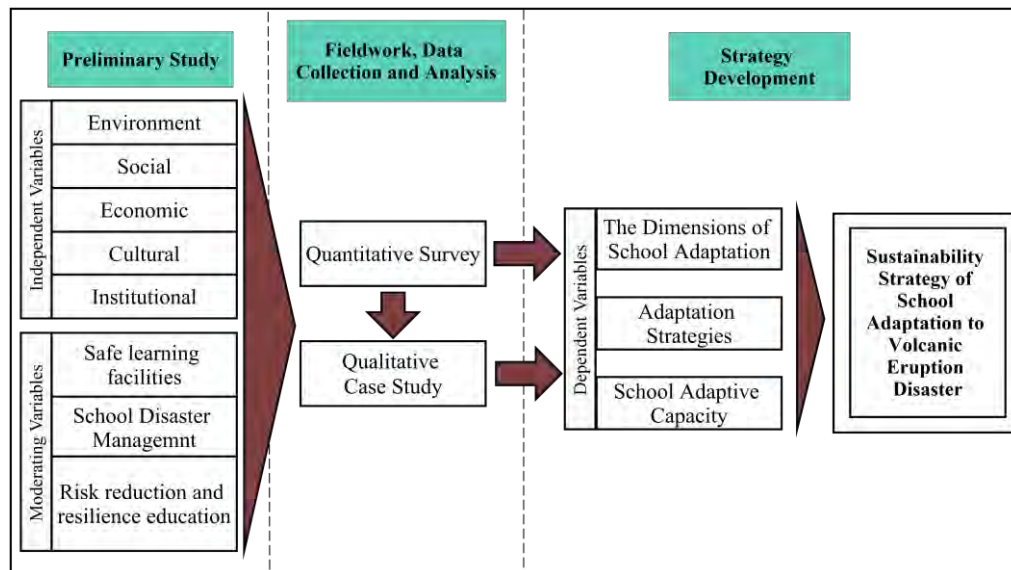
institutional. Each of these components will be supported by an appropriate strategy. The strategies adopted by the school will ultimately affect the behavioral or psychological adaptation abilities of the students and teachers at the school. The better of behavioral and psychological adaptation conditions that are owned, the higher adaptive capacity possessed by the school.

A review of the sustainability of school adaptation in eruption disasters offers several indicators. This adaptation indicators will go through an expert validation process by considering the development of existing disaster policies and practices in the local context. The adaptation indicators will be tested for validity by one officer of the Regional Disaster Management Agency, one officer of the Muhammadiyah Disaster Management Agency, one officer of the Non-Government Organization (Resilience Development Initiative), three academics who have background knowledge related to disaster adaptation, and two school principal that have good disaster adaptation. The process of developing a strategy for realizing school adaptation is illustrated in Figure 1.5.



Figure 1.5

Conceptual Framework



The result of this study was a strategy formulated for the sustainability of school adaptation in dealing with volcanic eruption disasters. This framework is obtained through the results of a literature review by comparing the principles of sustainability, disaster adaptation, and disaster safe school frameworks. The strategy is also obtained by integrating respondents' experience and knowledge about disaster adaptation efforts that they can do. This strategy is beneficial for creating safe and comfortable schools in disaster-prone areas. This strategy will provide direction for the process of developing school disaster adaptation in the future.

1.8 Operational Definition

The operational definition in this research will be limited according to the variables used in the research, namely adaptation strategy as the independent variable and adaptation capacity as the dependent variable.

1. **Adaptation strategy is a planned effort or action carried out by individuals or groups to overcome the problems faced by using existing resources with the aim of minimizing the impact of disasters, especially disaster victims.**
 - a. Social conditions are a condition related to circumstances or situations in society that are related to social conditions.
 - b. Economic conditions are a position that rationally assigns a person to a certain position in society. The assignment of a position is accompanied by a set of rights and obligations that must be exercised by that person.
 - c. Environmental conditions are a combination of physical conditions which include the condition of natural resources such as land, water, solar energy, minerals, as well as flora and fauna which can be utilized to minimize the impact of disasters.
 - d. Cultural conditions are a way of life that is developed and owned by a person or group of people and is passed down from generation to generation but is not passed down from generation to generation.
 - e. Institutional conditions are an order and pattern of relationships between community members in an organization that has limiting and binding factors in the form of norms.

2. Adaptive capacity is the ability to adapt to surrounding disaster conditions by reducing potential damage by utilizing social and economic resources, technology, access to information and institutional ability to adapt.

- a. Behavioral adaptation is the adjustment of living creatures to their environment in the form of behavior so that they can avoid disasters.
- b. Psychological adaptation is the process of psychological adjustment due to existing stressors, by providing self-defense mechanisms in the hope of being able to protect or survive attacks or unpleasant things.

1.9 Limitation of the Study

This research only focuses on the sustainability of school adaptation in the cope of volcanic eruption disasters, the impact of disaster policies in schools on school communities, and strategies to integrate every aspect into school adaptation. The scope of the study only discusses related to adaptive capacity. It is in accordance with Deng, Wang, and Yousefpour (2017) and Putu et al. (2019a), which states that adaptation is a strategy to overcome changes in individual behavior in response to disasters. Changes in behavior toward a disaster is a very important aspect because it can determine the number of disaster victims. If the community can adapt well, then the number of disaster victims can be minimized, and vice versa, if the adaptation in the community is bad, so the number of disaster victims will increase.

This research has limitations in the following aspects:

1. This research was only conducted in schools that are included in the Merapi Eruption Disaster Prone Area. On the other hand, the Merapi eruption disaster not only affected schools in disaster-prone areas but also other schools in the surrounding area. However, researcher only focused on 15 schools in disaster prone areas.
2. This research focuses on the high school level, even though if you look at the location of the schools affected by the eruption, more elementary schools were affected. This is because high school students will need longer time to stay at school and require better adaptation than students at other levels.
3. This research was only conducted at a certain time, which means the researcher did not conduct research every year to see any changes in the attitudes of the respondents.
4. This research focuses on the strategies implemented by schools to adapt to the Merapi eruption disaster, however, it does not reach the stage of developing a strategy to support disaster adaptation in schools.

1.10 Importance of Research

This research is arranged in accordance with the research gaps in this research topic. Various researches have discussed disaster adaptation and climate change adaptation; however, discussions about the capacity of school adaptation in volcanic eruption disasters and strategies for integrating adaptation capacity into disaster management are very few. Research that has been carried out around the slopes of Merapi Volcano is closely related to the technical, social, political, and economic aspects of the



community. There is no study that focuses on the school's adaptation capacity, considering that schools are places that children spend most of their time. Therefore, it is crucial to study this research topic to ensure that the concept of resilience must begin with good adaptation and can be integrated into schools. As a result, this research can contribute to the development of science, especially to integrate the sustainability of school adaptation in dealing with volcanic eruption disasters.

The focus of this research provides significant potential as a means to increase knowledge about school capacity in volcanic eruption disasters through its adaptation efforts. It can provide an understanding of the importance of incorporating aspects of disaster management (specifically adaptation) within the scope of the school. This research can be utilized by the government to create or develop a program or policy on increasing school adaptation capacity so that children who are victims of disasters can be minimized. This research not only provides benefits for the development of knowledge related to school adaptation capacity, but it also encourages the creation of safe schools in the vicinity of disaster-prone areas.

This research will encourage the government to be more responsive to children who are victims of disasters. The government must prepare strategies and policies to encourage the resilience of the younger generation in coping with disasters. Moreover, this research can introduce students to the cycle of disaster management (especially adaptation). The knowledge and understanding of disaster will encourage students to be better prepared in coping with disasters. Therefore, researcher believe that the final strategy that prepared at the end of the research will be beneficial to guide and



encourage the realization of sustainable adaptation in the cope of volcanic eruption disasters.

1.11 Summary

The first chapter of this research highlights the motivation behind this research, many students are still victims of disasters even though efforts to improve disaster preparedness are always carried out every year. This chapter also discusses the importance of adaptability in dealing with disasters, especially for students who are in disaster-prone areas of Mount Merapi. With this adaptability, it will be easier for students to adapt themselves wherever and whenever. Apart from that, adaptability can also encourage the realization of disaster resilience among high school students in disaster-prone areas.

Figure 1.6

Thesis Structure

