

Public Engagement and Community Resilience-Building Strategies in Post-Disaster Redevelopment Planning

A Case Study of Post-Eruption Mount Merapi in Sleman Regency (Indonesia)



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MASTER THESIS

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Abstract

Community resilience is the set of cognitive and interactional processes that enable local communities to learn from crises and disasters and transform towards enhanced disaster risk reduction and sustainability in their localities. Building community resilience is crucial to build back better and enhance community preparedness, especially in disaster-prone areas, such as the Mount Merapi region (Indonesia), where local people are exposed to frequent disruptive eruptions. This study looks at the redevelopment processes after the large eruption of Mount Merapi in 2010 and at whether and how these redevelopment interventions led to enhancing local community wellbeing and building resilience to the following 2018/2021 eruptions. More precisely, using Mount Merapi as a case study, a qualitative approach with in-depth interviews and autoethnography has been used as a methodology. This study looks at the public engagement strategies implemented in redevelopment planning processes after eruptions in 2010 and whether and how these led to community resilience-building strategies to deal with future disasters (2018/2021). This research seeks to contribute to the literature on planning in vulnerable regions, especially on public engagement, community resilience, and planning interventions in disaster-prone areas. In the end, this research concludes that engaging communities, indeed, can support redevelopment planning and building community resilience in post-disaster areas.

Key words: Bottom-up approach, Community resilience, Disaster Management, Public engagement, Top-down approach

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List of Abbreviations

Bappeda	: Badan Perencanaan dan Pembangunan Daerah (Regional Planning and Development Agency)
Bappenas	: Badan Perencanaan Pembangunan Nasional (State Minister for Chairperson of the National Development Planning Agency)
BNPB	: Badan Nasional Penanggulangan Bencana (National Disaster Management Agency)
BPBD	: Badan Penanggulangan Bencana Daerah (Regional Disaster Management Agency)
BPPTKG	: Balai Penyelidikan dan Pengembangan Teknologi Kebencanaan Geologi (Geological Agency)
DPUP	: Dinas Pekerjaan Umum dan Perumahan (Regional Public Work)
DIY	: Daerah Istimewa Yogyakarta (Special Region of Yogyakarta Province)
DRR	: Disaster Risk Reduction
ESDM	: Energi dan Sumber Daya Mineral (Ministry of Energy and Mineral Resources)
EWS	: Early Warning System
IDNDR	: International Decade for Natural Disaster Reduction
KRB	: Kawasan Rawan Bencana (Disaster-prone Area)
KSM	: Komunitas Siaga Merapi (NGO community)
MGM	: Museum Gunungapi Merapi (Mount Merapi Museum)
PKK	: Pemberdayaan Kesejahteraan Keluarga (Village women organization)
REKOMPAK	: Rehabilitasi dan Rekonstruksi Masyarakat dan Permukiman Berbasis Komunitas (Community-Based Settlement Rehabilitation and Reconstruction Project)
SKSB	: Saluran Komunikasi Sosial Bersama (NGO community)
TAGANA	: Tanggap Darurat Bencana (NGO Community)
UNDP	: United Nations Development Programme
UNDRO	: United Nations Disaster Relief Organization
UNISDR	: United Nations International Strategy for Disaster Reduction (United Nations Office for Disaster Risk Reduction [UNDRR])
VEI	: Volcano Explosivity Index

Chapter 1

Introduction

1.1 Background of Case Study

Mount Merapi (2,910 m) is situated on the border of Central Java and the Yogyakarta regions, and it is one of the most popular mountains in Indonesia. It is also one of the most active volcanoes in Indonesia and the world (Bappenas and BNPB, 2011). As depicted in Figure 1.1, Mount Merapi is located in four regions, namely Sleman Regency, Magelang Regency, Boyolali Regency, and Klaten Regency (Bappenas and BNPB, 2011). The first region is in Daerah Istimewa Yogyakarta Province, while the others are in Central Java Province.

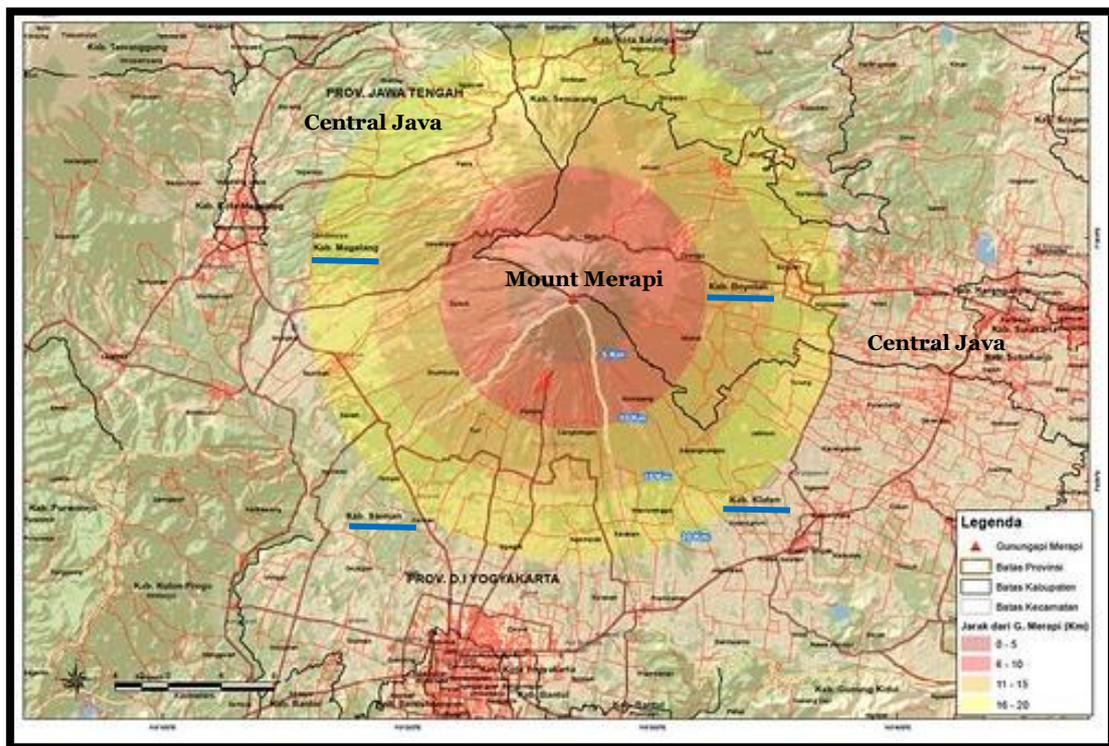


Figure 1.1 Map of Mount Merapi (Source: Bappenas and BNPB, 2011)

On October 26th, October 29th, November 3th, and November 5th, 2010, Mount Merapi experienced large explosions. The fatal large eruption occurred on November 5th, 2010 and killed 277 people, damaged and buried 2,682 houses, and caused a total loss of Rp 2,141,437,930,000.00 (approximately EUR 180,000,000.00) in Sleman Regency, Indonesia (Bappenas and BNPB, 2011). According to them, 40,634 houses in Sleman Regency also experienced minor damage due to Mount Merapi block-and-ash flows that formed by dome collapse and contained a substantial amount of broken dome fragments.

Indonesia has 127 active volcanoes or approximately 13% of the world's active volcanoes and 60% of that amount potentially endangering nearby residents (BNPB, 2016). Regarding Mount Merapi eruption, more than 80 eruptions have been recorded and among these eruptions were large eruptions with Volcano Explosivity Index (VEI) ≥ 3 since 1768 (Bappenas and BNPB, 2011; MGM-Jogjakarta, 2017). According to Newhall et al. (2000), it is likely that a large eruption from Mount Merapi can be explosive with hot ashes reaching up to 15 km and occurs once in 100 years. Following a large explosion in 2010 (VEI 4), the surrounding areas of Mount Merapi were flattened by lava, and it had left a vast sea of sand (Figure 1.2). This eruption has affected the settlement, infrastructure, social, economic, and cross-sectoral sectors resulting in disruption of activities and public services in Sleman Regency.



Figure 1. 2 The impact of Mount Merapi explosion in 2010 (Source: Voa Indonesia, 2020)

Mount Merapi's eruptions in 2010 were the biggest and it was the most devastating eruption compared to the previous eruptions in 1994, 1997, 2001, and 2006 (Bappenas and BNPB, 2011). After the large eruption in 2010, Mount Merapi experienced another magmatic eruption on 11 August 2018, which lasted until September 2019. After that, a series of explosive eruptions happened until 21 June 2020, and volcanic activity continues to increase until the end of 2020 (ESDM, 2020). From January 2021 until the end of the research (June 2021), the eruption of Mount Merapi still occurs. On June 24, 2021, there were three hot clouds of avalanches with a maximum sliding distance of three km to the southeast of Mount Merapi, and a column of smoke as high as 1,000 m was observed above the peak (ESDM, 2021). The hot avalanche clouds caused ash rain in several areas in Sleman Regency.

1.2 Problem Definition

For over forty years, the United Nations have established the disaster risk reduction (DRR) and resilience paradigm which calls upon all states to: (1) genuinely engage and empower local communities affected by disasters; and (2) help them to reduce their vulnerabilities and enhance their wellbeing and resilience to future disasters (IDNDR, 1994; UNDRO, 1982; UNISDR, 2005, 2015). However, too often states implement top-down approaches in planning disaster management interventions that fail to observe the United Nations principles, guidelines and recommendations, creating second disasters and facilitating disaster capitalism rather than building the resilience of affected communities and their localities (Gill, 2007; Harvey, 2017; Schuller and Maldonado, 2016; Imperiale and Vanclay, 2019a; 2019b; 2020a; 2020b; 2020c). These failures are due to vested interests in perpetuating business as usual, but also to the issue that still little is clear in planning literature about how to adequately engage local communities and build their resilience to future disaster. What is community resilience? What are the right participatory processes and methodology needed to engage and strengthen community resilience while planning interventions?

To enhance DRR and build community resilience to future disaster and integrate the DRR and resilience paradigm into all planned interventions, including post-disaster redevelopment planning, the Sendai Framework for Disaster Risk Reduction 2015-2030 (UNISDR, 2015) recommends that all states should put their efforts in four priority areas: 1) Understanding disaster risk; 2) Strengthening disaster risk governance; 3) Investing in disaster risk reduction for resilience; and 4) Enhancing disaster preparedness for effective response and to “build back better” in the activities of recovery, rehabilitation, and reconstruction (UNISDR, 2015).

Mount Merapi creates periodical, disruptive eruptions that affect the lives and wellbeing of local communities living in the Mount Merapi region. Building local community resilience is crucial to prepare local people for the frequent disasters that affect this region. More precisely, public engagement and community resilience-building are key processes that (ideally) have to be enacted especially after large eruptions, such as the one occurred in 2010, and in the post-disaster redevelopment planning that follows to better prepare local communities to likely future disruptive eruptions. Recovery interventions after disruptive eruptions must be understood as windows of opportunity to build back better, more sustainable, prepared and resilient local communities in the Mount Merapi region.

Resilient local communities are capable to reflect on the causes of their vulnerability, and mobilize their resources to prevent threats to their survival and prosperity (Diamond, 2004). Building community resilience in the Mount Merapi region enhances local community preparedness and thus makes local people more capable to prevent, reduce and cope with the negative impacts of frequent eruptions. Engaging local communities, recognizing their needs, desires and capacities and empowering them during post-disaster redevelopment processes are crucial processes that need to be enacted to enhance disaster risk reduction (DRR), build community resilience, and achieve the sustainable development goals (Imperiale and Vanclay, 2016, 2021). In this way, the redevelopment planning

programs can be realized in collaboration with and be more useful for the affected local communities (BPBD Sleman, 2010).

According to the DRR and resilience paradigm, the 2010 Mount Merapi eruption was an opportunity to learn from previous failures and positively transform towards “building back better” not only housing and infrastructure but also more sustainable and resilient communities. Little research has been conducted to understand whether and how post-disaster redevelopment following the 2010 eruptions led to enhancing DRR and building community resilience in the region, especially in the face of the new disruptive eruptions in 2018/2020. This study looks at the redevelopment processes after the large eruption of Mount Merapi in 2010 and seeks to investigate whether and how local communities affected by these eruptions were engaged in the emergency, recovery, reconstruction and development planning. It also looks at whether and how these community engagement strategies led to building local community resilience in the region. Using this case, this research seeks to contribute to the literature on planning in vulnerable regions, especially on public engagement, community resilience, and planning interventions in disaster-prone areas.

1.3 Research Objective

By conducting this research with a specific focus on the case of post-eruption Mount Merapi 2010, knowledge will be gained about community engagement, and community resilience-building processes and strategies in redevelopment planning in post-disaster areas. This study aims to understand how public engagement can support the redevelopment planning in post-disaster areas and to “build back better” more sustainable and resilient communities for future disaster. Furthermore, the levers, success factors, barriers, drawbacks, and pitfalls to do public engagement in post-disaster regions will be investigated from a community resilience-building perspective.

1.4 Research Questions

The primary research question of this research is: “How can public engagement support redevelopment planning to build community resilience in post-disaster areas – such as Sleman Regency after a large eruption of Mount Merapi 2010?”

The primary research question is accompanied by the following secondary research questions:

1. What is disaster risk management and what is community resilience, and how are these related to public engagement in post-disaster redevelopment planning?
2. What disaster management has been implemented in the Sleman Regency after the large eruption of Mount Merapi in 2010?
3. How was the community engaged in the redevelopment planning process after the large eruption of Mount Merapi in 2010?
4. How did the redevelopment planning process affect disaster management and community resilience in light of the next eruptions in 2018/2021 in the Sleman Regency?

5. What are from a community resilience building perspective the success factors, barriers, and conditions to do public engagement in redevelopment planning in post-disaster regions?

1.5 Scientific and Societal Relevance

The topic of public engagement in planning and decision-making has emerged a long time ago. Arnstein (1969) introduced a participation ladder that shows the different levels of engaging communities in public sector development projects. Edelenbos et al. (2018) provided an updated framework for categorizing the public engagement that involves ongoing interplay between public initiatives and governmental actors. Public engagement should be democratic and cooperative instead of individualist and competitive (Rawley, 2016). According to Innes and Booher (2004), engaging communities helps policymakers and planners understand the public preferences and builds support for policies. Public engagement may avoid expensive and time-consuming litigation against plans and policies (Innes and Booher, 2004; Scott, 1998). Friedmann (1992) argued that participation also empowers people and neighborhoods. Todd and Todd (2011) stated that public engagement could help build local capacities for future activities identification, planning, implementation, and maintenance. However, little research has been conducted about public engagement related to the disaster management and the redevelopment planning after disasters for such concrete cases as the Mount Merapi eruptions. The public engagement in the recovery, rehabilitation and reconstruction planning interventions and how these were carried out, especially from a disaster risk reduction and resilience perspective, do little or not appear in the picture.

The concept of community resilience has a long history and can be viewed from different angles and subthemes. Even though the concept of resilience is vague and still unclear (Gaillard, 2010) and some people disagree with the rhetoric used in policy and planning discourses that does not provide a clear operationalization of the resilience concept, such as Kaika (2017), it is good to be resilient in a common assumption (Davoudi, 2012a). In engineering (bounces back) resilience perspective, “the resistance to disturbance and the speed by which the system returns to equilibrium is the measure of resilience” (Davoudi, 2012a, p. 300). On the other hand, in ecological resilience perspective focused not on the ability of systems to persist, but on their ability to adapt (Davoudi 2012a; Fiksel, 2006). Eventually, a resilient system is “one which may undergo significant fluctuation but still return to either the old or a new stable state” (Davoudi, 2012a, p.301). Resilient communities have the capability to reflect on the causes of their vulnerability and mobilize the resources and will to prevent threats to their survival (Diamond, 2004).

As well as public engagement, little research has been conducted about the community resilience related to the redevelopment planning in the Mount Merapi eruptions in 2010 to deal with future disasters. The relation of community resilience in disaster management and redevelopment planning of the Mount Merapi eruptions in 2010, especially from the disaster risk reduction and resilience paradigm, has been little investigated. There is a knowledge gap regarding the possible explanation of community resilience in the redevelopment planning activities in 2010 Mount Merapi eruptions that

were carried out, and whether these enhanced the preparedness to deal with Mount Merapi eruptions in 2018/2021. Therefore, this research provides a first insight into that relationship.

Due to its location, geography, geology, climate, and other natural features, Indonesia is particularly affected by disasters, including volcanic eruptions, tsunamis, earthquakes, flooding, landslides, typhoons, hurricanes, extreme weather events, and bush fires. Those unpredictable disasters and their often-catastrophic consequences are expected to happen more frequently due to climate change (Reidmiller et al., 2018). Additionally, Coppola (2015) argued that there are two primary explanations for the increasing number of disasters which are climate change (both natural and human-influenced) and environmental degradation. They are together resulting in a greater overall number of disaster events. Understanding the outcomes of the redevelopment planning in Sleman Regency after the large eruptions of Mount Merapi 2010 is important to contribute to the literature on planning in vulnerable regions, especially on public engagement, community resilience, and planned interventions in disaster-prone areas. Understanding this in the light of the subsequent eruptions such as those in 2018/2021 is even more important to provide further insights on the processes of public engagement in redevelopment planning in post disaster regions, on the interconnections between public participation and community resilience-building strategies, and on the main drivers and constraints that lead states and local authorities to building (or neglecting) community resilience in post-disaster situations.

1.6 Outline

Chapter 1 introduced the background, problem definition, and relevant issues underlying this thesis. The research objectives, research questions, scientific and societal relevance are outlined too. Chapter 2 provides a theoretical framework that explains the theoretical debate concerning the subjects and themes of this research. Chapter 3 presents the methodology of this study including the longitudinal case study approach as research design, data collection, data analysis, and research ethics. Chapter 4 provides the findings of case study analysis. Chapter 5 discusses about interpreting the findings (discussion), the forthcoming conclusions, and discusses strengths and limitations. It also contains suggestions for follow-up research, recommendations, and reflections. In the end, the references as the literary sources and appendices can be found in the last section.

Chapter 2

Theoretical Framework

2.1 Planning in normal situations vs planning in crises

Planning in normal times proves quite often to be challenging with many pressures on its processes. However, modern-day planning is usually rather collaborative-rationalistic than technical-rationalistic due to the need to deal with complexity and diversity (Healey, 2003). Nowadays participation has become a common element of planning, worldwide, and it is almost guaranteed in the process of policy-making (Healey, 2003). In modern-planning, therefore, the role and wishes of the public have a bigger opportunity to be heard in the policy-making process. According to Bonn and Rundle-Thiele (2007), decision-making in a normal situation or a stable environment is characterized by a more cooperative, formal and analytical process than decision-making following a shock event. Decision-making in these normal situations tends to be comprehensive and slow (Bonn and Rundle-Thiele, 2007).

Planning processes in challenging times of crises, however, can usually be characterized as technical rationalistic rather than collaborative rationalistic. This means that the planning strategy used in times of crises and disasters is often a top-down, rather than bottom-up, with too often no room being left for public participation (Allmendinger, 2002). Decision-making in times of crisis is often characterized as being rather simplified and fast (Bonn and Rundle-Thiele, 2007). They argued that there is no time for a comprehensive and consultative way of planning in emergency times. In times of crises and disasters, because of time pressure and the insufficiency of alternative models, decision-makers often use a top-down or command-and-control approach in post-disaster planning. However, such an approach may erode the potentialities of local communities, increase local dependency on external support, and lead to second disasters (Imperiale and Vanclay, 2019b, 2020a, 2020b). Too often top-down planning in post-disaster situations does not take into account the social and environmental impacts created by the planned interventions, nor their mid-term to long-term sustainability, or the resilience of affected communities to engage and strengthen in the long run (Imperiale and Vanclay, 2019b).

It is a common assumption that the government has the ultimate power to make decisions in times of crises, and this often results into restricting the chances to build public participation (Allmendinger, 2002). The limited public participation in post-disaster planning is because of the complexities that characterized post-disaster planning and the affected communities (Jacobs and Williams, 2011). The affected local communities are often depicted as helpless in the literature. However, they are not helpless (Imperiale and Vanclay, 2016; Ganapati and Ganapati, 2008; Tierney et al., 2006). Studies undertaken by Ganapati and Ganapati (2008) found that the affected people of disaster are not hopeless but they are active agents of change who have their own priorities. Planners and policy makers should learn to listen and learn from them in post-disaster planning processes (Ganapati and Ganapati, 2008).

2.2 Defining disasters: the social impacts and pre-condition of disasters

Disasters have negatively affected humans since the beginning of its existence. More recent, the world is suffering more and more due to inevitable and unpredictable disasters. Disasters cause havoc on the living, on built structures, and on the environment. According to the United Nations (UNISDR, 2009, p. 9), a disaster can be defined as:

A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.

Even though there are several differences in these definitions of a disaster, the main idea of a disaster is a critical or emergency situation beyond the normal capacity of the people to deal with and it needs help from external assistance (de Guzman and Unit, 2003).

Disasters such as volcanic eruptions, tsunamis, earthquakes, flooding, landslides, and hurricanes are only seen as threats if they are causing damages and losses: collapsed infrastructure, damaged agricultural lands, losses of livelihoods, and losses of people's life (Gaillard, 2007). Disasters are usually disruptive, unpleasant and causing negative impacts on the social, economic and environmental sectors. They are often illustrated as a result of the combination of the exposure to a hazard, the conditions of vulnerability that are present, or insufficient capacity to reduce the potential negative impacts (UNISDR, 2009). They are measured in terms of the loss of life, injury, property and infrastructure damaged or lost, and environmental degradation (Coppola, 2015). Those impacts affected not only personal life but also community life. Disasters also affected social structure such as destruction of or damage to government systems, buildings, communications and essential services (Carter, 1991). According to Coppola (2015), the consequences of disasters are shown through both direct and indirect means, and can be tangible or intangible. The study undertaken by Moe and Pathranarakul (2006) found that the efforts in reducing the disaster's social impact are substantial due to the devastating impacts of the disasters.

Looking at the social preconditions can help to determine the impact of disasters, the potential disasters that can happen later, how a disaster unfolds, and how communities can respond (van Bavel et al., 2020). Additionally, they argued that climatic and environmental conditions, levels of technology, and the state of economic development are considered as the potential preconditions to a disaster. Due to its location, geography, geology, climate, and other natural features, Indonesia is particularly affected by disasters. Indonesia is located in the "Ring of fire" or in the edge of the Pacific Ocean, because of the subduction of tectonic plates, leading to high frequencies of earthquakes and volcanic eruptions. Van Bavel et al. (2020) argued that regardless of the prevention measures and mitigation strategies implemented to deal with the disasters, the communities that live in this type of disaster-prone area are often considered highly vulnerable and measured as the potential preconditions to a disaster too. To cope with that, determining disaster response in systematic management is necessary, as it contributes as the main factor of integrated disaster management (Zhang et al., 2006).

2.3 Disaster management cycle

The systematic management as a disaster management framework is generally represented as a circular process or continuum of interlinked activities (Carter, 1991; Moe and Pathranarakul, 2006) – see also figure 2.1. Disaster management essentially deals with management of resources and information towards a disastrous event and is measured by how efficiently, effectively and seamlessly one coordinates these resources (Modh, 2010). According to Carter (1991), the disaster management cycle is not a series of events with a definite start and end, which can be addressed in the transitional period of disaster. Carter considers it to consist of a continuum. Even though different opinions concerning how such a disaster management cycle is depicted subsist, almost all of the cycles are intermixed and performed to some degree before, during, and after disasters (Coppola, 2015).

In spite of the fact that a range of terminology is often used in describing disaster management, effective disaster management cycle applies four phases: mitigation, preparedness, response, and recovery (Alexander, 2002; Carter, 1991; Coppola, 2015; Todd and Todd, 2011), which is illustrated in figure 2.1. The figure illustrates that disaster tends to exist in a continuum, with the recovery from one often leading straight into another. While response is often pictured as beginning directly after disaster impact, it is common for the actual response to begin well before the disaster actually occurs (Coppola, 2015). Additionally, he argued that the components of effective disaster management cycle (shown in figure 2.1) are:

- Mitigation or Disaster Risk Reduction (DRR)

Mitigation involves minimizing or eliminating the probability or the consequences of a hazard. It concerns to minimize the impacts of a hazard towards communities.

- Preparedness

Preparedness includes providing people who may be affected by a disaster or who may be able to help those affected with the tools to increase their chances of survival. It concerns minimizing the financial and other losses of the affected people.

- Recovery

It involves returning affected people' lives back to a normal state following the impact of disaster consequences and begins after the immediate response has ended and can continue for weeks, months, or years later.

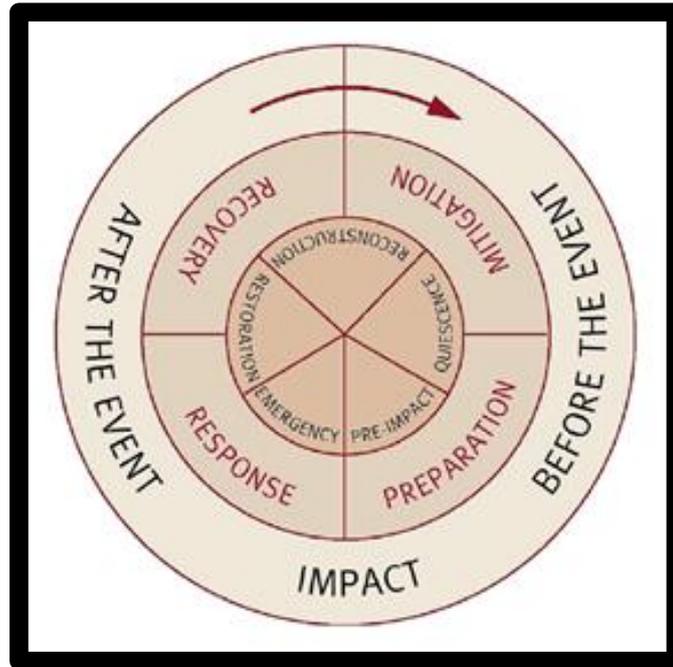


Figure 2.1 The disaster management cycle (Source: Coppola, 2015)

2.4 Post-disaster phase

The post-disaster phase – i.e., after the event of disaster – in the disaster management cycle is intended to guarantee that the impacts of the disaster are effectively can be pictured the future and to make sure that the development does not create further disaster problems or worsen existing ones (Carter, 1991). Aligned with Carter (1991), Todd and Todd (2011) stated that the post-disaster phase includes activities in the fields of recovery, rehabilitation, reconstruction, and development. Resuming from Todd and Todd (2011), post-disaster phase activities include: 1) Decisions and actions that taken after a disaster with the aim of restoring or improving the living conditions of disaster-affected communities before the disaster; 2) Restoring the basic services and infrastructures; 3) External support; 4) Rebuilding homes and other facilities; and 5) Empowering communities to protect themselves. Those activities are needed to provide room to increase disaster risk reduction (DRR) measures, which can be applied during the next pre-disaster phase.

Aside from the detailed disaster management cycle figure from Coppola (2015), especially in post-disaster management, many different typologies are largely the same but distinguish in detail just a bit different stages/phase. For example, According to Carter (1991) and Van Zeijl - Rozema et al. (2008), an integrated-disaster management cycle can be divided into different phases:

- Pre-disaster phase: prevention, mitigation, and preparedness
- During the disaster phase: disaster impact (emergency response and disaster countermeasures)
- Post-disaster phase: recovery (restoration, rehabilitation, and reconstruction) and development (redevelopment process)

Therefore, due to the various typologies in distinguishing the post-disaster phases, the researcher follows the Todd and Todd (2011) for the distinction in the Mount Merapi eruption stages. That was because the disaster management applied in the Sleman Regency was largely based on Todd and Todd (2011) typology that including the recovery, rehabilitation and reconstruction stages in the post-disaster management cycle. Next to that, this thesis looking for preparedness before and during disasters. Hence, the researcher includes the emergency phase in this research because this phase is a direct action on how to deal with the disasters. The emergency phase is prepared partially in the pre-disaster stages, and thereby should ideally have learned from previous disasters

As part of the post-disaster phase, *disaster recovery* activity plays an important and significant role in the disaster management cycle because it can afford an opportunity to develop DRR measures (Todd and Todd, 2011). The definition of disaster recovery is:

The restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors (UNISDR, 2009, p. 23).

The emergency management function by which countries, communities, families, and individuals repair, reconstruct, or regain what has been lost as result of a disaster and, ideally, reduce the risk of similar catastrophe in the future (Coppola, 2015, p. 405).

According to Coppola (2015), once the disaster occurs, recovery is implemented for weeks, months, or years. Compared to the other phases of disaster management, it induces the biggest amount of interest from communities and the most expensive action (Coppola, 2015). Next to that, Coppola (2015) stated that the recovery function is characterized by the decisions and actions that enable the building of homes, the construction of infrastructure, strengthening of economic drivers, and other actions related to urban or community development.

Based on Coppola (2015), post-disaster recovery is divided into short-term and long-term phases with different activities. The short-term recovery phase directly follows the disaster event, starting while emergency response operations are ongoing. It aims to stabilize the lives of the affected people to prepare them for the long road toward rebuilding their lives that include activities such as providing temporary housing, distribution of food and water, and restoration of critical infrastructure. On the other hand, the long-term recovery phase is beginning after the emergency phase of the disaster has really ended and to rebuild and rehabilitate. In this phase, this activity takes years and needs more funding and more actors from all sectors than to any other emergency management phase (Coppola, 2015). He also stated that long-term recovery activities require a significant amount of coordination and planning while short-term recovery activities tend to be guided by (pre-disaster prepared) response plans and are often uncoordinated.

2.5 The disaster risk reduction (DRR) and resilience paradigm

According to the United Nations (UNISDR, 2009), disaster risk reduction (DRR) is considered to be an integral part of social and economic development, and has been recognized by various global documents on DRR and sustainable development. DRR is defined by the United Nations (UNISDR, 2009, p. 10) as:

The concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.

Since 1980s, the United Nations have promulgated the DRR and resilience paradigm, which calls upon all states to genuinely engage and empower local communities affected by disasters and to help them to reduce their vulnerabilities and enhance their prosperity and resilience (IDNDR, 1994; Jha et al., 2010; UNDRO, 1982; UNISDR, 2005, 2015).

Supporting the previous declarations to enhance DRR and to build community resilience, the Sendai Framework for Disaster Risk Reduction 2015-2030 (UNISDR, 2015) recommended that all states should take into account four priority areas: 1) Understanding disaster risk; 2) Strengthening disaster risk governance; 3) Investing in disaster risk reduction for resilience; and 4) Enhancing disaster preparedness for effective response and to “build back better” in the activities of recovery, rehabilitation, and reconstruction. Even though the disaster risk reduction and resilience paradigm are not yet fully implemented in practice of disaster management, there can be seen a shift in disaster management thinking from “managing disasters” to “reducing disaster risks and building resilience” (IDNDR, 1994; UNISDR, 2005, 2015). Referring to the DRR and resilience paradigm, crises and disasters should be seen as opportunities to “build back better”, not only infrastructure but also more sustainable and resilient societies (Collodi et al., 2021; Imperiale and Vanclay, 2020a; 2020b). It also should be seen as opportunities to learn from previous failures, to transform towards “build back better”, increasing disaster risk reduction, and strengthening community resilience (Imperiale & Vanclay, 2020a; 2020b; Manzini and M'Rithaa, 2016).

2.6 Public engagement in post-disaster redevelopment planning

Public engagement is a goal as well as a tool of redevelopment (UNDP, 2020). It illustrates an ideology that constitutes enhancing shared understanding in a decision-making process. Rawley (2016) stated that public engagement should be democratic and cooperative instead of individualist and competitive or driven by individual and group interests. In the emergency stage during and directly after a disaster the governments do top-down approaches. However, they have the tendency to continue such top-down approach, little collaborative planning approach in the subsequent stages of recovery phase, and rehabilitation and reconstruction phase of post disaster redevelopment planning (Ingram et al., 2006; Innes and Booher, 2010). As already indicated in Chapter 1, public engagement helps

policymakers and planners to understand the public preferences and to build support for policies (Innes & Booher, 2004). It may avoid expensive and time-consuming litigation against plans and policies (Innes & Booher, 2004; Scott, 1998). Friedmann (1992) argued that public engagement also empowers people and neighborhoods. Public engagement can help build local capacities for future activities identification, planning, implementation, and maintenance (Todd and Todd, 2011).

Arnstein (1969) introduced a participation ladder that shows the different levels of public engagement in relation to public sector development projects. She argues that there are different degrees to which people can engage in decision-making processes and places “citizen control” at the highest ladder. Based on typology of Arnstein (1969) and subsequent study of Choguill (1996), Davidson et al. (2006) proposed a ladder of community participation in the context of the post-disaster reconstruction. After that, Edelenbos et al. (2018) provided an updated framework or typology for categorizing the public engagement that involves ongoing interplay between citizen initiatives and governmental actors.

The importance of public engagement in post disaster planning processes are emphasized in many kinds of literature such as in Ahrens and Rudolph (2006), Gaillard and Mercer (2012), and Yamamura (2010). Public engagement is needed to engage with local communities to integrate the wishes, needs, and knowledge in processes regarding the redevelopment of affected areas after disasters (Yamamura, 2010). Public engagement refers to people’s ability to participate in decision-making processes that can influence policy-making (Ahrens and Rudolph, 2006). Gaillard and Mercer (2012) stated that public engagement is necessary, as it permits and stimulates the social interaction needed for knowledge reproduction. Horney et al. (2016) argued that public engagement in recovery planning is more successful when planners actively engage individuals and groups and when dedicated staff are assigned to participation activities. Therefore, public engagement can be appropriate and effective when actively involving and consulting communities in the post-disaster redevelopment planning process (UNDP, 2020).

Post-disaster redevelopment planning processes are often centrally planned and implemented, and they use a top-down approach that does not engage stricken communities in their own redevelopment process (UNDP, 2020). Ingram et al. (2006) and Innes and Booher (2010) stated that in emergency times (emergency phase in disaster management), the governments do top-down approaches. These authors stated that after the emergency times (post-disaster stages of recovery and rehabilitation and reconstruction), the governments have a tendency to continue to plan in a top-down approach and lack of collaborative manner or less of engaging affected people. They argued that was because the urgent need of redeveloping affected areas. In the context of post-disaster planning, public engagement sometimes can be viewed as an additional time-consuming process that adds even more to the challenge of dealing with disasters. However, based on experiences, the post-disaster redevelopment planning processes can be improper and ineffective when communities are not consulted and involved actively in the process (UNDP, 2020). In other words, public engagement can increase the effectiveness and outcomes of post-disaster redevelopment planning processes. Engaging people and their communities

help to enhance the delivery and quality of redevelopment services, improves social inclusion, and brings greater transparency and accountability. Ingram et al. (2006, p. 6) argued that:

Redevelopment policies should be cautiously developed upon comprehensive, site-based assessment of risk and vulnerability alongside continual consultation with all stakeholders.

Public engagement in the form of consistent and continuous support, consultation, and information is needed in order to create longer-term plans that reduce anxiety, frustration, and consequently uncertainty (Ingram et al., 2006). Public engagement can be appropriate and effective when it actively involves and consults communities in the post-disaster redevelopment planning process (UNDP, 2020). Jha et al. (2010) stated that public engagement approach must be in the conceptual framework for reconstructing after disasters to assist in the recovery process, in order to make sure that the development in post-disaster does not create further disaster problems or worsen existing ones.

2.7 Community resilience in post-disaster regions

People live in challenging times of uncertainties and unpredictable disasters that might happen everywhere and anytime. This condition has encouraged planners and policymakers to try understanding local development through the concept of resilience (Cutter et al., 2008; Imperiale and Vanclay, 2016; Saunders and Becker, 2015). The word “resilience” illustrates the adaptive and evolutionary dynamics that deal with uncertainties arising (Restemeyer, 2018) and allow systems to respond to disturbance and change (Davidson, 2010). Sometimes, resilience is replacing sustainability in policy discussions, just as the environment has been included in the very important factor influencing climate change (Davoudi, 2012b; Wilson, 2012). Due to the importance of resilience, there is increasing literature and research that acknowledges the benefits of resilience in vulnerable regions (Scott, 2013). The United Nations (UN, 2016, GA 71/276, p.22) define resilience as:

The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management.

There are four issues to translate resilience from natural to the social world (Davoudi, 2012a). The first one is the intentionality of human actions. Community resilience happens through and is influenced by the willingness of people to take action that is driven by feelings and a sense of social responsibility and public obligation (Imperiale and Vanclay, 2016). The second issue relates to the outcome or goal of resilience. The desired outcome created by greater community resilience would improve social sustainability (Imperiale and Vanclay, 2016). The third issue relates to the defining system’s boundary. It means that analysts inevitably focus on some issues and ignore others. In this research, the disturbance to the social system was the first disaster in the form of Mount Merapi eruptions in 2010. Next, the affected communities found that they had to deal with the ongoing

experience of redevelopment planning in the post-disaster recovery, rehabilitation and reconstruction phases to cope with the Mount Merapi eruptions in 2018/2021. The fourth issue relates to justice and fairness. Community resilience leads to better outcomes for humans. It comes into action through the cooperative behavior of individuals, bringing advantages to all humans. Resilience is about “enhancing the wellbeing of all people, especially the worse-off members of society - it is not about protecting the financial interests of the rich and powerful” (Imperiale and Vanclay, 2016, p. 216).

According to Goldstein (2007), enhancing community resilience in post-disaster regions is needed in order to take advantages of disasters to develop socio-ecological relationships that might prevent impending tragedy (Goldstein, 2007). Imperiale and Vanclay (2021, p. 5) define community resilience as:

The social processes (cognitive and interactional) that occur within places and that are put into action by local people to collectively learn and transform toward enhancing community wellbeing and addressing the negative risks and impacts they perceive and experience as common problems.

Resilience communities have the capability to reflect on the causes of their vulnerability and mobilize the resources and will to prevent threats to their survival (Diamond, 2004). To sum up, community resilience can enhance a community’s preparedness to deal with the frequent disasters and it can prevent and/or reduce the negative impacts of them.

2.8 Conceptualizing public engagement and community resilience in post-disaster redevelopment planning

According to Carpenter and Gunderson (2001), in social-ecological systems and sustainable natural resource management theories, resilience is the adaptive and transformative capacity of systems, especially social systems, to learn and transform following a crisis or a disaster. These authors stated that a crisis or a disaster depicts a window of opportunity for social actors to learn and transform, bringing about innovative changes that can improve the social-ecological systems management and resilience in the future. In a world with such uncertainties, understanding how to build resilience in social systems means understanding how people learn from crises and disasters to transform within their communities and institutions in order to reduce the risks and impacts created by a crisis or a disaster, and to increase the prosperity of communities (Imperiale and Vanclay, 2021).

Disasters cannot be completely forecasted. But the experience of disasters appears to be helpful for mitigating the impact of disasters at government and community levels (Yamamura, 2010). Yamamura stated that affected people seem to learn from their experiences of disasters and gain relevant information and knowledge about how affected communities can take collective actions to protect against them. Experiencing a disaster becomes a joint learning process for communities resulting in better disaster preparedness and therefore higher resilience (Yamamura, 2010). This statement is aligned with Cioccio and Michael (2007), who argued that experiencing disasters have positive influences on the risk perceptions of the community and consequently on the resilience of a community.

According to Imperiale and Vanclay (2021), local communities are the arenas where crises and disasters are perceived and experienced in their negative impacts that should be mitigated, and where the risks of the bad consequences of future disasters should be reduced. These authors argued that the vulnerability of local communities negatively influences the likelihood and intensity of crises and of disaster risks and impacts. Conversely, local capacity can contribute to the improvement of prosperity and disaster risk reduction at different levels of societies. The vulnerability of local communities is negatively influenced by social risks such as inequity and poverty, which compose the local root causes of disasters (Oliver-Smith, et al. 2017; Imperiale and Vanclay, 2021).

Social risks include those negative social processes within local communities and across multiple governance scales that undermine the social sustainability of a planned intervention or of a community in its whole and include: rent-seeking, elite capture, organized crime infiltration, disaster capitalism, and corruption (Imperiale and Vanclay, 2021). Social risks negatively influence and are negatively influenced by local vulnerabilities. Social risks and vulnerabilities exacerbate hazard exposure and associated disaster risks and impacts. On the other hand, local community resilience is the agency that enables members of affected communities to learn from crises and disasters, and transform towards reducing local vulnerabilities, social risks, and associated disaster risks and impacts, and enhancing disaster risk reduction (Imperiale and Vanclay, 2021).

Local knowledge is considered necessary for post-disaster redevelopment planning processes by such authors as Jacobs and Williams (2011) because it saves time and reduces the risks of governments responding ineffectively to the consequences of a disaster. Moreover, they said that policies are most effective in their implementation when they are based on local pieces of knowledge and have been properly resourced. The tension between a top-down control process and the need for local communities in disaster management is a systemic feature that needs to be acknowledged. The best responses are those which are properly resourced but sufficiently flexible to enable staff to respond to the affected communities and to make best use of local resources (Jacob and Williams, 2011). Next to that, Diefendorf (2009) stated that public engagement was one of several reasons for the open, transparent, and rapid planning processes after a disaster in New Orleans, which made that disaster turn into a window of opportunity to redevelop a better place. Those statements are aligned with Collodi et al. (2021) and Imperiale and Vanclay (2020b) who argued that crises and disasters should be seen as windows of opportunity to “build back better” places and communities. Another reason for the importance of public engagement in post-disaster recovery or redevelopment is that planners and policymakers should be concerned about the resources, strengths, and weaknesses of the communities, which can be achieved by engaging communities (Vallance, 2011). In the end, those pieces of knowledge are necessary because vulnerabilities have to be identified to enhance resilience concerning future disasters or disaster risk reduction (Lindell and Prater, 2003).

Chapter 3

Methodology

This chapter presents the methodology of this research that has been used for answering the research questions as described in chapter 1. The research methodology is qualitative research approach and case study approach. The qualitative approach builds the framework of thinking of this research, while the case study approach relates to the data collection and analysis. Qualitative data collection is core to this study and applied through: literature study, analysis of formal documents and media collections, in-depth interviews, and an autoethnography (personal experience of the author who originates from the Merapi region). The information is gathered to explain public engagement in post-disaster areas in the Sleman Regency after the large eruption of Mount Merapi in 2010, and to explore how these activities engaged and strengthened local community resilience, especially in the light of the recent Mount Merapi eruption in 2018/2021.

3.1 Literature study

A literature study has been conducted of existing theories related to public engagement, community resilience, and disaster management about comparing the actual condition of the area study from field observation with the theories. Literature study gave the researcher a picture about post-disaster redevelopment planning in order to construct the theoretical framework for this study. Then, the researcher compares the statements from the literatures to her findings. Next to that, existing theories are analyzed regarding the relationship between public engagement and community resilience to deal with the frequent disaster of Mount Merapi eruption. Additionally, the literature study focused specifically on the links between all of these themes with community resilience. Subsequently, literature about other cases of recovery after a disaster is examined in order to learn about post-disaster redevelopment planning in other contexts. The sources of the literature are mostly taken from ResearchGate and Google Scholar.

3.2 Qualitative research

This study began with literature research. The literatures were gathered by searching in Google search engine with specific keywords, such as “public engagement journal”, “community resilience journal”, “participation journal”, “disaster management journal”, “post-disaster planning”, etc. The literatures were mostly from ResearchGate and Google Scholar. Then relevant lead was follow-up.

3.3 Case Study Approach

This research uses the case study approach to examine both social and physical processes and phenomena associated with the post-eruption of the Mount Merapi in Sleman Regency. The Sleman Regency has been chosen because this region often faces many kinds of disasters. For the most, the Sleman Regency always dealing with the Mount Merapi eruptions continuously due to the periodical characteristic of the Mount Merapi eruption. How the Sleman Regency always cope with never ending disaster was interesting thing to study. While the post-disaster redevelopment planning represents the response of the dynamic situation in the societies, the activities and physical condition of Mount Merapi represent the disaster events. First, the Mount Merapi eruptions in 2010 will be investigated related to redevelopment planning, including in the emergency phase, recovery phase, and rehabilitation and reconstruction phase. Then, the existence and role of public engagement in those phases will be examined through in-depth interviews. Those are also applied to the Mount Merapi eruptions in 2018/2021. Then, a comparison will be made about the preparedness of the affected communities in dealing with the Mount Merapi eruptions in 2010 and 2018/2021. For example, in the feeling of social responsibility towards the most vulnerable and those most affected by the Mount Merapi eruptions, and in developing local knowledge about the risks of eruptions, and building cooperation to deal with the risks of the disasters. Besides, how did the redevelopment planning process affect disaster management and community resilience will also be investigated. Finally, the levers, success factors, barriers, drawbacks, and pitfalls to doing public engagement in post-disaster areas, will be investigated from a community resilience-building perspective.

3.4 Data Collection

The use of several different research methods to test the same findings (triangulation) is needed because each research method has particular strengths and weaknesses, there is always a danger that research findings will reflect, at least in part, the method of inquiry (Babbie, 2010). Triangulation means that the use of a mixed data collection method maximizes the validity of the data. In this way, the strengths of the overall research approach can be enhanced and the limitations or the weaknesses of individual methods can be counteracted (Atkinson and Coffey, 2003). In order to answer the primary and secondary research questions of this research, several methods of data collection are used: analysis of formal documents and media collection, in depth interview, and autoethnography. These methods will be described in this section

3.4.1 Analysis of Formal Documents and Media Collections

In the redevelopment planning process of post-eruption of Mount Merapi in 2010, multiple formal plans and policy documents were analyzed from the National Development Planning Agency, Regional Planning Agency, National Disaster Management Agency, and Regional Disaster Management Agency for the future were designed. This was done in order to examine whether and how public engagement was done, and how this might support redevelopment planning to build community resilience in post-

disaster areas. Public engagement activities were studied and analyzed that were included in the process of the creation of those formal plans and policies for redevelopment. The formal documents were the documents released by the governments from national and local level (regional) mentioned above. The documents were selected according to their importance and role in redevelopment planning processes after the Mount Merapi eruptions in 2010. For instance, the documents with key words such as “Merapi eruption”, “Spatial plan in Sleman Regency”, “Regulation in disaster-prone areas” were analyzed. They were listed in the appendix A.

Furthermore, online newspaper articles, blogs, and many kinds of social media about the redevelopment planning after Mount Merapi’s explosion in 2010 and 2018/2021 were analyzed. This has been conducted by the researcher to gain a new perspective from different angle. Usually, news from media were bold and straight to the point if something was good or bad. These documents were gathered by searching in Google search engine with specific keywords in the Indonesian language, such as “Erupsi Gunung Merapi 2010”, “Akibat erupsi Merapi 2010” “Peran masyarakat setelah erupsi Merapi 2010”, and “Erupsi Gunung Merapi 2021”. Then, relevant leads were followed up. The result of this activity was an insight into the redevelopment planning process based on media releases. The sources of the media collections are mostly taken from Kompas.com, Viva.co.id, Voa Indonesia, Jawa Pos, and Antara News. Those were used due to their focus on opinions about emergency phase, recovery phase, and rehabilitation/reconstruction process from different perspectives.

3.4.2 In-depth Interviews

To better understanding and deeper insight about the condition in the case study areas, the in-depth interview was conducted into why and how issues related to the four key terms: public engagement, community resilience, disaster management, and redevelopment planning. They are determined into features that are used to create the interview guides for the in-depth interviews (see Appendices B, C, D).

Related to the case study of post-eruption Mount Merapi in 2010 in Sleman Regency, the interviews comprised three types of interviewees that had an important role during and after the Mount Merapi eruptions in 2010 and 2018/2021, and in redevelopment planning processes after the Mount Merapi eruptions in 2010: government actors, affected communities, and NGOs. It represents the diversity of stakeholders involved in the post-disaster redevelopment planning of post-eruption Mount Merapi in 2010 and 2018/2021. The selected government actors show the different levels of government institutions, interviewees were from: the national level, local level I (province), and local level II (regency). At the national level, the government officer of spatial planning and disaster management division from Bappenas (National Development Planning Agency) was taken as the interviewee. Government officers from Bappeda (Regional Planning and Development Agency) DIY and BPBD (Regional Disaster Management Agency) DIY were taken as the interviewees from the local level I

(provincial). In the local level II, Government officers from Bappeda (Regional Planning and Development Agency) Sleman and BPBD (Regional Disaster Management Agency) Sleman were taken as the interviewees from the local level II (regency). One government actor interviewed was a former employee at Bappeda Sleman and BPBD Sleman, who played an important role in the redevelopment planning process after the Mount Merapi eruption in 2010.

From the affected communities five inhabitants were selected, who experienced and were directly affected by the Mount Merapi eruption in 2010 and 2018/2021. They currently live in disaster-prone areas of Mount Merapi and are still dealing with the Mount Merapi eruptions in 2021. They have different backgrounds. Two of the five selected interviewees were the community's representatives. One of them was a teacher, one of them was a public figure (an elder), and one of them was a farmer. They also had an important role in redevelopment planning processes after the Mount Merapi eruptions in 2010. They have a good relationship with the majority of the affected communities. Hence, their answers from the interview not only from what they thought but also, they know what the other affected communities thought (broader perspective). Next to that, they also want to be interview online. That was something hard to do in a remote area. Therefore, they were chosen by the researcher.

The selected NGOs relate to the organization that was frequently mentioned by the other actors during the interviews and played important roles during the Mount Merapi eruption in 2010 and 2018/2021. These NGOs also experienced Mount Merapi eruptions in 2010 and 2018/2021 and were involved in redevelopment planning after the Mount Merapi eruption in 2010. One of the interviewees was the chief from SKSB (Saluran Komunikasi Sosial Bersama). It is one of the non-profit organizations whose majority of members are youth who live in the disaster-prone areas of Mount Merapi. The SKSB is engaged in disaster management in Cangkringan District in Sleman Regency, especially regarding monitoring the weather, lavas flow, and Mount Merapi activities. Another NGOs interviewee was the chief of KSM (Komunitas Siaga Merapi). It is like SKSB communities but only in Glagaharjo Village (part of Cangkringan District). Additional interviewee was the chief of TAGANA (Taruna Siaga Bencana) Sleman. TAGANA Sleman (save and rescue team) is the NGO that is engaged in disaster management in Sleman Regency. It helps communities during and after the eruptions of Mount Merapi in 2010 and 2018/2021.

The total number of interviewees was fourteen people, which are described in table 3.1 and the detailed questions of the interviewees are in Appendices B, C, and D.

Table 3.1 The types of interviewees (Source: Author, 2021)

Interviewee	Types of interviewees	Organization
X1	Government Actor	Bappenas (National level)
X2	Government Actor	Bappeda DIY (Local level I [Province])
X3	Government Actor	BPBD DIY (Local level I [Province])
X4	Government Actor	Bappeda Sleman (Local level II [Regency])
X5	Government Actor	BPBD Sleman (Local level II [Regency])
X6	Government Actor	Ex- Bappeda Sleman and BPBD Sleman
X7	Affected Community	Inhabitant
X8	Affected Community	Inhabitant
X9	Affected Community	Inhabitant
X10	Affected Community	Inhabitant
X11	Affected Community	Inhabitant
X12	NGO	SKSB
X13	NGO	KSM
X14	NGO	TAGANA Sleman

Due to the Covid-19 pandemic, the interviews had to be done online by “Zoom” meetings. They were direct and live conversations and were recorded. The interviewer read the consent form (Appendix E) to each interviewee and asked permission to record the interview. The records of the interviews then have been transcribed, translated into English, and coded (Appendix F). All the results then to be uploaded to Google Drive to minimize the risk of data loss.

3.4.3 Autoethnography (personal experience)

In addition, an autoethnography or personal experience approach has been used in this research because the researcher experienced the Mount Merapi eruptions in 2010 and 2018/2021. Besides, the researcher lived in a disaster-prone area of Mount Merapi since she was born. The researcher was part of the affected communities, a government officer in the Sleman Regency, and experienced the redevelopment planning process regarding the Mount Merapi eruption in 2010. Therefore, she has a better perspective on what happens in the activities that were carried out by the governments. In this study, her personal experiences have been used as primary data. The researcher followed the usual ethnographic research process of data collection, data analysis, and report writing. She has collected data by participation, observation, in-depth interviews, and document analysis. Her personal documents, such as photos of the eruptions and what she experienced when the disaster strike was compared with the other interviewees. After that, she has verified the data by triangulating the sources and contents from multiple sources. Then, these data were analyzed and interpreted in order to decipher the meaning of events and to finally write the findings.

By conducting an autoethnography in this research, the researcher has several advantages. First, she is part of the affected communities and a government officer in the Sleman Regency. She knew what really happens in all processes from communities and government perspectives. Therefore, she can make a comparison from different angles and have a better understanding of which government agencies and affected communities that related to the redevelopment planning. Second, she knew the

majority of the interviewees that make them were more open to saying what they thought and what they really want regarding the issues. In contrast, being a government officer could have a potential bias. Hence, in the consent form, the researcher declares that she is a master's student from the University of Groningen (The Netherlands) and University of Gadjah Mada (UGM) (Indonesia) not as a government officer.

3.5 Research Ethics

To cope with many respondents from different backgrounds and the degree of vulnerability, it was essential to organize the in-depth interview with research ethic principles in mind. The privacy of respondents, especially the results from the in-depth interview process, was carefully maintained in the research. To deal with moral ambiguity, the moral obligation and responsibility of providing the consent form for the interviewees has been provided in this research. This consent form was to safeguard a common understanding between the interviewer and the interviewee. It was used to address the interview process, the information processing, and the needs of using the materials for the public. According to the autoethnography approach, the researcher declared she has no conflict of interest in conducting the research. Next, the researcher noted that relationships between interviewees were an inevitable part of participant observation, especially in bottom-up, organic social processes at the local level and where the research is also participating. Hence, she realized that this relationship may have influenced the perception of her role. However, she tried to correct this by cross-checking and validating her own story with other interviewees and sources.

Chapter 4

Findings

4.1 The chronology of the Mount Merapi eruptions

On basis of the in depth-interviews with the government officers, NGOs, and affected communities, of the analysis of formal documents and media collections, and of the autoethnography (the author's experience), the chronology of the Mount Merapi Eruptions has been reconstructed and described in this section. This section subsequently describes the emergency phase, recovery phase, and rehabilitation and reconstruction phase. As depicted in figure 4. 1, 2010 eruptions began on September 20, 2010, and ended on April 2011. Until June 2021 (the end of the research), the rehabilitation and reconstruction phase carried out in 2010 eruptions is not yet finished, but the new eruptions of Mount Merapi already occurred on May 11, 2018 (2018/2021 eruptions). The detailed chronology of the Mount Merapi eruptions will be explained in the following subthemes.

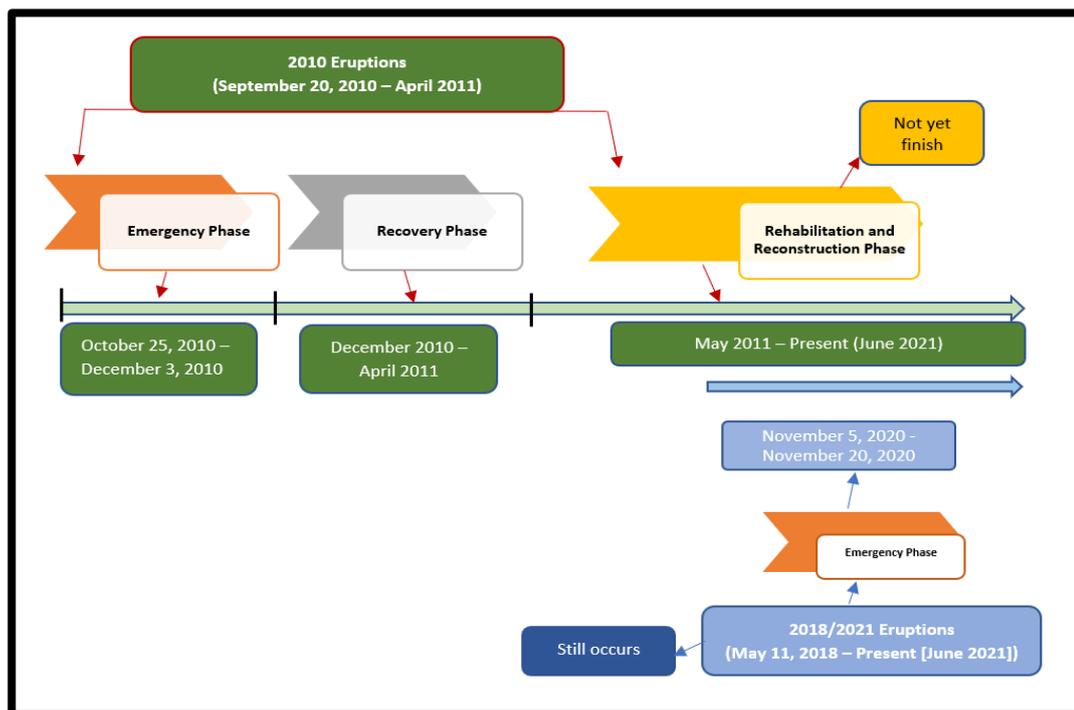


Figure 4. 1. The chronology of the Mount Merapi Eruptions (Source: Author, 2021)

4.1.1 The emergency phase of the eruption in 2010

According to Bappenas (National Development Planning Agency) and BNPB (National Disaster Management Agency) (2011), the Mount Merapi eruptions in 2010 damaged and buried 2,682 houses, and affected minor damage to 40,632 houses in the settlement areas in the slope of the Mount Merapi. As depicted in figure 4.2 made by DPUP (Public Work Agency) Sleman, the settlement areas or

“Permukiman” and “Gedung” in light brown colors were scattered around Mount Merapi. Those settlements were mostly damaged and buried by the lava and pyroclastic flows of the Mount Merapi eruptions in 2010 as depicted in figure 4.3, in the light brown color.

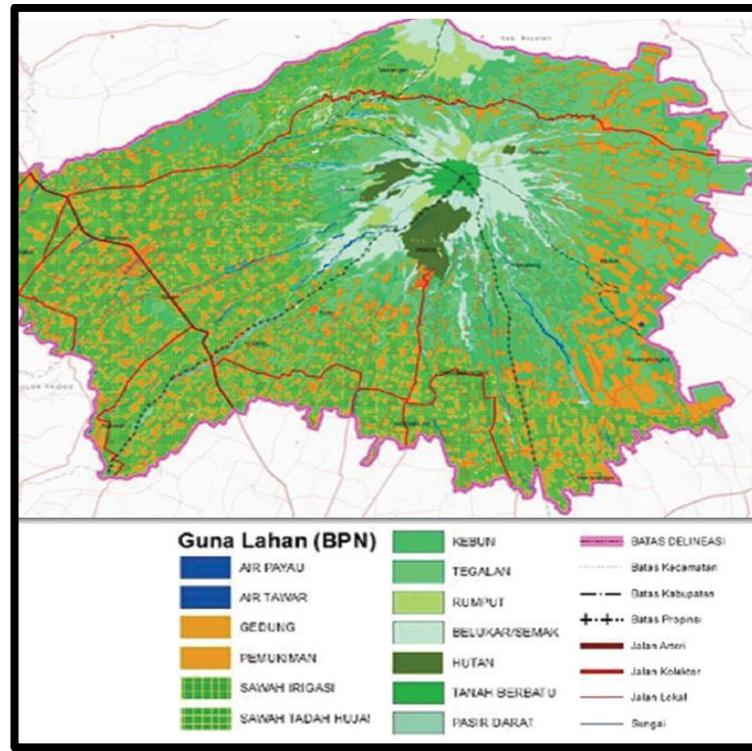


Figure 4.2. The site plan of the Mount Merapi (Source: DPUP Sleman, 2013)

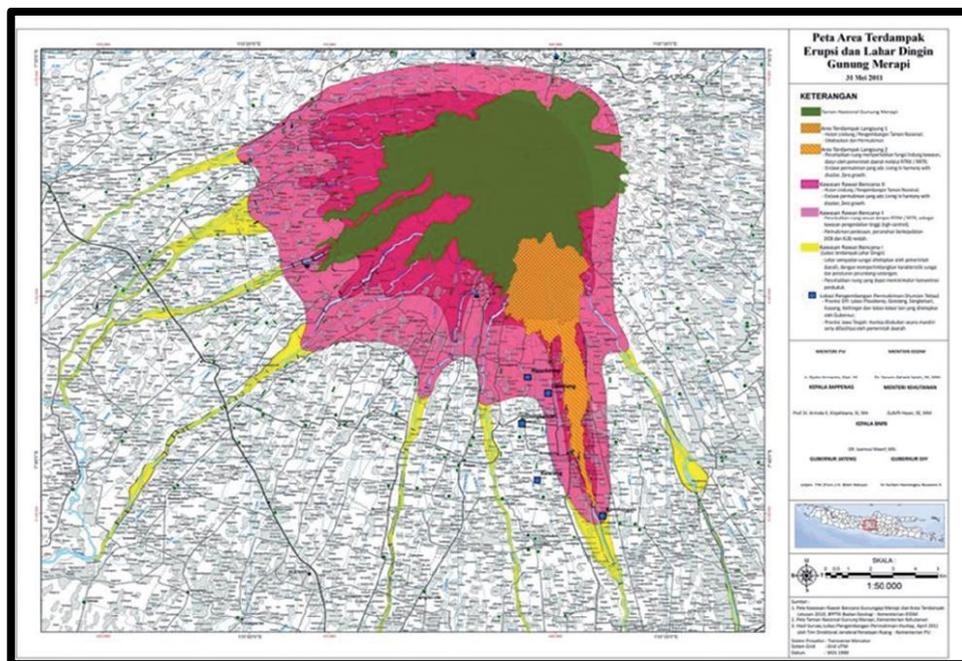


Figure 4.3. The affected areas of the Mount Merapi eruptions in 2010 (Source: DPUP Sleman, 2013)

The eruption crisis of Mount Merapi began with an increase in status from “Normal” (Level I) to “Alert” (Level II) on September 20, 2010 (BPBD Sleman, 2011; ESDM, 2014). The increase in Merapi activity was determined based on the results of monitoring using instruments and visuals (Interviewee X5; Interviewee X12). From the results of monitoring Merapi's activity, it was concluded that there was an increase in very extreme volcanic activity so that eruptions could occur at any time leading to a situation that could lead to a disaster (Interviewee X14). On October 21, the status of Mount Merapi's activity was again raised to “Standby” (Level III) and raised to “Caution” (Level IV) on October 25 (BPBD Sleman, 2011). The safe radius was set beyond 10 km from the peak of Mount Merapi.

According to BPBD (Regional Disaster Management Agency) Sleman (2011) and Interviewee X5, the emergency response period began with the stipulation of the status of the Mount Merapi volcanic activity from “Standby” to “Caution” on October 25. Next to that, the Sleman Regency Government responded by taking policies, such as establishing an emergency response command, emptying the area in the disaster-prone area (KRB) III, ensuring refugee protection and compliance with treatment standards, fulfilling of basic needs according to the minimum standards set, etc.

The evacuation that began after the status of Mount Merapi reached Level III on October 21 was carried out with priority for vulnerable groups with a total of 2,880 people (BPBD Sleman, 2011). Those refugees were vulnerable people who live in KRB III (disaster prone area level III/ the most dangerous area which was located three kilometers from the peak of Mount Merapi). The evacuation was accompanied by the establishment of refugee barracks in the form of refugee buildings and emergency tents which were more than ten kilometers from the peak of Mount Merapi, including public kitchens and distribution of logistics (Interviewee X14). The services for public kitchens around the refugee barracks were operated by Social Agency of Sleman Regency, Tagana of Sleman Regency, Indonesian military, and volunteers, but mostly by community residents (PKK (Village women organization) Communities) themselves, as described by Interviewee X14, who stated:

The ones who cook were mostly PKK communities around the refugee barracks because they better understand what are the refugees' needs.

In addition, the distribution of clean water, the establishment of temporary toilets, health services in the refugee barracks, and the provision of transportation facilities for the evacuation of some more 10,723 inhabitants were carried out by the Sleman Regency Government (BPBD Sleman, 2011). Those activities were done thanks to a collaboration between regional agencies: Public Work of Sleman Regency, Health Agency of Sleman Regency, and Transportation and Communication Agency of Sleman Regency (BPBD Sleman, 2011)

After the stipulation of the "Caution" status and the evacuation of the affected population from KRB III to refugee barracks, Mount Merapi showed an increase in its activity was marked by an extreme Merapi signal, a rumbling sound but did not show the initial signs (hot clouds) commonly seen by people on the slopes of Merapi (Interviewee X12; Interviewee X13). The emergency response command and BPPTKG (Geological Agency) continued to monitor the progress of Mount Merapi activities from

time to time. The emergency response commander with the governor of Yogyakarta Special Province, Sri Sultan Hamengku Buwono X, and volunteers persuasively conveyed the results of monitoring instruments about the dangerous situation of Mount Merapi's to inhabitants so that those who did not want to evacuate could be immediately moved to a safe place if needed (Viva, 2010).

On October 26, there was a large eruption which led to Kali Gendol, the river where hot lava flows. About 20 minutes before the eruption, the emergency response commander ordered the EWS (early warning system) officer to sound the siren in the hope that inhabitants who did not want to evacuate would immediately rush to leave the location (BPBD Sleman, 2011). However, before all inhabitants were evacuated a large eruption accompanied by hot clouds and gases occurred. This eruption reached settlements and resulted in 40 people being killed and the EWS instruments being damaged (BPBD Sleman, 2011; Interviewee X5; Interviewee X12). After the eruption on October 26, Mount Merapi's activity continued to increase and was marked by the emergence of larger aftershocks starting on 27, 28, 29, 30, and 31 October (ESDM, 2014).

On November 3, another major eruption occurred, hot clouds continued to occur for almost 1.5 hours (ESDM, 2014). The BPPTKG recommended shifting refugees to a safe area within a radius of 15 km from the peak of Mount Merapi. Thus, several refugee barracks located within a 10 km radius had to be shifted and resulted in an increase of 21,933 refugees (BPBD Sleman, 2011). After the eruption on November 3, the activity of Mount Merapi increased. Many of the instruments installed at the top of Mount Merapi were damaged, and visual monitoring was hindered by cloudy weather and thick volcanic ash in the air (Interviewee X12; Interviewee X13). As reported to the researcher by Interviewee X12 who declared:

At that time, we were already overwhelmed, all of our monitoring equipment had been damaged by the previous eruption. Visual observation was also impossible because it was covered in volcanic ash everywhere.

Seismic monitoring showed a level beyond detection for a long time, sounds and tremors were felt in a far radius of up to 12 km, and eruptions accompanied by volcanic ash continue to occur (ESDM, 2014). The EWS in the form of sirens were mostly damaged by the eruptions of October 26 and November 3 (Interviewee X13). Hot clouds continue to occur with increasing frequency, rumbling sounds heard from far away, rain of ash and sand made the crisis increasingly out of control (Interviewee X5; Interviewee X12; Interviewee X13). Those conditions just like what Interviewee X9 stated:

After the large eruption (October 26, 2010), my family and I took refuge at my relative's house, which was about 15 km from the peak of Merapi. ... I still heard the sound of the mountain rumbling continuously, and I also felt the tremors. The glass windows and doors of the house where I took refuge shook. It was like endless small earthquakes.

The results of the BPPTKG's analysis of the activity of Mount Merapi were translated in a recommendation that the safe distance be increased from 15 km to 20 km. The recommendation made

the people living in a radius of 15 km-20 km increasingly afraid and they panicked about the dangers coming to their settlements. This resulted in waves of refugees that were getting overwhelming (Interviewee X14). As inhabitants did not know where to evacuate, they fled to places they felt safe by themselves. The Governor of Yogyakarta Province ordered that the areas where refugees from the Mount Merapi eruption were, would be guaranteed, and that the existing inhabitants must accept the arrival of refugees and provide emergency services (Interviewee X3; Interviewee X5). On November 5, the eruption of Mount Merapi was getting more and more powerful, which produced hot cloud flows up to 15 km from the summit of Mount Merapi (ESDM, 2014). The safe radius was set beyond 20 km from the summit of Mount Merapi. As described by one of Interview X10 who said:

At first, I thought I was safe because I had taken refuge at a relative's house with a radius of more than 15 km from the peak of Merapi. However, in the middle of the night, I received a message via SMS that the hot lava from Merapi had reached the Bronggang Hamlet (> 15 km from the peak of Merapi) and devastated the surrounding area of Kali Gendol. My family and I immediately moved further away. That night the atmosphere was very eerie. Everything was pitch black. Car lights can't penetrate the hot mud rain.

On November 6, the tremors continued, and the huge mass of SO₂ in the air reached a peak of 250-300 kilotons (ESDM, 2014). On November 13, the intensity of the eruption began to decrease, and the safe radius was also changed to 20 km from the summit of Mount Merapi. On November 19, the eruption intensity again showed a decrease, and the safe radius was further reduced to 15 km. Based on the results of the instrumental and visual evaluation of the Mount Merapi monitoring data, it was concluded that the activity of Mount Merapi was showing a decline. With the decrease in activity, starting on December 3, at 09.00 WIB, the status of the activity of Mount Merapi was lowered from the "Caution" level to "Standby". Then, on December 30, the status of Mount Merapi's activity was again lowered to "Alert".

In the end, the series of eruptions in 2010 caused 277 people killed in Sleman Regency who died due to pyroclastic flows and buried by hot lava (Bappenas and BNPB, 2011), injured 1,697 people, and made 151,891 people fled from their homes (BPBD Sleman, 2011). Next to that, the victims' evacuation of the Mount Merapi eruptions in 2010 was conducted by a joint team, including governmental agencies and NGOs: the Indonesian military, Sleman save and rescue, DIY save and rescue, Sleman red cross, Tagana Sleman, SKSB, and Sleman Regency police (BPBD Sleman, 2011).

4.1.2 Recovery phase

Post-disaster planning started from emergency response and early recovery and then continued with rehabilitation and reconstruction of the area throughout the years (Interviewee X3; Interviewee X5). Early recovery comprised a series of urgent activities that had to be carried out immediately at the end of the emergency response phase leading to the post-disaster rehabilitation and reconstruction stage (BPBD Sleman, 2011). Bappeda (Regional Planning and Development Agency) Sleman (2010), early recovery activities were directed at restoring aspects of livelihood and community life, taking into

account the existence and functioning of public services, such as built temporary housing. Early recovery was completed in five months starting from December 2010 to April 2011 (BPBD Sleman, 2011).

During the recovery phase, the Sleman Regency Government in collaboration with the provincial government, central government, and donors carried out the construction of 2,682 temporary housings (shelters) (BPBD Sleman, 2011). Temporary housings were built on village treasury land (land owned by the village government). Specifications for temporary housing made of bamboo with a size of 6 x 6 m² consisting of two bedrooms, one living/family room, one toilet, one kitchen, three light points, and one socket. Temporary residential areas were equipped with public facilities and social facilities such as prayer rooms, cattle pens, fish ponds, and meeting halls (DPUP Sleman, 2013). Temporary housings that have been built were equipped with basic necessities such as gas stoves, gas cylinders, bedding, toiletries, and carpets. As described by Interviewee X8:

I got a temporary housing of 6 x 6 m². The walls were made of woven bamboo and the roof was made of aluminum sheet. There were two bedrooms, one kitchen, and one bathroom. At that time, I also received gas cylinders, cooking utensils, toiletries, and beddings.

The temporary housings were built in several places in several stages by DPUP Sleman in collaboration with donors. In the first phase as many as 50 units were built and began to be occupied by the affected communities on December 28, 2010 (BPBD Sleman, 2011).

Next to that, referring to the in-depth interview with Interviewee X6, the government also started to carry out a damage and loss assessment related to the eruption of Mount Merapi that hit Sleman Regency. The damage and loss assessment were divided into five sectors (settlement, infrastructure, social, economic, and cross-sectoral). The interviewee X6 stated that:

The main objective of assessing the extent of damage and loss was to immediately measure the scale of the impact of the disaster so that priority can be determined and ultimately determine the planning strategy for rehabilitation and reconstruction.

Additionally, the damage and loss assessment were to estimate whether the investment can provide benefits or not for the livelihoods of the community and the redevelopment of the disaster-affected area (Interviewee X1; Interviewee X2, Interviewee X4; Interviewee X6).

4.1.3 Rehabilitation and Reconstruction phase of Mount Merapi eruption

According to BPBD Sleman (2011) and interviewee X3, the rehabilitation and reconstruction phase start from May 2011 and should have been finished in 2013 (with a formal maximum period of three years = 2014). Based on interviewees (X3 and X5), however, the reconstruction process was still not yet finished at the date of the interviews (May 2021). One of the reconstruction activities that was not yet

finished was the building of resettlement for the affected communities that should be relocated from their original housing because these original houses were in the new KRB III (the most dangerous area which was located three kilometers from the peak of Mount Merapi and area that was flattened by the lava due to 2010 eruptions). The construction of resettlements was done using the allocation of Houses Fund Assistance which was derived from Java Reconstruction Fund, BNPB, and some other donors (DPUP Sleman, 2013). The construction of resettlements was carried out by a collaboration between communities and regional agencies: Public Work of Sleman Regency, Regional Planning and Development of Sleman Agency (BPBD Sleman, 2011). The location of resettlements in Sleman Regency is depicted in figure 4.4.

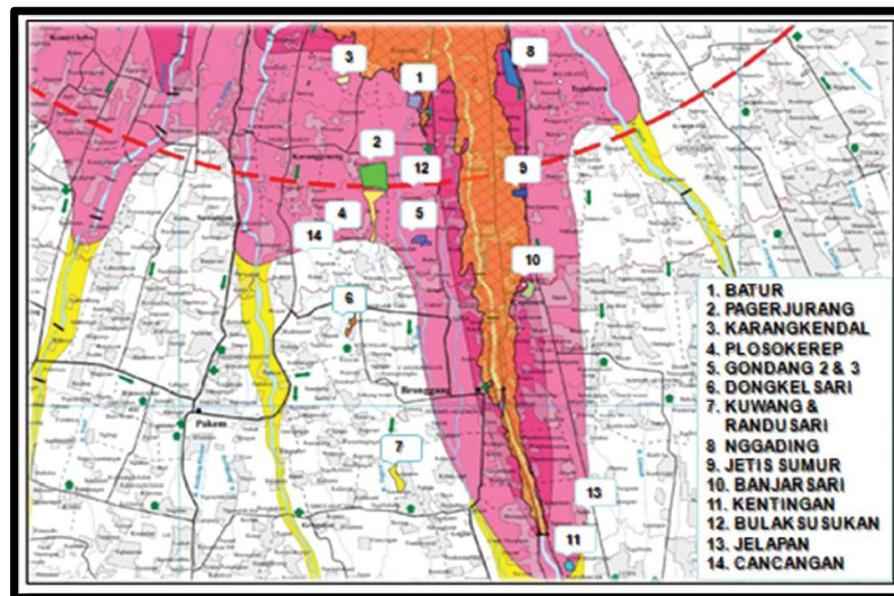


Figure 4.4. The location of resettlements in Sleman Regency
(Source: DPUP Sleman, 2013)

It is forbidden to establish permanent housing in the KRB III areas (BPBD Sleman, 2011; Interviewee X2; Interviewee X3; Interviewee X4; Interviewee X5). This restriction is based on government regulations issued by the Sleman Regency Government Number 12 of 2012 and the Presidential Regulation of the Republic of Indonesia Number 70 of 2014. These restrictions caused resistance amongst the communities: many affected communities of the Mount Merapi eruptions in 2010 did not want to relocate. As explained by the Interviewee X3:

Rehabilitation and reconstruction in 2010 have not yet been completed in the settlement sector, where out of 3023 families that must be relocated, there are still around 400 families who do not want to be relocated.

Some of the affected communities did not want to relocate as the new location of the resettlements were not far away from their original settlements (Interviewee X7; Interviewee X11). Interviewee X7 stated that there was no point to relocated his settlement only 500 meters from his original place. According to Interviewee X5, the selection of the resettlement locations also depended on the availability of village

treasury land. Therefore, there were limited areas to establish resettlements to relocate the affected communities.

There were changes in the designated disaster-prone area of Mount Merapi (Interviewee X2) due to the Mount Merapi eruptions of 2010. According to BPBD Sleman (2011), Before Mount Merapi eruptions of 2010, as illustrated in Figure 4.5, the KRB III (bright pink) were areas that were located approximately within three kilometers from the peak of Mount Merapi. It was an area that was often hit by hot clouds, lava flows, toxic gases, and avalanches of incandescent rock. Therefore, it was not recommended for anyone to make permanent housing and use the area for commercial purposes. The KRB II (soft pink) was an area that had the potential to be hit by hot clouds, possible lava flows, rock throws, avalanches, heavy ash rain, generally occupying the slopes and foothills of volcanoes, and lava flows. The KRB I (yellow) was an area that potentially was affected by lahars or lava floods and was likely to be affected by the expansion of hot clouds.

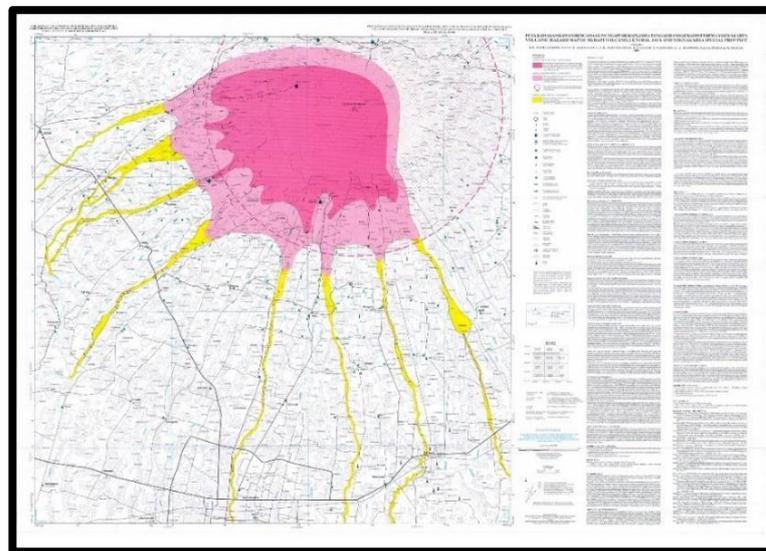


Figure 4.5. The disaster-prone area of the Mount Merapi before eruptions in 2010
(Source: BPBD Sleman, 2011)

After the Mount Merapi eruptions in 2010 as depicted in Figure 4.6, however, the KRB III (dark brown) became much larger and the policies stricter. The KRB III became areas within approximately five kilometers from the peak of Mount Merapi and strictly forbidden to build permanent housings in those areas.

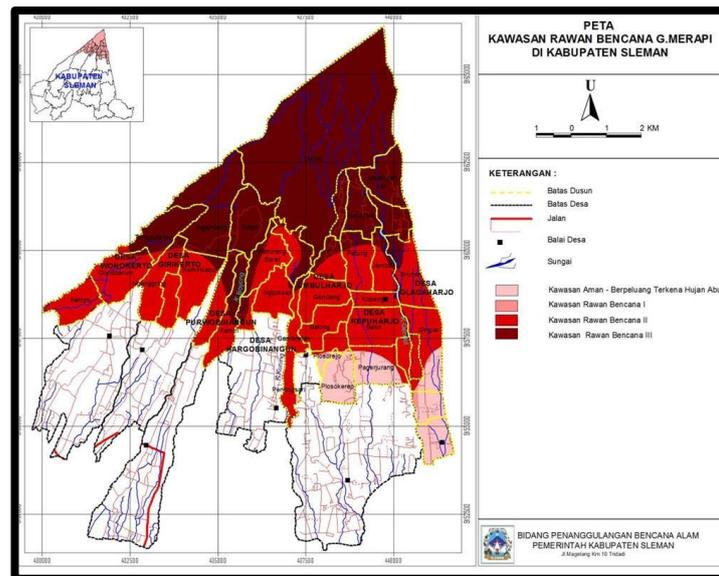


Figure 4.6. The disaster-prone area of the Mount Merapi after eruptions in 2010
(Source: BPBD Sleman, 2011)

As a consequence of this redefined KRB III area, it was necessary to arrange new residential areas or resettlements for affected communities whose houses have been damaged (Bappeda Sleman, 2010; Interviewee X2; Interviewee X4). Socialization of the resettlement plan needed to be done so as not to cause social conflict and misunderstanding in the communities (Interviewee X5). As described by Interviewee X7, who explains his experience that:

At first, I heard that the disaster-prone area, especially KRB III, would be converted into Mount Merapi national park (strict regulation not to build settlement). Therefore, to prevent that happen, the inhabitants started living in the previous settlements by starting to rebuild their houses (were damaged by the eruptions) through “gotong royong” (cooperation) to make their hometowns like they used to be (without any helps from the governments).

The rehabilitation and reconstruction of new settlements was the initial activity of spatial redevelopment planning after the 2010 eruption on the slopes of Mount Merapi and its surroundings. It was taking into account the land ownership status and environmental carrying capacity to meet human needs (settlements, agriculture, pasture, social and public facilities, clean water, etc.) (Interviewee X2). To make sure the land ownership status (the boundaries of the land among the affected communities were damaged by the eruptions), therefore, the regency governments agencies based on the initial maps and the affected communities set the boundaries in the first place. In the Sleman Regency spatial plan, The Bappeda Sleman, BPBD Sleman, and related stakeholders decided where to build the new resettlements for the affected communities. The DPUP Sleman (Public Work of Sleman Agency) was in charge of the establishment of the settlements in collaboration and cooperation with the communities.

The Public Work of Sleman Agency set the shop drawing of the permanent housing based on the input and wishes of the communities in accordance with the rules regarding permanent housing. Then, in the establishment of permanent housing, the affected communities are directly involved in the construction process (Interviewee X8). In the residential zone on the slopes of Merapi, the settlements should also be equipped with instructions for evacuation routes or signs for early warning systems in anticipation of a disaster, as well as access roads for evacuation so that people can live side by side with Mount Merapi comfortably (Interviewee X7, X11, X12, X13).

According to several interviewees (X12 and X13) Disaster mitigation efforts with local wisdom also need to be revived. The local wisdom is that the communities around Mount Merapi have been living in harmony among the threats of disaster. Even though Mount Merapi has erupted periodically, the communities keep on running their activities and surviving by holding the principles of “life peacefully with nature” and “gotong royong among communities” (collaboration and cooperation among the communities or helping each other). Next to that, The BPBD Sleman agency was responsible for the establishment of the evacuation routes or signs for early warning systems. However, their operation was the responsibility of the related government agencies in disaster management as well as the communities (BPBD Sleman, 2011). The BPBD Sleman believes that engaging the communities would build the resilience of the communities.

In this phase, the national government (Bappenas) stipulated the affected communities by the eruption of Mount Merapi should receive resettlement stimulus as much as Rp 30,000,000 (EUR 2,525) for heavily damaged houses (Bappenas and BNPB, 2011). Assistance was given to people who were willing to take part in relocation programs organized by the government or to do independently relocations to locations that were still available and safe to become resettlement. The government offered several options for relocation areas to the affected communities. The construction of permanent housing was an important activity of the REKOMPAK program (Community-Based Settlement Rehabilitation and Reconstruction Project). In this program, the activities carried out had to be based on community empowerment and DPUP Sleman was in charge. According to Bappenas and BNPB (2011), the REKOMPAK provided a forum for communication for the communities so they could share their opinions and wishes with the governments. It was one of the methods in the redevelopment process where the communities were engaged and involved themselves in the redevelopment from the start of the planning program. As stated of the Interviewee X8:

The inhabitants and I wanted to be involved in rehabilitation and reconstruction activities since deciding the relocation areas, the site plan of the permanent housings, and the choices in materials. It could make sure that the established permanent housings are according to the wishes of the inhabitants and me. Besides, at that moment, I could directly share my wishes on how my new resettlement will be built with the DPUP officers when they did the field jobs.

4.1.4 The eruption of Mount Merapi in 2018/2021

While the redevelopment because of the 2010 eruption still was going on, Mount Merapi experienced a phreatic eruption on May 11, 2018, (Interviewee X12; Interviewee X13; Interviewee X14; Kompas). A phreatic eruption is an eruption in the form of gas or material smoke gusts triggered by gas pressure below the ground surface (Interviewee X5). Then, Mount Merapi experienced a magmatic eruption again on August 11, 2018, which lasted until September 2019, and a series of explosive eruptions until June 21, 2020 (ESDM, 2020). Since October 2020, seismicity has further intensified. Based on the evaluation of monitoring data and visual observations, the volcanic activity of Mount Merapi may continue to erupt, which endangers the nearby inhabitants (Interviewee X5; Interviewee X12; Interviewee X13). The status of Mount Merapi's activity has been increased from "Alert" (level II) to "Standby" (level III) starting on November 5, 2020 (ESDM, 2020). From January 2021 until the end of the research (June 2021), the eruption of Mount Merapi still was occurring. Since January 4, 2021, there have been effusive eruptions of Mount Merapi in the form of avalanches of incandescent lava accompanied by hot clouds with a sliding distance of approximately two kilometers, and those kinds of eruptions happened continuously until June 2021. On June 24, 2021, there were three hot clouds of avalanches with a maximum sliding distance of three kilometers to the southeast of Mount Merapi, and a column of smoke as high as 1,000 m was observed above the peak (ESDM, 2021). The hot avalanche clouds caused ash rain in several areas in Sleman Regency (Antara News, 2021).

The Sleman Regency was in the emergency phase of Mount Merapi eruptions starting from November 5, 2020, until November 20, 2020. One of the activities in the emergency phase was evacuating vulnerable people who live in KRB III to the refugee barrack in Glagaharjo Village. People who live in KRB III were the affected communities by the 2010 eruptions and did not want to relocate. Even though the Mount Merapi eruptions in 2018/2021 occurred continuously over three years, there were no victims from the affected communities as well as the livestock and settlements. The no victims here because the Mount Merapi eruptions in 2018/2021 were not devastating, such as in the 2010 eruptions, and the communities were more prepared to deal with future disasters (Interviewees X12, X13, X14). Hence, there was no (need for a) recovery phase and rehabilitation and reconstruction phase in the 2018/2021 eruptions (at least, until now). As stated by Interviewee X5:

Although this eruption made vulnerable people in KRB III evacuate, these eruptions did not cause any damages, so there was no recovery phase.

However, it has to be bear in mind that the Mount Merapi eruption in this period has not ended yet and continues to occur. As described by an interviewee who stated:

Until now (May 2021) there are still eruptions in the form of hot lava melt and sometimes accompanied by "Wedhus Gembel" (hot clouds).
(Interviewee X12).

To sum up, after this detailed discussion of the chronology of Mount Merapi eruption in 2010 and 2018/2021 are parallel (see again figure 4.1). Striking is that the 2010 and 2018/2021 eruptions are parallel. As mentioned above, the rehabilitation and reconstruction phase carried out in eruptions 2010 is not yet finished, but the new eruptions of Mount Merapi already occurred (2018/2021) – however for these eruptions no recovery and rehabilitation and reconstructions has been needed (yet). The rehabilitation and reconstruction phases of the 2010 eruption are overlapping, with the emergency phase of the Mount Merapi eruptions in 2018/2021. The consequences of these parallel phases for the rehabilitation and reconstruction because of the 2010 eruptions were that the affected communities become more alert of the Mount Merapi threats. According to Interviewee X7, the affected communities from Kalitengah Kidul village who did not want to relocate have already bought two hectares of land in a safer area with their own money (the location is not in the treasury land provided by the government). These parallel phases for the rehabilitation and reconstruction showed the affected communities become more resilience because they organize themselves to prevent and reduce threats from future disasters.

4.2 Local community resilience in action

When experiencing Mount Merapi eruptions in 2010, the governments and affected communities proved to be not ready to deal with such devastating disasters (Interviewee X1; Interviewee X5; Interviewee X11). For instance, the BPBD DIY (provincial level) and BPBD Sleman (regency level) had not yet been formed in 2010 (Interviewee X3). Disaster management in local governments was handled by a division under the Bappeda DIY (provincial level) and Bappeda Sleman (regency level). Hence, the disaster management of the Mount Merapi eruptions in 2010 was not to be fully coordinated among the related agencies at the local level, which was also due to the limited authority of the disaster management division of the Bappeda DIY and Bappeda Sleman (Interviewee X3). The local governments were also dependent on BNPB or the national government because the Mount Merapi eruptions in 2010 were declared a national disaster (Interviewee X1). However, the BPBD DIY was finally formed at the end of 2010. The BPBD DIY had the task of handling the recovery and rehabilitation/reconstruction phases. It cooperates with the Bappeda DIY and the Bappeda Sleman. After that, in early 2011, the BPBD Sleman was formed and made responsible for the recovery and rehabilitation/reconstruction phases due to the Mount Merapi eruptions in 2010 in Sleman Regency (Interviewee X5), with the related agencies, such as the Bappeda DIY, BPBD DIY, Bappeda Sleman, and DPUP Sleman. The establishment of BPBD DIY and BPBD Sleman was in dealing with the Mount Merapi eruptions in 2010 and future disasters (Interviewee XI, X3, X5). There was a joint team from those multilevel government agencies to make sure that there were no overlapping activities in post-disaster development planning. According to Interviewee X5, the joint team has a base in the BPBD Sleman office to facilitate coordination among them and the communities.

From the affected communities' perspectives, the affected communities were not ready to cope with the Mount Merapi eruptions in 2010 (Interviewee X7; Interviewee X8; Interviewee X9; Interviewee

X10; Interviewee X11). They were not much aware of the Mount Merapi eruptions risks. At that time, the communities had a big dependency on governments because of the limited resources to deal with the catastrophic disaster and never been in such devastating eruptions as the one of 2010. As described by Interviewee X11, who explains his experience that:

Only a few of our inhabitants had means of transportation, so at that time, we relied on the transportation provided by the government to evacuate inhabitants from our hamlet.

After experiencing devastating Mount Merapi eruptions in 2010, the communities started to organize themselves. In collaboration and cooperation with the government, they began to establish “sister schools” and “sister villages” (Interviewee X5). The Mount Merapi eruptions in 2010 had become a valuable lesson in disaster management, including evacuation. A refugee camp emerged with the concept of "sister-village" in 2014 (Interviewee X3; Interviewee X5). The sister village concept was to change the mindset of the refugees. It was decided by the Sleman Regency Government and designed by BPBD Sleman in collaboration with the village's governments (Interviewee X5). In the concept of the sister village, there is an agreement between two villages, namely the affected village (a village in KRB III or KRB II) and the buffer village (a non-disaster-prone village) (Interviewee X5; Kompas, 2020). They agreed to deal with disasters in the spirit of mutual help and cooperation. With this bottom-up sister village concept, affected communities of the eruption of Mount Merapi were directed to evacuate to the buffer village. In the buffer village, they could do activities similar to their daily life. For example, if the family in buffer village that accommodates the refugee from the affected village go to paddy fields, the refugee could help them in the paddy field. The sister village concept was done by reflecting on the experience of the 2010 eruptions. At that time, many refugees experienced stress because they only lived in refugee barracks and had no activities (Kompas, 2020).

With the “sister village” system, however, refugees will be accepted into people's homes, and they could work together with their village-buffer families as their activities (Interviewee X5). Those are applied also to the sister school concept. If the Mount Merapi eruptions impacted the affected schools, their students would continue their studies to the buffer schools of the sister school (Interviewee X3). Regarding the sister village concept, in the case of the Mount Merapi eruptions in 2018/2021, the livestock from the KRB III (Kalitengah Lor Village as the affected village) was evacuated to Singlar village (the buffer village) (Interviewee X7). The communities in Singlar Village provide shelters for that livestock. Together, they were looking for grass for that livestock. In this case, the vulnerable people that evacuated were in the refugee barrack provided by the governments. The sister-village concept has not been implemented for the affected communities because the number of refugees was still small and can be handled by the government (Interviewees X7, X13).

Inhabitants, especially affected communities by the 2010 eruption, had equipped themselves by preparing themselves for future eruption of Merapi (such as the 2018/2021 eruptions). They proved to be better skilled at reading the signs of Mount Merapi's activities through training and public

engagement by the government and volunteers (Interviewee X5; Interviewee X12; Interviewee X13). As described by Interviewee X11:

Me and the other affected communities have equipped ourselves with tools of communication and transportation to be able to evacuate at any time if needed.

Referring to eruptions in 2018/2021, the affected communities seemed to have a higher degree in the capacity of perceiving shared needs and vulnerabilities compared to the eruptions in 2010 as stated by the several government actors such as, Interviewee X5:

The affected communities were much more aware when the eruption happened. They began to evacuate the vulnerable people in their communities by themselves without waiting for the local government's aid. They have a high sense of responsibility and social spirit towards others.

interviewee X3:

Sister villages have been formed in the Sleman Regency, so there was cooperation between one village and another. They helped each other when the eruption happened.

and interviewee X6:

The affected communities have formed teams in the hamlets to help evacuate vulnerable people independently.

Those statements from government actors are strengthened by the affected communities as described to the researcher by Interviewee X10, who explained that:

In 2010 eruptions, the communities did not have experience dealing with such a devastating disaster, maybe only 10-15% were ready. In the 2018/2021 eruptions, the communities were much more prepared. In every hamlet, there was an evacuation gathering point, and there were volunteers that were ready to help with evacuation and other assistance. So, the evacuation process was much more coordinated.

The self-reliantness of the affected communities was accompanied not only by the local government but also by the civil aid from the volunteers such as Tagana Sleman, SKSB, and KSB. As stated by the interviewee from the affected communities, who stated that:

The other inhabitants and I usually listen to the information on the status of Merapi's activities through HT. Sometimes from the SKSB channel and sometimes from the KSB.
(Interviewee X9).

4.3 Public engagement strategies implemented during post-disaster redevelopment planning in Sleman Regency

How was the community engaged in the redevelopment planning process after the large eruption of Mount Merapi in 2010? Experiences of people regarding this issue based on the in-depth interviews with the government actors, NGOs, and affected communities will be addressed in this section.

According to the in-depth interviews with all government actors, one of the redevelopment planning activities was the rehabilitation and reconstruction of areas affected by the 2010 eruption, which was carried out in a participatory manner, involving directly affected communities, starting from the planning process to implementation. As reported by Interviewee X4:

The Sleman Regency Government provides assistance and institutional strengthening of affected communities, so that they have the capacity in development planning at the local level, including rebuilding the new resettlements and daily social-economic livelihood facilities.

The participatory manner that involving directly affected communities was done not only due to the regulations (Bappenas and BNPB, 2011) but also because the affected communities themselves want to be heard by the government regarding their wishes. The involvement of the affected communities facilitated the Sleman Regency Government in the rehabilitation and reconstruction process (Bappeda Sleman, 2010). In addition, during the process, the synergy of all stakeholders accelerated the implementation of rehabilitation and reconstruction activities (Interviewee X4).

From the affected communities' perspectives, the public engagement strategies implemented during post-disaster redevelopment planning in Sleman Regency could be seen in the relocation of the new resettlements and the other infrastructure facilities (Interviewees X7, X8, X9). Interviewee X8 stated:

When determining the location of resettlements, we were asked for opinions on how we would arrange permanent housings in the relocation site. We asked not to be randomized or by lottery. We prefer to keep our house in its position as it was before the disaster. The government granted our request.

In the establishment of the new resettlements, the affected communities were engaged by the government since the beginning of the project. The wishes and what people wanted were trying to be accommodated to make sure that the objectives of the activities were truly functional, guaranteed quality, and useful for the affected communities and make them have a sense of belonging (Interviewee X3). As reported from Interviewee X10, who stated that:

In principle, the establishment of the new resettlements was from the communities and for the communities. By involving them since the beginning of the planning and still continuing to involve them in the implementation, the quality of the resettlements will be guaranteed. In the end, of course, the communities have a higher sense of belonging to the building.

Engaging the affected communities influenced the activities in the post-disaster redevelopment planning. According to interviewees (X3, X4, and X5), engaging affected communities has an impact on the financial budgets that were available for the communities. The more people involved means the more money spent to facilitate the people involved. However, if the communities are involved since the beginning of the redevelopment planning, the programs implemented can be realized immediately and truly useful for the communities (Interviewee X3).

According to the Interviewees (X2 X3, X4, and X5), there is strength in redevelopment planning activities that involve the communities. Among them, the Merapi slope communities have local wisdom in the form of mutual cooperation in efforts to rebuild the environment and their livelihoods. Next to that, the wishes of the communities could be explained directly and in detail through planning. Hence, the communities were willing and able to build their own and according to their wishes. In the end, it caused the affected communities wanting to occupy the new resettlements and they created a sense of belonging (Interviewee X3). Finally, by engaging communities, it could support redevelopment planning to build community resilience in post-disaster (Interviewee X5).

On the other hand, there were weaknesses shown in engaging communities. According to the Interviewees X3 and X4, communities did not yet had the capacity, both individually and institutionally, in spatially-based development planning processes. That resulted in a slower redevelopment planning process. Next to that, according to several Interviewees (X1, X2, X5, X6), the low education level of the affected communities – who usually only had junior high school/high school graduates – required a longer time to have a same vision of the purpose of the redevelopment planning. Hence, engaging the communities had to be accompanied by a facilitator in accordance with the scientific aspects needed so that the objectives are achieved properly.

4.4 Reflecting about post-disaster redevelopment planning in Sleman Regency

From the researcher's own perspective being herself an inhabitant of the region, there was an issue concerning the reconstruction process as part of the redevelopment planning process related to the Mount Merapi 2010 eruptions. The reconstruction and rehabilitation of Mount Merapi eruption in 2010 in the settlement sector as part of the redevelopment planning process has not yet been completed until 2021 (May). This issue also strengthens by Interviewees X3 and X5. According to the Interviewee X3, from the 3,023 families that had to be relocated, there were still around 400 families who did not want to be relocated. While Interviewee X5 stated:

The focus of the problem in redevelopment planning is that there are affected communities that are not yet willing to be relocated. The affected communities who live in disaster-prone areas (KRB) III must be relocated to safer permanent housing.

The researcher family and the other ten families in Glagahmalang Village, as part of the affected communities, who now live in the KRB III when previously in the KRB I (regarding the changes of the disaster-prone area after Merapi eruptions in 2010), did not want to relocate to permanent housing provided by the government. Their reason was if they relocate to permanent housing, there would be no improvement in the infrastructures at their village at all (roads and electricity). Those infrastructures were very much needed to connect the surrounding communities on the slopes of Merapi to their livelihood and schools (no roads improvement means detour approximately 10 kilometers to go to school and livelihood). These statements also relevant with the reason from the other affected communities. The affected communities did not want to be relocated because they feel that their house is still safe and their livelihood is around it (Interviewees X3, X5, X7, and X11). As explained by Interviewee X7:

I am a farmer. If I moved to the relocation area far from where I was looking for grass, it would be difficult for me to feed and take care of my livestock.

The other reason from the researcher's own perspective is that some of the affected communities did not want to relocate due to the new location of the permanent housings was not far away from their original settlements. That is in accordance with Interviewee X7 stated there was no point to relocated his settlement only 500 meters from his original place. As also reported to the researcher from Interviewee X11, who do not want to relocate that stated:

The option of our relocation area is not far from the original position of our houses, only about 500 meters. So, the other inhabitants and I chose not to be relocated to that area.

Another reason that found by the researcher is that Mount Merapi has stages when it is about to erupt, so the affected communities would have time to evacuate if Mount Merapi erupts again.

From the researcher's own perspective being herself an inhabitant of the region, there is an issue concerning the redevelopment planning related to the Mount Merapi 2010 eruptions. There is still the attitude of people who are reluctant to obey the policies of the Sleman Regency Government related to activities in KRB III disaster-prone areas. Even though regulations prohibit the establishment of settlements in areas directly affected by the 2010 Merapi eruptions, some inhabitants are still repairing and then occupying their houses where their livelihoods are there. That is in line with what Interviewee X4 said:

Some affected communities are reluctant to obey the regulation related to activities in disaster-prone areas. Whereas, their areas are in the KRB III.

Those inhabitants have their own reasons why they are reluctant to obey the policies. First, they are afraid that their land would be converted into Mount Merapi National Park. Second, their livelihood is in the surrounding Mount Merapi. Third, there are no strict regulations if the people do not obey the policies.

In the researcher's opinion, related to public engagement in redevelopment planning, some people seem to have passive attitudes and are shy in expressing their opinions and desires in the forums provided by the governments. That is a similar issue as reported to the researcher by Interview X6, who explains that some affected communities have passive attitudes to involve in the redevelopment planning process. They argued that being part of the forum provided by the governments will take time, and it will affect their time to do their jobs.

Another concern about redevelopment planning in the post-disaster region from the author's own perspective is the need for powerful institutions for disaster management given the unpredictable nature of disasters (as also indicated by Interviewee X5). In addition, there is a need for synergy and coordination in redevelopment planning. Relocating affected communities did not only moved their settlements but also their livelihoods (as reported by Interviewee X3).

On the other hand, there are several success factors to involve communities in redevelopment planning that are recognized by the author being an inhabitant. First, good coordination among all stakeholders involved from the national government, provincial government, local government, NGOs, and affected communities in these activities (also indicated by Interviewees X1, X3, and X6). Second, some regulations guaranteed communities involvement in redevelopment planning activities (indicated by Interviewee X5). Third, the common perception or same vision between the governments and communities to build-back better and build-back safer of the affected areas (as reported by Interviewee X2). The purpose of redevelopment planning activities was for the safety and good of the communities. Fourth, the willingness of the affected communities to immediately rebuild their areas as before (as indicated by Interviewee X4).

From the author's own perspective and strengthens by the interviewees X7, X8, X9, X10, there are success factors and barriers to doing public engagement in redevelopment planning after the Mount Merapi eruption in 2010. The success factors which can be found are: first, the affected communities' desire to immediately carry out daily activities before the eruptions occur. That has triggered many affected communities to be actively involved in redevelopment planning. Second, the high spirit of mutual cooperation to rebuild their areas. Third, public awareness about the importance of redevelopment planning activities. The communities seem to be aware that these activities are carried out by the government together with related stakeholders for the good and safety of the communities themselves.

On the other hand, the barriers that can be seen are: First, the affected communities have different jobs and activities, so sometimes they do not have time to be involved in public engagement in redevelopment planning activities. Second, limited human resources for understanding how redevelopment planning activities should be carried out. Hence, more time is needed to educate the affected communities. Third, there are government activities that are not in accordance with the wishes and perceptions of the affected communities. Those make the affected communities are reluctant to participate in public engagement in redevelopment planning activities.

According to the author being an inhabitant, a government officer in the Sleman Regency, the media analysis, the analysis from the formal documents, and strengthened by interviewees X3, X4, X5, the regional government had established a spatial plan policy in areas prone to the eruption of Mount Merapi through Regional Regulation No. 12 the year 2012 concerning the Sleman Regency Spatial Plan for 2011-2031. All activities/programs prepared by the regional government actors had to comply with this regulation by developing service centers outside the disaster-prone area (KRB) III of Mount Merapi. Through this regulation, the Sleman Regency Government prohibited several activities, especially in the directly affected areas, as stated in article 79 of this regulation. It stated that it is not allowed to develop living dwellings or permanent housings in areas directly affected by the 2010 Merapi eruption and not allowed to add new infrastructure and facilities in areas directly affected by the 2010 Merapi eruption. As indicated by interviewees X4 and X5, those areas were considered too dangerous for the communities while the safety of them were the priority of the governments. That still becomes an issue with the affected communities because they do not want to relocate from those areas (as reported by Interviewee X3, X4).

4.5 Preparedness in the new series of eruption in 2018/2021

According to the interviewees from all government actors, the affected communities were more prepared and more cohesive with a higher sense of risk related to their preparedness to deal with the Mount Merapi eruptions in 2018/2021 after their experiences to cope with the Mount Merapi eruptions of 2010. In this case, it can be seen in the statement of Interviewee X4, who explains that:

The affected communities had shown increased preparedness in dealing with the eruption of Mount Merapi after the 2010 eruption, being able to independently evacuate to a refugee camp when it was announced that the status upgrade of Merapi was announced. That can happen because of the institutionalization of disaster risk reduction efforts at the local level and the synergy of various related institutions/stakeholders accompanied by an adequate early warning system infrastructure.

From the affected communities' perspectives, all of the interviewees from affected communities stated that they become much more prepared to deal with Mount Merapi eruptions in 2018/2021 after their experiences to cope with the Mount Merapi eruptions in 2010. As reported to the researcher by Interviewee X10, who stated:

In 2010 eruptions, the communities did not have experience dealing with such a devastating disaster, maybe only 10-15% were ready. In the 2018/2021 eruptions, the communities were much more prepared. In every hamlet, there was an evacuation gathering point, and there were volunteers that were ready to help with evacuation and other assistance. So, the evacuation process was much more coordinated.

Those statements are strengthened by Interviewee X7, who stated:

The affected communities and I experienced the 2010 eruptions. They and I were much more prepared and alert in facing the 2018/2021 eruptions. For example, in the 2010 eruptions, we did not have time to save our precious belongings and securities. However, in the 2018/2021 eruptions, we were ready to evacuate by preparing precious belongings and securities in one bag that can immediately be taken when disaster strikes.

The interviewees from the NGOs also stated that the affected communities after their experiences to cope with the Mount Merapi eruptions in 2010 become much more prepared to deal with Mount Merapi eruptions in 2018/2021. As described by Interviewee X13, who explains that:

When they felt danger due to the activities of Mount Merapi, inhabitants immediately evacuated themselves using private vehicles directed by volunteers (KSM).

While Interviewee X12 stated:

Most of the affected communities already have HT and adequate communication tools, so they get the latest news of the activities of Mount Merapi. When Mount Merapi's activities endanger them, they immediately evacuate independently.

In addition to the affected communities who seemed to be better prepared to face the 2018/2021 eruptions, the governments appeared also to be better prepared to face the future disasters. At the time of the 2010 eruption, BPBD DIY and BPBD Sleman had not yet been formed. Disaster countermeasures are only carried out in the Disaster Management Division under the Bappeda Agency. Due to the devastating eruption of Mount Merapi in 2010, in late 2010, the BPBD DIY was formed, and in early 2011, the BPBD Sleman was formed to deal with the future disasters (Interviewees X3 and X5). The formed disaster agencies at the local level show the more preparedness of the governments to deal with the Mount Merapi eruptions in 2018/2021 (Interviewee X3). Besides, the governments made evacuation routes and refugee barracks in strategic places for refugees to cope with future eruptions (Interviewees X5 and X6). The evacuation routes and refugee camps that was made by BPBD Sleman (Regional Disaster Management Agency) in 2019, as depicted in Figure 4.7, have considered disaster risks and were communicated with communities and volunteer communities in disaster-prone areas of Mount Merapi (BPBD Sleman, 2019; Interviewees X5, X12, and X13).

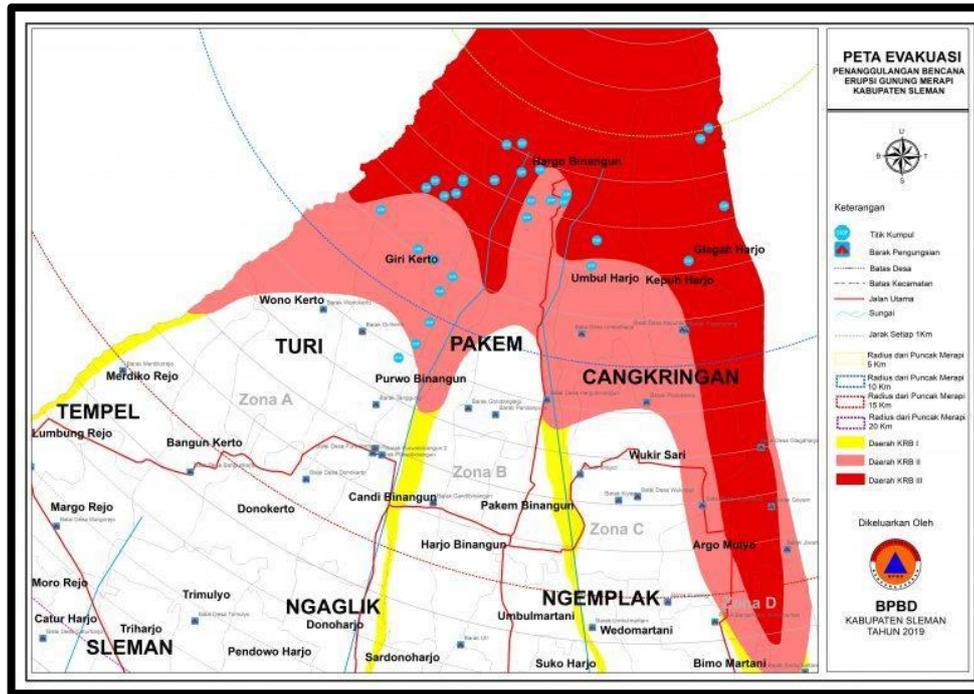


Figure 4.7. The evacuation routes and refugee camps in Sleman Regency
(Source: BPBD Sleman, 2019)

Furthermore, the NGOs were also much more prepared to cope with the eruptions of Mount Merapi in 2018/2021. In 2010, only a few inhabitants became members of the NGOs communities, and the equipment owned by the communities was also limited (Interviewee X12). Most of them only rely on visuals to observe the activity of Mount Merapi. However, when facing the 2018/2021 eruption of Mount Merapi, new volunteer communities (NGOs) were formed, and they also had much more adequate supporting equipment (Interviewees X12 and X13). As reported to the researcher by Interviewee X13, who explains:

KSM was formed in mid-2011. That is because the SKSB post was in the west of Kali Gendol. To facilitate monitoring of information and coordination regarding Merapi's activities, a KSM community was formed in mid-2011. The KSM post was located east of Kali Gendol and supported by more adequate equipment.

Next to that, the NGOs with local governments and the communities have built an observation post for the Mount Merapi activities, which is located about three kilometers from the summit of Mount Merapi, resulting the visual observations are more accurate, and the information will reach the communities in disaster-prone areas more quickly (Interviewee X13).

Moreover, more preparedness in dealing with the eruptions in 2018/2021 also shown in the new barrack refugees building. It was accommodating the Covid-19 pandemic preventions (Interviewee X13). The Tagana, NGOs, and local governments made some adjustments in the new barrack refugees building to prevent the spread of the Covid-19 pandemic – another disaster that struck the already burdened region – among the refugees (Figure 4.8). Besides, the Tagana only accepted volunteers from

a limited group of people with several terms and conditions applied. As stated by Interviewee X14, who explains to the researcher that:

Before Covid-19, we were very open to receiving assistance from external aids. However, since the Covid-19 outbreak, we have prioritized volunteers from internal communities with the terms and conditions that we have set. When handling Mount Merapi refugees at the end of 2020, we strictly limited volunteers from the external aids.



Figure 4.8. The new barrack refugees of the Mount Merapi eruptions in 2018/2021
(Source: Merdeka, 2020)

The adjustments in the barrack refugees building show the adaptability of the governments, NGOs, and communities (Interviewee X13; Interviewee X14). To deal with future disasters, they have the capability to reflect on the causes of their vulnerability and how to cope with that. That led to a closer step toward community resilience.

Chapter 5

Discussions and Conclusions

In this chapter, the primary research question and the sub-questions are answered. In section 5.1, the results of the research are discussed and interpreted in relation to the relevant literature. Subsequently, conclusions are drawn in section 5.2. Suggestions for follow-up research are given in section 5.3. The chapter finishes with recommendations in section 5.4 and a reflection on the research in section 5.5.

5.1 Discussions

First, the discussion section interprets the findings and relates them to the theoretical framework and literature. Next to that, the strengths and limitations of the research are pointed out.

5.1.1 Interpreting the findings

There are seven main findings in this research:

1. Affected communities by the 2010 eruptions, had equipped themselves by preparing themselves for 2018/2021 eruptions. They proved to be better skilled at reading the signs of Mount Merapi's activities through training and public engagement by the government and volunteers (see section 4.2). This finding is accordance with the studies undertaken by Imperiale and Vanclay (2016), Ganapati and Ganapati (2008), and Tierney et al. (2006) that stated the affected communities are not helpless (see section 2.1).
2. Engaging communities can support redevelopment planning to build community resilience in post-disaster. In section 4.3 it has been discussed that various redevelopment planning activities were carried out in a participatory manner, involving directly affected communities, starting from the planning process up to implementation, and by understanding the resources, strengths, and weaknesses of the communities. Those statements are in line with literature IDNDR (1994), Jha et al., (2010), UNDRO (1982), and UNISDR (2005;2015) (see section 2. 5), that argue that reduction of disaster risks is by engaging and empowering local communities affected by disasters and by helping them to reduce their vulnerabilities and enhance their prosperity and resilience.
3. The unpredictable and catastrophic impacts of the Mount Merapi eruptions led governments and communities, who live in challenging times of uncertainties and unpredictable disasters, to embrace the concept of resilience. That statement aligns with the studies by Cutter et al. (2008), Imperiale and Vanclay (2016), and Saunders and Becker (2015) that stated that the 'world of uncertainties and unpredictable disasters' have encouraged planners and policymakers to try understanding local development through the concept of resilience.
4. The governments proved to not want to compromise with the affected communities in building settlements in the disaster-prone areas. This result is in accordance with the statements of the UNDP

(2020). The UNDP (2020) stated that post-disaster redevelopment planning processes are often centrally planned and implemented, and the governments use a top-down approach that does not engage affected communities in their redevelopment process.

5. Engaging communities in the redevelopment planning process can make sure that the objectives of redevelopment planning activities were truly functional, guaranteed quality, and useful for the affected communities to enhance their resilience. By engaging communities, the wishes and what people want were accommodated by the governments and it can accelerate the implementation of redevelopment planning activities that were carried out by the governments. Those conditions comply with the statement of Innes and Booher (2004) who argued that public engagement helps policymakers and planners understand the public preferences and builds support for policies.
6. The affected communities' desire to immediately carry out daily activities before the eruptions occur, the high spirit of cooperation to rebuild their areas, and the public awareness about the importance of redevelopment planning activities were important success factors to do public engagement in redevelopment planning in post-disaster regions. These show that the affected communities comply with the statement of Ganapati and Ganapati (2008). They found that the affected people of disaster are not hopeless.
7. Engaging the affected communities influenced the activities in the post-disaster redevelopment planning. Engaging affected communities has an impact on the financial budgets that were available for the communities. The more people involved means the more money spent to facilitate the people involved (see section 4.3). This finding is not suitable with the statement of Innes and Booher (2004) and Scott (1998) that stated engaging communities may avoid expensive and time-consuming litigation against plans and policies (see section 2.6).

5.1.2 Strengths and Limitations

This research has different strengths. First, it uses various sources and materials for a detailed case study regarding the Mount Merapi eruptions in 2010 and 2018/2021. It uses in-depth interviews with multiple actors from the multi-level governments (national government, provincial government, and regency government) who have important roles in redevelopment planning, as well as affected communities who experience both eruptions, and NGOs from the community's initiatives. Ultimately, this research also uses an autoethnography approach or the researcher's personal experience. She was part of the affected communities and experienced both eruptions. Second, this study was very relevant to the sciences because the research looks at the whole cycle of disaster management, by comprising both the Mount Merapi eruptions in 2010 and 2018/2021, and including the emergency phase, recovery phase, and rehabilitation and construction phase. Therefore, this study could provide a comparison of the preparedness of the communities and governments to deal with future disasters with the previous disaster. Was there any improvement in the preparedness, or did the communities become resilient? Those can be answered in this research.

However, this research may have some limitations. First, this research was a master thesis study, which means the time to conduct the study of the case, analysis of documents, in-depth interviews etc.

was quite limited. There was approximately one month for preparing the interview guidelines, conducting the in-depth interviews, and transcribing the interviews. Second, the in-depth interviews had to be conducted online due to the Covid-19 pandemic. It prevented the researcher from experiencing the enthusiasm of the interviewees, especially the affected communities when sharing their experiences regarding how they deal with the Mount Merapi eruptions. Besides, the affected communities live in remote areas where the internet connection was poor – so therefore some potentially relevant people could not be interviewed. That gave the researcher some limitations to understand what the interviewees said and needing more time when the internet connection was broken. However, as the researcher was from the region itself, she could better interpret the findings.

5.2 Conclusions

This study researched the question: How can public engagement support redevelopment planning to build community resilience in post-disaster areas – such as Sleman Regency after a large eruption of Mount Merapi 2010? To this end, a qualitative research and longitudinal case study was executed to investigate this relationship.

The first sub-question was: What is disaster risk management and what is community resilience, and how are these related to public engagement in post-disaster redevelopment planning? Based on disaster risk management literature (see section 2.3), disaster risk management can be seen as essentially dealing with management of resources and information towards a disastrous event and is measured by how efficiently, effectively and seamlessly one coordinates these resources. Regarding the various typologies of the different stages in disaster management, this research has used typology based on Todd and Todd (2011). The stages consist of the emergency phase, recovery phase, and rehabilitation and reconstruction phase. According to community resilience literature (see section 2.7), the community resilience is the social processes (cognitive and interactional) that occur within places and that are put into action by local people to collectively learn and transform toward enhancing community wellbeing and addressing the negative risks and impacts they perceive and experience as common problems. It is important to doing public engagement in post-disaster redevelopment planning because planners and policymakers should be concerned about the resources, strengths, and weaknesses of the communities, which can be achieved by engaging communities (see section 2.8). By understanding the disaster risk management and community resilience, public engagement in post-disaster redevelopment planning could be done in a proper way.

The second sub-question was: What disaster management has been implemented in the Sleman Regency after the large eruption of Mount Merapi in 2010? The disaster management that was implemented in the Sleman Regency after the large eruption of Mount Merapi in 2010 comprised the emergency phase, recovery phase, and rehabilitation and reconstruction phase (see section 4.1). In the emergency phase, activities related especially to the safety and security of the affected communities. This comprised for instance: the evacuation for vulnerable people; establishment of the refugee barracks in the form of refugee buildings and emergency tents; operating public kitchens and

distribution of logistics; distribution of clean water; the establishment of temporary toilets; and health services in the refugee barracks. Important is that those activities were done in collaborative manner including multiple levels of governance by: the Sleman Regency Government by collaboration of Public Work of Sleman Regency, Health Agency of Sleman Regency, Transportation and Communication Agency of Sleman Regency. In addition, for instance, the evacuation of the Mount Merapi eruptions victims were conducted by a joint team, including governmental and NGO parties. In the recovery phase, the Sleman Regency Government in collaboration with the provincial government, national government, and external aids carried out jointly the construction of 2,682 temporary housings (shelters) for the affected communities. In the rehabilitation and reconstruction phases, the establishment of new resettlements for the affected communities in a safer zone as part of the redevelopment planning activities was carried out by the multilevel governments. Land ownership status and environmental carrying capacity were taken into account when planning to meet housing needs. Those activities were carried out in a multi-level governance approach that included the national government (Bappenas and BNPB), provincial government (Bappeda DIY and BPBD DIY), regency government (Bappeda Sleman, BPBD Sleman, DPUP Sleman), external aids, and the affected communities themselves.

The third sub-question was: How was the community engaged in the redevelopment planning process after the large eruption of Mount Merapi in 2010? According to the findings (see section 4.3), the redevelopment planning activities such as building resettlements in a safer zone was carried out involving directly affected communities, which started already in the planning process and was continued to the implementation. The affected communities could participate in village's meeting and forum for communication (usually the communities are invited to go to the joint team base at the office of the BPBD Sleman Agency) to share their opinions and wishes with the governments. They could also directly convey their opinions and wishes to the DPUP Sleman, which was made responsible for the planning and establishment of the permanent housing (see 4.1.3). This was one of the activities in the redevelopment process where the communities engaged with the governmental agencies. The communities were involved in carrying out the development starting from the stages of planning program, implementation, and evaluation. The resettlement establishment activities were part of the rehabilitation and reconstruction phase. Mostly, the affected communities were engaged by the government since the beginning of the relocation to a safer resettlement project. Unfortunately, there were around 400 families of the affected communities who lived in the disaster-prone area who did not want to relocate to a safer zone. Some of them did not want to relocate as the new location of resettlements was not far away from their original settlements. They feel their house location is still safe, and their livelihood is around their previous house location. On the other hand, the governments issued regulations (see 4.1.3) that prohibit the communities from developing permanent housing and adding new infrastructure and facilities in areas directly affected by the 2010 Merapi eruptions. The governments saw those prohibitions necessary as they could not compromise the safety of the communities. However, with regard to this, the communities were not engaged with the government – in contrast with many other issues as discussed above. The government only informed people about

the regulations without proper involvement and engaged the communities. That proved to become an issue in the rehabilitation and reconstruction phase. In the initial plan, the rehabilitation and reconstruction phases should have been finished in 2013 (with a formal maximum period of three years = 2014). However, until June 2021, the rehabilitation and reconstruction phases related to the 2010 eruption still are not finished yet.

The fourth sub-question was: How did the redevelopment planning process affect disaster management and community resilience in light of the subsequent eruptions in 2018/2021 in the Sleman Regency? The study findings suggest that the redevelopment planning process did affect the disaster management and community resilience to deal with the new eruptions in 2018/2021. The overall picture is that community resilience had improved for dealing with the eruptions in 2018/2021. For example, to cope with the disasters, firm institutions for disaster management are needed. Hence, the BPBD Sleman and DIY agencies were formed in the end of 2010 and the early of 2011 after the Mount Merapi eruptions in 2010 (see section 4.4). The redevelopment planning activities included deciding the relocation areas for the affected communities to prevent the negative impacts of disasters (See section 4.1.3). It was taking into account the land ownership status and environmental carrying capacity to meet human needs (settlements, agriculture, pasture, social and public facilities, clean water, etc.). In redevelopment planning also included the preparedness to deal with future disaster in the residential zone on the slopes of Merapi. Evacuation routes and refugee barracks were made in strategic places for refugees to cope with eruptions in 2018/2021 (See section 4.5). The evacuation routes and refugee camps considered disaster risks and were communicated with communities and volunteer communities in disaster-prone areas of Mount Merapi. Even though the eruptions in 2018/2021 occurred continuously over three years, there were no victims from the affected communities as well as the livestock and settlements. These findings suggest an enhanced resilience of the communities to deal with Mount Merapi eruptions in 2018/2021. Another prove is that in 2010 eruption killed 277 people, damaged and buried 2,682 houses, and caused a total loss of approximately EUR 180,000,000.00 in Sleman Regency. Moreover, 40,634 houses in Sleman Regency also experienced minor damage due to Mount Merapi block-and-ash flows that formed by dome collapse and contained a substantial amount of broken dome fragments.

The last sub-question was: What are from a community resilience building perspective the success factors, barriers, and conditions to do public engagement in redevelopment planning in post-disaster regions? The success factors are (See section 4.4): First, the affected communities' desire to immediately carry out daily activities before the eruptions occur. Second, the high spirit of mutual cooperation to rebuild their areas. Third, public awareness about the importance of redevelopment planning activities. On the other hand, the barriers are: First, the affected communities have different jobs and activities, so sometimes they do not have time to be involved in public engagement in redevelopment planning activities. Second, limited human resources who understand how redevelopment planning activities should be carried out. Third, there are government activities that are not in accordance with the wishes and perceptions of the affected communities.

The overall research question was phrased as follows: In the context of post-disaster redevelopment planning, public engagement is a fundamental step towards bridging and creating synergies between the different disaster experiences and forms of knowledge held by different actors – both national, regional local government as well as local communities and NGOs (see section 2.6; section 4.2; section 4.3; section 4.5). To integrate the wishes, needs, and knowledge in processes regarding the redevelopment planning of affected areas after disasters, there is a need to engage with affected communities. The findings clearly show that engaging affected communities influenced the activities in the post-disaster redevelopment planning in a positive way (See section 4.3). It proved to help to reduce and prevent the negative impacts of disaster. Also, it proved to enhance communities' preparedness to deal with future disasters – resulting in less victims of the 2018/2021 eruptions. However, planners and policymakers should take into account the resources, strengths, and weaknesses of the communities, which can be created by engaging communities. In the end, the various pieces of knowledge are necessary because of identifying vulnerabilities to enhance the resilience to future disasters or because of disaster risk reduction. Furthermore, there can be strength in redevelopment planning activities that involve the communities. For instance, the Merapi slope communities proved to have local wisdom in the form of mutual cooperation in efforts to rebuild the environment and their livelihoods. The local wisdom is that the communities around Mount Merapi have been living in harmony among the threats of disaster. Even though Mount Merapi has erupted periodically, the communities keep on running their activities and surviving by holding the principles of “life peacefully with nature” and “gotong royong among communities” (collaboration and cooperation among the communities or helping each other that was develop the ‘sister villages’ approach – see section 4.1.3; section 4.2). Hence, the communities were willing and able to build their own housing and facilities and they had a sense of belonging. Finally, it can be concluded that engaging communities, indeed, can support redevelopment planning and building community resilience in post-disaster areas.

5.3 Suggestions for follow-up research

Based on the limitations and findings of the research, some suggestions for follow-up research are formulated. First, follow-up research could include a more detailed analysis, more information, and a longer period (more stages) to conduct the research. To be a better case study, future research should do more in-depth interviews, more extensive GIS analysis, and go into the field if possible. Second, it would be interesting if the future research would include more cases to do a comparative case study because this research is only a single case study. It is about an Indonesian volcano case study. It would be relevant if further research conducted more case studies about the other Indonesian volcanoes, or even do case studies internationally. Then a comparative case study with a broader perspective and different geographically context could be done. Third, this study only looked at the catastrophic disaster of volcano eruptions, while disaster management is relevant to other types of disasters. It becomes more challenging and interesting if future research would compare the disaster management on volcano eruptions with other disaster management relating to such disasters as floods disaster management, earthquakes disaster management, or even pandemics like Covid-19.

5.4 Recommendations

Based on the findings of the research, various recommendations can be made to improve post-disaster redevelopment planning after the Mount Merapi eruptions.

First, related to the certain issues of the public engagement and community resilience-building strategies in post-disaster redevelopment planning in Sleman Regency:

1. To conduct future research to make this research even better. The follow-up study should do more analysis and more case study research. The longer period to conduct the study should be on the agenda. Ultimately, conducting comparative case study research internationally with different geography and culture.
2. To successfully implement public engagement in post-disaster redevelopment planning, the relevant stakeholders should know and understand their role and have good communication and relationship with each other. Having good communication and relationships would make stakeholders, especially the communities, eagerly involved in the planning process. They would leave aside their passive attitudes and shyness in expressing their opinions and desires in the forums provided by the governments.
3. The governments should support the affected communities by genuinely engaging and empowering local communities affected by disasters. To build community resilience, the government should listen carefully to what the affected communities think and desire. The governments do all the planning and redevelopment activities for the good sake of the communities. But actually, it is not always the best for them. The communities know better what they are dealing with. They know their capability to reflect on the causes of their vulnerability and to reduce it to enhance their wellbeing and resilience to future disasters. Therefore, engaging and empowering local communities would lead to community resilience.
4. The government should address the local wisdom of the affected communities in the form of mutual cooperation in efforts to rebuild their environment and livelihoods. It would lead to creating resilience in the communities to deal with future disasters.
5. There should be more integrated planning regarding the Mount Merapi areas in disaster management among multi-level governments. It could produce comprehensive planning in national, provincial, and regency spatial plan documents.
6. Involving private sectors and empowering local communities to build social and economic resilience. The impact of disasters is mostly catastrophic not only in the social sector but also in the economic scheme. Hence, by involving the private sector with mutual collaboration with the communities and governments, it would make the communities back to their economic level sooner and the growth of the regional economic income. The communities would become independent and not depend on external aids.

Second, related to the post-disaster management in general:

1. The disaster management cycle, especially in the post-disaster management cycle, should address how to deal with the multiple cases of disasters. The existing post-disaster management is mostly regarding one disaster event or one chronicle of the disaster management cycle. But there is no disaster management on multiple cycles of disaster or parallel disaster. The parallel disaster management cycle could be the guidelines to create more prepared communities and governments to cope with multiple disasters.
2. Post-disaster planning should address the importance of public engagement to create community resilience. In the literature, many have said that engaging communities is time-consuming and costs more money. However, engaging communities would lead to accelerating the implementation of the program. Besides, if the communities have been involved since the beginning of the program, it would lead the program to become successful. There would be no rejection from the communities since they know what they are dealing with.
3. The redevelopment disaster planning should count the development of surrounding areas. It would create the balanced development of the affected areas. Hence, it would prevent the second disaster and disaster capitalism. Then it could build resilience in the communities.

5.5 Reflections

This master thesis was a life-changing experience for me. First, I came from a different educational culture in writing the type of thesis. I experienced many difficulties to catch up with the conditions. I spent more time reading and rereading the literature. I familiarized myself with the University of Groningen type of learning. Second, I struggled with the time difference when conducting the in-depth interviews. Conducting interviews at 04:00 am and 05:00 a.m. was something to remember. Moreover, conducting all the in-depth interviews online due to the Covid-19 pandemic gave me several limitations to grasp the information from the interviewees. I needed help to conduct the interviews with the affected communities because most of them were not familiar with online situations.

Ultimately, despite the obstacles and unfamiliar circumstances, I was able to complete this thesis on time. For this achievement, I would like to thank my supervisor Jos Arts that made it happen. Thanks to him for being caring, critical, and always giving much better suggestions. His detailed comments were beyond my imagination. Next to that, I would like to thank Angelo Imperiale, who patiently discussed literature and gave me a very handful of comments for making this thesis better. Without Jos Arts and Angelo Imperiale, I would probably still be exploring literature and struggling to complete my thesis. Next, their ever-lasting enthusiasm toward my thesis topic was a memorable thing to remember. Besides, I would like to thank the interviewees for their time and openness, through which they helped to answer my research questions. In the end, my appreciation goes out to my families, who always support me without any conditions. Their beliefs made me strong.

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Appendix A

List of formal documents analyzed:

1. Map of disaster-prone area of Mount Merapi that was published by Sleman Regency Government (local government level II) in RTRW (Spatial plan) 2011-2031
Available on: <http://geoportal.slemankab.go.id/documents/28> and available on:
[http://geoportal.slemankab.go.id/layers/geonode: 3404 50kb ar kawasan rawan gunungapi bpbd 2012](http://geoportal.slemankab.go.id/layers/geonode:3404_50kb_ar_kawasan_rawan_gunungapi_bpbd_2012)
2. Rencana Aksi Rehabilitasi dan Rekonstruksi Pascabencana Erupsi Gunung Merapi Provinsi D.I. Yogyakarta dan Provinsi Jawa Tengah Tahun 2011-2013 (Action plan for post-disaster eruption of Mount Merapi rehabilitation and reconstruction of the province of Yogyakarta Special Region and Central Java Province 2011-2013) that was published by Bappenas and BNPB (national governments) in 2011
Available on: <https://bnpb.go.id/uploads/migration/pubs/448.pdf>
3. Risiko Bencana Indonesia (Disaster risk of Indonesia) that was published by BNPB (national government) in 2016
Available on: https://inarisk.bnpb.go.id/pdf/Buku%20RBI_Final_low.pdf
4. Sleman Regency spatial plan that was published by Sleman Regency Government (local government level II) in 2012
Available on: <https://pertaru.slemankab.go.id/download/pemerintah-kabupaten-sleman-peraturan-daerah-kabupaten-sleman-nomor-12-tahun-2012-tentang-rencana-tata-ruang-wilayah-kabupaten-sleman-tahun-2011-2031/>
5. Spatial plan of the Mount Merapi National Park Area that was published by national government in 2014
Available on: <https://peraturan.bpk.go.id/Home/Details/41564/perpres-no-70-tahun-2014>

Appendix B

Guide Interviews for the government actors

Public Engagement and Community Resilience-Building Strategies in Post-Disaster Redevelopment Planning: A Case Study of Post-Eruption Mount Merapi in Sleman Regency (Indonesia)

Introductory questions

1. Could you please introduce yourself?
 - Specify your full name?
 - The institution where you work for?
 - Your position in the office and your period of work?
 - Your educational background?
2. Could you explain your involvement in the activities or programs of post-disaster redevelopment planning of the Mount Merapi eruption in 2010 and in the activities of the Mount Merapi eruptions in 2018/2021 (representing yourself either the institution where you work with)?
3. Could you explain the activities or programs you were involved with in 2018/2021 and in the ongoing recovery process related to the Mount Merapi 2010 eruptions?
4. What is (was) your biggest concern on the activities or programs related to the issue of post-disaster redevelopment planning? For example, what should be done and what shouldn't? Why?

Public Engagement

5. Were the activities you were involved in or dealing with engaging affected communities? To what extent and how?
6. Did engaging affected communities influence your activities in the post-disaster redevelopment planning? In which way?
7. What are the weaknesses, strengths, and conditions (how to make it work) of involving the affected communities in the post-disaster redevelopment planning? How did you address these issues?
8. What are the success factors, barriers, and conditions to do public engagement in redevelopment planning after the Mount Merapi eruption in 2010 and in the ongoing process of the Mount Merapi eruption in 2018/2021?

Community Resilience

9. What do you think about the affected communities related to their preparedness to deal with the Mount Merapi eruptions in 2018/2021 after their experiences to cope with the Mount Merapi eruptions in 2010? Are they more prepared and more cohesive with a higher sense of risk? Why?

10. Do the affected communities have a higher degree in the capacity of perceiving shared needs and vulnerabilities related to the eruptions in 2010 and 2018/2021? For example, in the feeling of social responsibility towards the most vulnerable and those most affected by the eruptions and in developing local knowledge about the risks of eruptions and building cooperation to deal with the risk of eruption? Why?
11. How did the redevelopment planning process affect disaster management and community resilience? What is the difference between 2010 and 2018/2021? What was the role of public engagement in these? Are they conforming to what in theory said? What are the do and don't, the success factors, barriers, and conditions? To what extent redevelopment planning announced these issues, and how public engagement strategies happened in these?

Closing Question

12. After experienced eruptions in 2010 and 2018/2021, what is the best thing to do, and what could be the worst thing you could do in the redevelopment planning process? What could you do differently in the future?
13. Do you have more materials and names of people related to these?

Appendix C

Guide Interviews for the affected communities

Public Engagement and Community Resilience-Building Strategies in Post-Disaster Redevelopment Planning: A Case Study of Post-Eruption Mount Merapi in Sleman Regency (Indonesia)

Introductory questions

1. Could you please introduce yourself?
 - Specify your full name?
 - Gender and age?
 - Where do you live and how far from the peak of the Mount Merapi?
 - Your job?
2. Could you explain your experience regarding the Mount Merapi eruption in 2010 from the beginning of the disaster until now? How did you cope with the impacts? How you did organize with the community?
3. Could you explain your experience regarding the Mount Merapi eruption in 2018/2020 from the beginning of the disaster until now? How did you cope with the impacts? How you did organize with the community?

Public Engagement

4. Did the governmental actors (local or national levels) involve you in the activities or programs of the redevelopment planning process after the Mount Merapi eruption in 2010 and 2018/2021? To what extent and how? In the future, in which way do you like to be involved?
5. If yes (refer to number 4), could you explain more about the activities or programs that you are (were) involved with (regarding the eruption in 2010 and 2018/2021)? How and why?
6. To what extent your involvement influences the governments' activities or programs in the post-disaster redevelopment planning (regarding the eruption in 2010 and 2018/2021)? In which way?
7. What do you think about public participation in the redevelopment planning process of Mount Merapi eruption in 2010 and 2018/2021? Do the governments address your concerns and hopes? To what extent and why?
8. Regarding your experiences, what are the weaknesses, strengths, and conditions (how to make it work) of your involvement in the post-disaster redevelopment planning? How did the governments address these issues?
9. What are the success factors and barriers in the procedure to do public engagement in redevelopment planning after the Mount Merapi eruption in 2010 and in the ongoing process of the Mount Merapi eruption in 2018/2021?

Community Resilience

10. Did you perceive any change in terms of preparedness between the Mount Merapi eruptions in 2010 and 2018/2021? Were you prepared to cope with the 2010 eruptions? Were you more or less prepared for the 2018/2021 eruptions? Can you explain more?
11. Did you perceive any changes in your community in the 2010 eruptions between 2010 and 2018? Was there any cooperation in the community toward the impact in 2010 and was more or less any cooperation in 2018 compare to 2010? Can you explain more?
12. Do you think that recovery intervention carried out after the 2010 eruptions that announced preparedness among your community in facing the next disaster (2018/2021 eruption)? How does the public engagement strategy influence your sense of risk and sense of place within the community?

Closing Question

13. Do you have any comments regarding public engagement in redevelopment planning? Do you have more thought to share? Any suggestions?

Appendix D

Guide Interviews for the NGOs

Public Engagement and Community Resilience-Building Strategies in Post-Disaster Redevelopment Planning: A Case Study of Post-Eruption Mount Merapi in Sleman Regency (Indonesia)

Introductory questions

1. Could you please introduce yourself?
 - Specify your full name?
 - Gender and age?
 - Where do you live?
 - Your job and your position in NGOs community?
2. Could you explain your experience regarding the Mount Merapi eruptions in 2010 from the beginning of the disaster until now? How did you cope with the impacts? How you did organize with the community?
3. Could you explain your experience regarding the Mount Merapi eruption in 2018/2020 from the beginning of the disaster until now? How did you cope with the impacts? How you did organize with the community?
4. What was the role of your NGOs you were joining regarding the Mount Merapi eruptions in 2010 and 2018/2021?

Public Engagement

5. Did the governmental actors (local or national levels) involve your NGOs community in the activities or programs of the redevelopment planning process after the Mount Merapi eruption in 2010 and 2018/2021? To what extent and how? In the future, in which way do your NGOs community's like to be involved?
6. If yes (refer to number 4), could you explain more about the activities or programs that your NGOs communities are (were) involved with (regarding the eruption in 2010 and 2018/2021)? How and why?
7. To what extent your NGOs community's involvement influences the governments' activities or programs in the post-disaster redevelopment planning (regarding the eruption in 2010 and 2018/2021)? In which way?
8. What do you think about public participation in the redevelopment planning process of Mount Merapi eruption in 2010 and 2018/2021? Do the governments address your NGOs community's concerns and hopes? To what extent and why?
9. Regarding your experiences, what are the weaknesses, strengths, and conditions (how to make it work) of your involvement in the post-disaster redevelopment planning? How did the governments address these issues?

10. What are the success factors and barriers in the procedure to do public engagement in redevelopment planning after the Mount Merapi eruption in 2010 and in the ongoing process of the Mount Merapi eruption in 2018/2021?

Community Resilience

11. Did your NGOs community and the affected communities perceive any change in terms of preparedness between the Mount Merapi eruptions in 2010 and 2018/2021? Were your NGOs community and the affected communities prepared to cope with the 2010 eruptions? Were your NGOs community and the affected communities more or less prepared for the 2018/2021 eruptions? Can you explain more?
12. Did you perceive any changes in your NGOs community and the affected communities in the 2010 eruptions between 2010 and 2018? Was there any cooperation in the community toward the impact in 2010 and was more or less any cooperation in 2018 compare to 2010? Can you explain more?
13. Do you think that recovery intervention carried out after the 2010 eruptions that announced preparedness among your NGOs community and the affected communities in facing the next disaster (2018/2021 eruption)? How does the public engagement strategy influence your sense of risk and sense of place within the community?

Closing Question

14. Do you have any comments regarding public engagement in redevelopment planning? Do you have more thought to share? Any suggestions?

Appendix E

Consent Form

Public Engagement and Community Resilience-Building Strategies in Post-Disaster Redevelopment Planning: A Case Study of Post-Eruption Mount Merapi in Sleman Regency (Indonesia)

Interview Description

- ✚ Conducted by Anita Yulianti, this interview is part of data collection process on the research about Public Engagement and Community Resilience-Building Strategies in Post-Disaster Redevelopment Planning: A Case Study of Post-Eruption Mount Merapi in Sleman Regency (Indonesia)
- ✚ The interviewer is a master student from the University of Groningen (The Netherlands) and University of Gadjah Mada (UGM) (Indonesia). Two supervisors in charge are Prof. Dr. Jos Arts from the University of Groningen and Prof. Ir. Bakti Setiawan, MA., Ph.D. from University of Gadjah Mada (UGM)
- ✚ The interviewer would like to gain information about the participant's experiences and involvement with regard to redevelopment planning in post-disaster after Mount Merapi Eruptions in Sleman Regency (Indonesia)
- ✚ This interview will be recorded to have accurate information of participant's views. Those who can access the tapes and/or the transcripts are only the interviewer and the two supervisors
- ✚ Everything said by participant during the interview will be treated confidentially
- ✚ The participant can choose to stay anonymous; it means her/his name will not appear on the transcript or in any further publication
- ✚ It is possible to add any supplementary information on the transcript which is obtained from correspondences between the participant and the interviewer via email or any other messages facilities.

Participant's Consent

As participant,

- ✚ I agree to be interviewed for the research entitled "**Public Engagement and Community Resilience-Building Strategies in Post-Disaster Redevelopment Planning: A Case Study of Post-Eruption Mount Merapi in Sleman Regency (Indonesia)**" which is being produced by Anita Yulianti of the University of Groningen and University of Gadjah Mada (UGM)
- ✚ I have been given satisfactory answers to my inquiries concerning project procedures and other matters; and that I have been advised that I am free to withdraw my consent and to discontinue participation in the project or activity at any time without prejudice
- ✚ I agree to participate in one or more electronically recorded interviews for this research, and one or more written correspondences via email or any other messages facilities. I understand that such interviews and related materials will be kept completely (not) anonymous, and that the results of

this study will be published in interviewer's master thesis and other academic courses, and may be published in academic journals, and academic conferences

- ✦ I agree that any information obtained from this research may be used in any way thought best for this study. I would (not) like to have the copy of this interview's transcript, and the copy of the draft final thesis, and please send it to:
-

- ✦ Hereby I grant the right to use information from recordings and or notes taken in interviews of me, to the University of Groningen and University of Gadjah Mada (UGM). I understand that the interview records will be kept by the interviewer and the research, and that the information contained in the interviews may be used in materials to be made available to the general public.

Place and date:

Name of participant:

Signature of participant:

Name of interviewer: Anita Yulianti

Signature of interviewer:

**Any hesitation and questions can be addressed by contact the interviewer on phone number: +621329138887 and/or email: anita.yulianti.2907@gmail.com or a.yulianti@student.rug.nl*

Appendix F

Table F. Coding: Key terms and the features of the in-depth interviews

Public Engagement	Community Resilience	Disaster Management	Redevelopment Planning
❖ Participation	❖ Affected communities	❖ Preparedness	❖ Build-back better
❖ Affected communities	❖ Living harmony	❖ Emergency	❖ Affected communities
❖ Representatives	❖ Collaboration	❖ Response	❖ Participation
❖ Multilevel governments	❖ Coordination	❖ Mitigation	❖ Multilevel governments
❖ Coordination	❖ Communication	❖ Recovery	❖ Cooperation
❖ Informing	❖ Local wisdom	❖ Rehabilitation	❖ Coordination
❖ Understanding	❖ Willingness	❖ Reconstruction	❖ Collaboration
❖ Vulnerable people	❖ Awareness	❖ Coordination	❖ Preparedness
❖ Sharing	❖ Evacuation	❖ Intervention	❖ Rehabilitation
❖ Forum	❖ Response	❖ Refugee	❖ Reconstruction
❖ Local wisdom	❖ SKSB	❖ Evacuation	❖ Engaging communities
❖ Communities' expectation	❖ KSM	❖ Refugee barrack	❖ Temporary housing
❖ Trust	❖ Vulnerable people	❖ Victim	❖ Permanent housing
❖ Interactive	❖ Preparedness	❖ Living harmony	❖ External aids
❖ Relationship	❖ Sense of risks	❖ Multilevel governments	❖ Infrastructure
❖ Build-back better	❖ Social responsibility	❖ Affected communities	❖ Evacuation routes
❖ Willingness	❖ Cooperation	❖ Disaster risk management	❖ Signs
❖ Redevelop	❖ Trust	❖ Integrated	❖ Mitigation
❖ Collaboration	❖ Changes	❖ Build-back better	❖ Disaster-prone area
❖ Cooperation	❖ Redevelopment	❖ Build-back safer	❖ KRB III
❖ Communication	❖ Intervention	❖ Redevelop	❖ Safer place
	❖ Rehabilitation	❖ Planning	❖ Willingness
	❖ Reconstruction	❖ Disaster-prone areas	❖ Livelihood
	❖ Evacuation Routes	❖ Affected communities	❖ Build-back safer
	❖ Standby	❖ Vulnerable people	❖ Relocation
	❖ Alert	❖ Signs	❖ Sense of belonging
	❖ Sense of place	❖ Evacuation routes	❖ Regulation
		❖ Standby	❖ Restriction
		❖ Alert	❖ Spatial plan
			❖ Local wisdom
			❖ Implementation