From the Ashes: How Tourism Became the Phoenix of Disaster Recovery
A Case Study from Mount Merapi, Indonesia

by

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A thesis
presented to the University of Waterloo
in fulfilment of the
thesis requirement for the degree of
Master of Environmental Studies
in
Geography

Waterloo, Ontario, Canada, 2024

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

This is a case study based on Mount Merapi, located on the border of both Central Java, and the Special Region of Yogyakarta, on Java, Indonesia. Merapi is one of the most active volcanoes in the world and in October of 2010, it begun one of its most eruptive sequences to date. Over 350 fatalities ensued and the destruction of hectares of agricultural lands, including thousands of homes. Due to the embedded cultural ideology of the communities in the Merapi region, a sense of unity and togetherness exuded across village borders, displaying community cohesion and social capital that laid the foundation for a synergized road to recovery. Tourism became a lifeline, propping up local communities supporting the transition from disaster to recovery. Tourism affected every aspect of residents' lives, working to fill the gaps left by traditional methods of disaster recovery. This study analyzes the resurgence of an innovative tourism industry in a post-disaster setting on Mount Merapi, Indonesia and the social/cultural capital and community cohesion that led to its success.

Acknowledgements

Land Acknowledgement

I acknowledge that the University of Waterloo, to which this thesis is affiliated, is located on the traditional territory of the Attawandaron (Neutral), Anishinaabeg and Haudenosaunee peoples. The University of Waterloo is situated on the Haldimand Tract, the land promised to the Six Nations that includes six miles on each side of the Grand River.

Funding Acknowledgement

This research would not have been possible without the funding support of the Social Sciences and Humanities Research Council of Canada (SSHRC). This research was supported by both the SSHRC CGS-M award and a SSHRC Insight Grant. Further, this research was made possible by funding from the University of Waterloo with a Graduate Studies International Experience Award.

Personal Acknowledgements

It is with utmost gratitude I recognize the individuals who supported and contributed to this work.

First, I wish to thank my supervisor Dr. Brent Doberstein, for his flexibility, calming words when I was ready to 'dismantle worldly systems', and his constant commitment to supporting his students whether they were halfway across the world or just down the hall. This research would not have been possible without his encouragement, expansive network of friends and colleagues, and his endless patience.

To the greater research team… Dr. Sanjay Nepal and Dr. Erin O'Connell, who contributed to the shaping of this project from the onset, and by participating in my committee to make my work as polished as it could be. To Jacqueline and Celina – thank you for trailblazing the fieldwork component of this project and for your guidance and support.

To Dipak .... I am so grateful for your ability to keep me on track, guide me in the right direction, and your determination in seeing me through this degree. There were many times I was ready to give up which were always met with the reassurance that I was in fact capable of this venture. You always found a way to make me laugh. Thank you.

To Kat... thank you for roughing the Grad School waters with me. I am so grateful for our friendship.

To Matthew... I cannot imagine spending those months in Indonesia without you. For the countless meals, and the Duolingo lessons – I am thankful for your impulsive decision to move to Yogyakarta to keep me company. Thank you for your friendship.

To Dave Hodgkin, thank you for your humor and the enriching conversations. Your advice and numerous contacts greatly contributed to the successful completion of this research.

To my Indonesian team, thank you for your hospitality. First, to my research assistants Lupiya and Nabiyya, I am so appreciative of the countless hours and input you dedicated to this project, as we discovered the best way to navigate this field work. You acted as my personal Gojeks introduced me to new experiences, food, culture, customs and I am so grateful for your friendship. Also, to April, I am grateful for your ability to step-in and help with transcribing and translating countless documents when I was on tight deadlines. Your contribution was greatly appreciated.

To Hendy, thank you for making me feel like a part of your family from the day I arrived in Yogya. For your support in organizing an office for me at UGM, to being my personal coffee supplier, I am forever grateful for the kindness you and Rahma showed me. I cherish the memories of Fun Football, camping on Merapi, and the countless other adventures you invited me to!

To Bobi and Dwita thank you for stepping in as my Indonesian parents. I am grateful for all the events I participated in, the dinners at your house, the chance to go trekking, and all the contacts you shared. I look forward to seeing you in Vancouver soon.

Finally, to my family and friends. This degree would not have been possible without the unending support of my parents, but also of my brothers, and my partner Chris. I would not be where I am today without your love.

For the rest of you, you know who you are, thank you for your piece in the puzzle.

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Statement of Positionality

In recognition of the historic disenfranchisement that traditional methods of research have inflicted towards members of marginalized communities, it is important I state my personal positionality early in this study. This statement assists the reader in understanding the lens through which I conducted my research. Declaring positionality eradicates the notion of total objectivity, supports a social constructivist ontological approach, and suggests that every study is merely a presentation of a story in a moment in time and further, recognizes that the story has a long history which continues to unfold beyond the time parameters of my research. It acknowledges that all humans have lived experiences which influence their work, and consequently they may face limitations in being able to describe a place, space, time, or experience that is not their own.

I am a privileged, educated, white female and a foreigner describing a story that is not entirely mine to tell. I acknowledge I may face limitations when it comes to my cultural understanding in this space yet endeavoured to reduce these limitations to the best of my ability. This both benefits the study with an outside perspective, while also recognizing I may be limited in my conceptualization of the cultural landscape. My aim was to tackle this topic with justice, but these intentions did not eliminate my ability to cause harm. I have endeavored to make this research collaborative and non-disruptive and to combat my limitations with the help and guidance of local researchers, students, and academics.

1.0 Introduction

This is a story about an ingenious group of individuals that transformed the lives of thousands during the aftermath of an unspeakable tragedy. As a researcher who is part of an esteemed, prestigious academic institution, I feel privileged to share this case study, for the benefit of others in the academic community. I hope that this research will add to the exponentially growing repository of literature highlighting the validity and power of locally-led initiatives and the sanctity of local knowledge.

Mount Merapi, located on the border of both Central Java, and the Special Region of Yogyakarta, on Java, Indonesia is one of the most active volcanoes in the world (Mei et al., 2013). In October of 2010, it began one of its most eruptive sequences to date. Over 350 fatalities ensued, with the additional destruction of hectares of agricultural lands, including thousands of homes (Muir et al, 2020). The livelihoods of surviving residents lay among the hot ash and rubble.

Historically, western academic research has interwoven capitalism into the foundation and philosophy of many academic tenets, ascribing a value to things that ultimately have intrinsic value, and thus leaving off many other important aspects that fall outside the capitalistic value system (Mohanty, 2003). Having said this, academics will refer to a sense of belonging, connectedness, and mutual assistance as either social or cultural 'capital' (Albrecht, 2018). Locally, due to the embedded cultural ideology of the communities in the Merapi region, a sense of unity and togetherness exuded across village borders, instantly palpable to anyone witnessing it. In the aftermath of Merapi's 2010 eruption, the social and cultural capital was unshakable. It laid the foundation for the story of revival that will follow in the subsequent chapters.

Capitalizing on misfortune, and the curiosity of onlookers, the creativity of local entrepreneurs led to the resurgence of a thriving tourism industry. Tourism became a lifeline, propping up local communities crossing the bridge from disaster to recovery, and supporting every aspect of residents' lives, working to fill the gaps left by traditional methods of disaster recovery. In the literature, tourism and disasters are usually seen to have a negative relationship, given that catastrophic events are 'bad for business' (Mair, Ritchie & Walters, 2016); however, this study aims to transform that narrative. The story of revival on Mount Merapi is about the positive,

mutually beneficial, and synergistic relationship between tourism and disaster recovery. The following chapters will describe this phenomenon, in which tourism offered a source of livelihood for those who lost theirs in the destruction.

The following sections outline the design of this research, some key background literature and context for this case study, the methods used to perform this research, and then the centerpiece in this body of work: the manuscript. Finally, this paper will conclude and provide insight into potential pathways for this research to advance in the future.

1.1. Research Objectives and Conceptual Framework

Disaster Management literature is evolving to protect the greatest number of vulnerable people and communities from hazards. Therefore, as both professionals and academics alike continue to search for more innovative ways to reduce disaster risk and bolster recovery, this research aims to provide a new way of looking at an old problem, using a case study to provide an alternative perspective and present new solutions. Consequently, the problem statement is: To understand the relationship between tourism, disaster recovery, and social capital on Mount Merapi, Indonesia.

1.2.1 Research Objectives

In order to understand the relationship between tourism, disaster recovery and social capital on Mount Merapi, the following research questions were used to focus the research and initiate the inquiry. The research objectives are stated under each question.

Primary Research Question

1. To what extent, and in what manner, does the tourism industry support community recovery in a post-disaster scenario?

Objective 1: Identify the involvement of the tourism industry in facilitating disaster recovery and its scope (i.e., short term or long term)

Secondary Research Questions

2. What role do social networks play in supporting tourism's operations and the extent to which tourism can support recovery post-disaster?

Objective 2: Recognize social capital in the tourism industry and gauge its effectiveness for various recovery initiatives

As noted above, much of the current literature on the relationship between tourism and disasters focuses on the impacts of disasters on tourism, or the recovery of the tourism industry itself to pre-disaster "normal" operations; however, there is scant literature on how this industry assists and promotes wide-reaching community recovery and resilience post-disaster (Gurtner, 2016; Mulligan et al., 2012). Given the paucity, this research will thus contribute to both the hazards and tourism literature. The next section will provide context-specific background information, to allow the reader to become fully immersed in the story.

1.2.2. Conceptual Framework

The following conceptual framework was used to visualize the case study.

Figure 1: Conceptual Framework



Note: AI Generated Image based on Author's own drawing of conceptual framework. Own Work (2024).

In Figure 1, the bridge depicts a journey from a place of disaster into the realm of recovery. Traditional forms of disaster management, such as official international relief aid, can be recognized as the archways, acting as catalysts and supportive anchors to start this process. The bridge deck itself can be recognized as social capital. The transition from disaster to recovery could be successful with disaster management and social capital alone, yet the process may be flimsy and unstable. In the phenomenon described below, tourism became the bridge's suspension and stability, supporting the efficient transition to recovery, acting as the linkage connecting a reliable sturdy source of livelihood, allowing residents to reach a recovery standpoint. This diagram travels in time from left to right, or from the inciting event onwards.

1.2. Background Literature

This section provides context to both research history and acknowledges the contribution of critical thinkers who have expanded and improved their fields in the natural hazards, social/cultural capital, and tourism realms. The following is a synthesis of background information and will cover the following subtopics in the literature: 1.3.1. will broadly discuss the concept of disaster management, 1.3.2. will discuss volcanic hazards in Indonesia, 1.3.3. will describe the broader concept and various forms of social/cultural capital and finally 1.3.4. will discuss the tourism industry. Additional literature reviewed is presented in the manuscript (Chapter 3).

1.2.1. Disaster Management

Disaster Management, in its many facets, is a discipline devoted to reducing damages caused from impending hazards. Disaster Risk Reduction is defined by the United Nations Office for Disaster Risk Reduction (UNDRR) as "the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards [and] lessened vulnerability of people and property" (UNISDR, 2009, pp. 10-11). An important distinction in this definition is the delineation between natural hazards and disasters. While often used interchangeably, more recent literature will note that hazards become disasters based on the socioeconomic context and resulting vulnerabilities it produces

(Porfiriev, 1998). Building on this, while it is common to refer to 'natural hazards', a commonly repeated phrase in the literature is that there is no such thing as a 'natural disaster'.

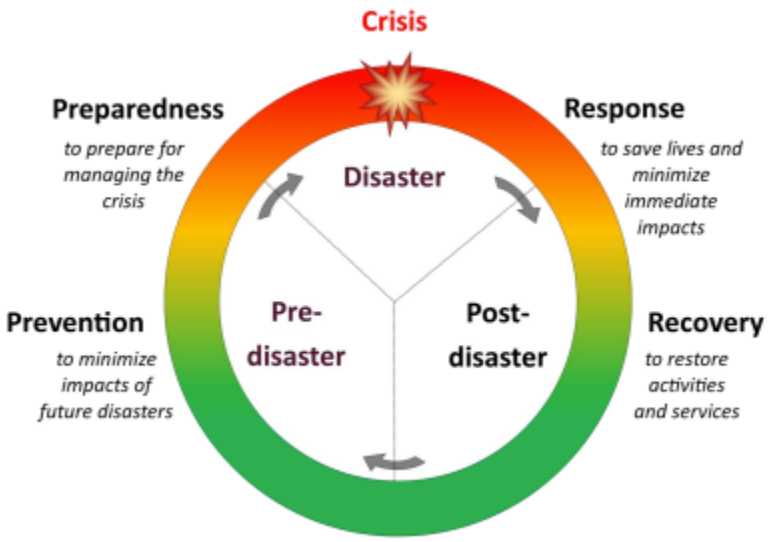
Closely linked to disaster management is the concept of vulnerability. Vulnerability, being the inability to resist or respond to a hazard, is not a static measurement. An individual's acute vulnerability during the aftermath of a natural hazard directly correlates to the composition of their social sphere, and is determined by a variety of sociocultural factors, such as gender presentation, age, mobility, disability, ethnicity, and social or economic status (Banford & Froude, 2015). It can also be dependent upon the season, the occurrence of other extreme events, such as compounding hazards, and the level of preparation against the hazard itself (Banholzer, Kossin & Donner, 2014). Due to these societal constructs, vulnerable community members are the least likely to be able to resist or counteract the processes which created their vulnerability, meaning that after a hazard's impact, they may become more vulnerable to subsequent hazards (Blaikie et al., 2004).

By adopting this understanding of vulnerability, a formal definition of disaster can provide parameters for how these scenarios may unfold. The classification metric used by the Centre for Research on the Epidemiology of Disasters, the agency that tracks disaster impacts, is that in order for a hazard to be classified as a disaster, it must satisfy one or more of the following criteria: 10 or more people are reported killed; 100 or more people are reported affected, injured, and/or homeless; the government declares a state of emergency; or the government requests international assistance (Raschky & Schwindt, 2016; Centre for Research on the Epidemiology of Disasters, 2023). The above criteria are directly affected by three distinct factors: "the triggering natural hazard event (such as the earthquake); the population exposed to the event; and the vulnerability of that population" (Stromberg, 2007, p.199). The two social/human criteria can be manipulated to reduce the extent of destruction; socially constructed vulnerabilities can be reduced, and in some instances, populations can be physically removed from hazard-prone areas. It is in this manipulation where disaster management can be employed.

In the hazards literature, there are four distinct phases of disaster management which often seamlessly transition over time: (i) Mitigation (ii) Preparedness (iii) Response (iv) Recovery (Henstra et al., 2004), as depicted in Figure 2. The mitigation and preparedness phases provide the

best opportunity to reduce risks before a disaster strikes; however, for locations in which hazards are frequent or repeated, all four phases may be employed in sequence over time.

Figure 2: Disaster Management Cycle



Note: From "Space-Based Earth Observations for Disaster Risk Management" by Le Cozannet et al. (2020).

Understanding the opportunities presented during each phase of the cycle, it can be helpful to outline the best practices for disaster management's operationalization. Disasters can create chaos, destroy infrastructure and livelihoods, and disrupt daily lives. Conversely, natural hazards may also present a window of opportunity to rewrite and recreate social norms for the greater good (Birkmann et al., 2010), and therefore reduce vulnerabilities. In certain instances, a disaster can be framed as a useful interruption of policies and or practices that were inadequate or that even magnified disaster impacts, but were nonetheless unchallenged (Fernandez & Ahmed, 2019). The concept that a disaster can become a catalyst for a better way forward was coined in a report entitled "Key Propositions for Building Back Better," issued by Former President Clinton in 2006 at the second anniversary of the 2004 Indian Ocean Tsunami. From this document, the recognition of the "Build Back Better' concept grew and is now widely cited and practiced in the field (Fernandez & Ahmed, 2019; Sarkissan, Diab & Vulliet, 2023). The consensus for practitioners and academics alike is that disaster-affected communities should be encouraged to seize the

opportunity to "improve conditions physically, socially, economically, and environmentally" (Fernandez & Ahmed, 2019, p.3). A failure to take advantage of this 'opportunity' maintains the status quo, rather than following a 'Build Back Better' or a risk reduction stance.

Additionally, the most recent global framework for Disaster Risk Reduction, titled the "Sendai Framework" outlines clear targets and action-items to prevent new and reduce existing disaster risks. This framework helps practitioners and policy-makers alike reference clear objectives and future priorities for the next 15 years (UNDRR, 2015). As stated under the "Investing in Disaster Risk Reduction" priority, the development of measures that include drivers of innovation, growth, and job creation is critical (UNDRR, 2015). Tourism's role in recovery can been seen through its ability to assist a transitioning workforce, supplement new jobs, and stimulate the local economy in innovative ways.

1.2.2. Volcanic Hazards

For the purposes of this review, the scope of the volcanic hazards research will be strictly bound to the geographic context of Indonesia. This will assist the reader in understanding this country's perspective and ongoing work towards volcanic hazard risk reduction.

Indonesia has both the highest number and highest density of active volcanoes in the world (Malawani et al., 2021). Figure 3 outlines several notable volcanic eruptions resulting in multiple fatalities between the years 1994-2023 in Indonesia, providing historic and geographic context.

Figure 3: Death Toll From Historic Volcanic Eruptions in Indonesia.

Year	**Volcano**	**Fatalities**	Source
1994	Mt Semeru	6	WorldData.info, 2024
1994	Mt Rinjani	31	WorldData.info, 2024
1994	Mt Merapi	60	Global Volcanic Program, 1994
1998	Mt Kelud	10	WorldData.info, 2024
2006	Mt Merapi	2	Reuters, 2006
2007	Mt Salak	6	WorldData.info, 2024
2010	Mt Sinabug	17	WorldData.info, 2024
2010	Mt Merapi	367	Bakkour et al., 2015; Mei et al., 2013
2014	Mt Kelud	14	WorldData.info, 2024
2017	Dieng Volc. Complex	8	WorldData.info, 2024
2018	Anak Krakatau	426	Ye et al., 2020
2021	Mt Semeru	51	ReliefWeb, 2021

2023	Mt Marapi	23	Chen, Jamaluddin & Suri, 2023

Given Java is the most densely populated island, millions of individuals experience frequent alerts, disruptions, or direct impacts from volcanic events. Although it may infer that inhabiting land so close in proximity to regular catastrophic threats and/or events is illogical, that would discount the benefits the land may provide and discredit the overwhelming majority of inhabitants that live in these regions, especially at higher altitudes, that have been there for generations (Rozaki et al., 2022). Their connection to the land for time immemorial creates a complex relationship, as stated by Rozaki et al. (2022), between "human, volcano mountain and environment" which provides economic, but also spiritual and sociocultural benefits" (p. 487). Although the mindset in the younger generation may begin to shift, the increasing population pressure on Java alone may leave residents feeling the necessity to stay.

Moreover, volcanoes produce excellent soil fertility, allowing high-yield crops and extensive available agricultural land (Fiantis et al., 2019). While volcanic ash soils cover less than 1% of the earth's surface, they contain approximately 5% of the soil carbon globally (Fiantis et al., 2019). This soil fertility not only benefits local communities with its productivity, but the produce often reaches international markets, servicing international consumers (Rozaki et al., 2022). Unfortunately, as farmers rarely receive monetary compensation in ratio to the service they provide to the greater population, many already live in unstable conditions, constantly threatened by market demands, input costs, and changes in agricultural technology (Rozaki et al., 2022). The threat of an impending natural hazard is just the tip of the iceberg. Unsurprisingly, the majority of residents who live on the flanks of these volcanoes have subsistence livelihoods, primarily through agriculture (Rozaki et al., 2022).

In order to mitigate the consequences of volcanic hazards, and thereby protect these vital agricultural communities, it is important to quantify and understand volcanic risk and damage. In an effort to estimate the scale or magnitude of each eruption, the Volcanic Explosivity Index (VEI) was created. The scale ranges from 0 to 8 and is a similar logarithmic benchmark to the Richter scale, used to quantify earthquakes (Newhall & Self, 1982; National Park Service, 2022). The VEI

is a general indication of the explosive characteristics in an eruptive episode (Newhall & Self, 1982). It is the composite of numerous measurements, including an eruption's magnitude, volume of material ejected, energy released, length of eruption, and destructiveness. Providing a single scale number affords the ability to compare multiple eruptions (Newhall & Self, 1982).

Although Indonesia's volcanoes are primarily stratovolcanoes, which have a relatively typical eruptive pattern, many exceptions to the pattern have occurred, which makes said eruptions particularly deadly. When a typical stratovolcano eruption occurs, the consequences may be threefold. The first wave is typically lava dome growth, followed by ash and tephra ejecta, with a partial or complete summit collapse, vegetation burning from pyroclastic flows and results in numerous fatalities (Malawani et al., 2021). The second wave may bring micro-weather patterns, creating localized atmospheric cooling, extreme rainfall, and thunderstorms (Malawani et al., 2021). Severe rainfall, either in concert with the volcanic eruption or many months and years later during a normal rainy season, can cause lahar flows or "cool lava" to travel rapidly down the volcano's slopes causing secondary destruction long after the ash and molten lava has ceased to erupt. Lastly, the third wave, typified by ash- or lahar-covered landscapes, may result in flooding, famine, and or disease (Malawani et al., 2021).

Thankfully, many Indonesian residents have long-standing traditional knowledge of eruptive warning signs, which can then be complemented by physical data, monitoring, and seismic detection. The technology and development of early warning systems has been transformative for Indonesian disaster management in the mitigation and preparedness phase. Contrary to popular media depictions, volcanoes can present with a wide array of characteristics, and their eruptive episodes may be singular or last weeks with a series of eruptive sequences.

In Indonesia specifically, volcano risk mitigation efforts are of top priority for the national Disaster Management Agency; in the Indonesian language this agency is abbreviated to BNPB (Rozaki et al., 2022). BNPB categorizes the warning system for active volcanoes with a 4-level alert system. Level 1 (Normal) is no cause for concern (BNPB, 2019). Level 2 (Wasapada) means there is an alert in effect, but no action is required (BNPB, 2019). Level 3 (Siaga) meaning 'standby' alerts civilians to take caution (BNPB, 2019); government bodies often enact mandatory

evacuations at this stage (Rozaki et al., 2022). Level 4 (Awas) meaning Beware or 'Watch Out', often means an eruption is looming (BNPB, 2019). Although it falls outside of the scope of this research, it should be noted that there is a long-standing precedence for the Indonesia government to conduct managed retreat and to provide permanent relocated shelter or settlements outside of the fatally hazardous radius for many volcanoes across the country (Depari & Lindell, 2023; Maly, Iuchi & Nareswari, 2015).

Understanding that volcanoes erupt and create a continuous, perpetually unfolding hazard, it is nearly impossible to predict and prevent every negative outcome. Many communities living in close proximity to volcanoes, in Indonesia, have strong preparedness initiatives but that does not eliminate the need for robust, multi-faceted recovery plans.

1.2.3. Social Capital, Javanese Culture, and Community-Based Disaster Management

Social capital describes the social networks within a society that uphold community cohesion by fostering trust and community-building (Albrecht, 2018). Key thinkers in this discipline include Bourdieu (1986), Putnam (1993;1995;2000) and Coleman (1988;1990), with each author attesting to the many benefits, both monetary and non-monetary, that social networks create throughout society (Agnitsch, Flora & Ryan, 2006). The term cultural capital has its conceptual roots in sociology and cultural studies but has close ties to human capital in economic literature (Throsby, 1999). Culture plays an essential role in the expression of collective aspects of people's behaviour which can be demonstrated through belief systems or shared activities (Throsby, 1999). Bourdieu (1986) categorizes cultural capital in three forms: an embodied state (i.e., "disposition of the individual's mind and body"); an objectified state, (i.e. cultural goods such as art, literature, pictures or instruments); and in an institutionalized state, (i.e. embodied cultural capital which gains recognition such as academic credential) (Throsby, 1999, p.4).

More recently, researchers have explored social/cultural capital's presence and importance during the aftermath of natural hazards and disaster recovery (Shaw, 2016). This research resoundingly demonstrates the benefit of social/cultural capital on community cohesion and collective action during disaster rebuilding efforts. Further, their presence has often been found to impact the success of recovery projects and allows resources to extend further when they are

communally owned and or distributed (Gero & Dominey-Howes, 2011; Berkes & Ross, 2013). Local communities are often the first to initiate hazard response plans (Shaw, 2016), and therefore social capital is integral to the effectiveness of both immediate and on-going recovery initiatives for vulnerability reduction in the region (Gero, Mehéux & Dominey-Howes, 2011). A failure to adequately consult with community members as to their needs and desires could result in problematic and unsuccessful outcomes. To understand how these networks add such immense benefit, it is important to provide context as to the different forms of social capital.

There are three distinct kinds of social capital, all of which connect different social spheres: bonding, bridging and linking. Bonding social capital refers to the social connections within a group with an exclusive identity, whereas bridging social capital is the linkage between two separate groups (Putnam, 2000; Baylis, Gong & Wang, 2013). Bonding social capital often refers to close family and friends; those who live in a close community circle and would likely support each other through daily life as well as during times of need. Bridging social capital connects a wider social sphere, and thus may be important contacts for resource acquisition. The key distinction in bridging connections is that the composition of the two or more groups are different, leading to heterogeneity, (e.g. two different church or mosque congregations in an area, bound by a common faith and religious structure) (Hawkins & Maurer, 2010). This difference provides the possibility for knowledge sharing and trade (Putnam 2000; Agnitsch, Flora & Ryan, 2006) across different groups in society. Linking social capital, often characterized as the most stable, is formalized through institutional actors and creates linkages between different sectors across societies, often allowing actors with little power to tap into actors with much greater power (e.g. a resident who is able to reach out to a local government representative). Both bridging and linking, due to their connection between heterogeneous segments, are "characterized by exposure to and development of new ideas, values and perspectives**”** (Hawkins & Maurer, 2010, p.1780). The presence of strong social networks described above are often rooted in the rules that a society subscribes to and are inherently socially-constructed based on shared cultural norms.

Javanese culture describes the term “Gotong Royong” or *mutual assistance*, which, using social capital language, denotes the strong sense of communality and reciprocity. Slikkerveer

(2019), eloquently puts this essence into words by describing Gotong Royong as a spirit or feeling of cooperation that stems from common goals and is "represented by a shared response to the needs of the entire community to accomplish a common task" (p.307). Gotong Royong can be categorized as both i) spontaneous help and ii) mutual assistance (Slikkerveer, 2019). For the purpose of this research, much of the Gotong Royong described will fall into the 'spontaneous help' categorization as this was most notable in the post-disaster era. Gotong Royong was well documented during the recovery efforts of the 2006 Bantul Earthquake, located further south in Yogyakarta, as this mutual support facilitated recovery during initial relief phases as well as long-term rehabilitation (Joakim, 2013). The same phenomenon occurred on Merapi post-eruption as manual labour was also provided to clear debris, support the construction of temporary and permanent housing, and contributed to the overall planning and decision-making (Joakim, 2013). The willingness of residents to support each other creates a powerful and efficient social resource which is then matched with human and material ones impacting not only the success but also the efficiency of recovery (MacRae & Hodgkin, 2011). Community-based Disaster Risk Reduction (CBDRR) strategies rely on the social capital in communities to be successful. As outlined by Shaw (2016), key elements of CBDRR include the resident's active participation, measures for risk reduction which are community-specific, and the recognition of existing capabilities and coping mechanisms.

Overall, the literature supports the notion that active participation from community-based organizations improves coordination between stakeholders and increases education, awareness, and advocacy for community members (Berkes, 2006). The ability to employ positive cultural characteristics and utilize local or indigenous knowledge while also tapping into pre-existing social networks is an incredibly effective approach to bolster resilience for communities facing natural hazards (Becken & Hughey, 2013). The adaptive capacity of communities to influence not only the resilience of their own communities, but also impact larger scale risk reduction spheres fundamentally depends on the social networks present (Berkes & Ross, 2013).

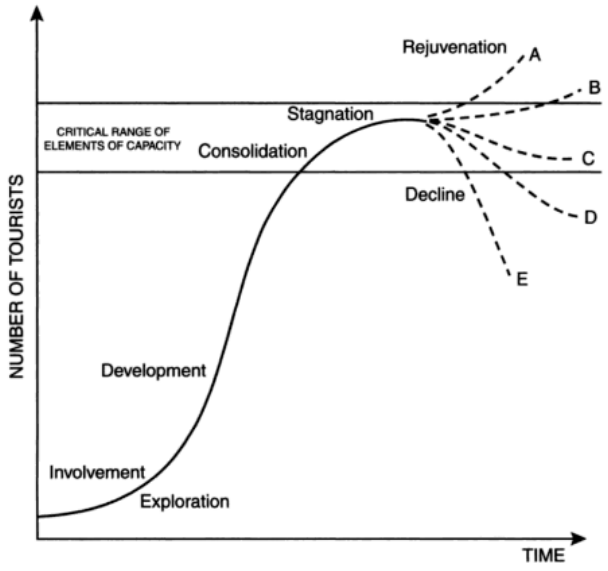
1.3.4. Tourism and Disasters

Tourists, by definition, are people who leave their home community and travel to new locations for a temporary period (Leiper, 1979), yet there are many kinds of tourists. Some travel for work or volunteer opportunities, while others travel predominantly to visit familial connections or those that travel for leisure and recreation (Leiper, 1979). For the purposes of this research, the focus will be on recreation and leisure tourists; those who simply travel for pleasure. An overwhelming majority of tourists who visit Mount Merapi would be categorized as recreation and leisure tourists. The leisure tourist leaves their place of residence on their own volition, simply to enjoy the journey, and their leisure can include any number of activities from cultural and educational purposes to recreation and simple relaxation. Although there has never been a definitive consensus in the literature as to a precise definition, a tourist destination arises when tourists see value in their journey to that place. Tourist destinations are also often then embedded into the "culture, economy, and lifestyle of communities" (Tripon & Cosma, 2018, p.269).

It should be noted, given the case study, the literature has defined a sub-category of tourism as 'dark tourism'. Dark tourism is used to designate sites that have become historically relevant in mass tragedies, such as genocide, incarceration, disaster, or assassinations (Lennon & Foley, 2000). Visitors often feel attracted to these locations due to the juxtaposition with history, education, and or commemoration (Lennon & Foley, 2000). Dark tourism can still be considered leisure tourism, given that the tourist may incorporate one of these sites into their vacation itinerary, should they so choose. This phenomenon was widespread on Mount Merapi, post-eruption.

The destination itself is not the only tourism product however, since adjacent businesses and services also become immersed in the tourism industry. Peripheral services can include accommodation, restaurant and food services, or even entertainment such as art and cultural institutions (Tripon & Cosma, 2018). These 'destinations' do not simply appear overnight. There is a distinct morphology, as outlined by Butler (2006), which depicts the potential life cycles of a tourist destination.

Figure 4: The Life Cycle of a Tourism Destination



Note: From "The Tourism Area Life Cycle Vol. 1: Applications and Modifications" by Butler (2006).

Trajectories A and B continue growing if the tourism operation remains within its carrying capacity (i.e. avoids over-exploitation) and continuously and creatively develops new products or experiences (Butler, 2006). As the surrounding communities transition across this graph, it is easy to understand that a greater demand from tourists often brings more diversity in terms of products. Merapi's tourism industry is a great representation of this life cycle.

In the literature, natural hazards, otherwise known as 'external shocks' in the tourism industry, have a resoundingly negative impact on existing tourism operations (Aliperti et al., 2019). A disastrous natural hazard can damage physical infrastructure, impacting the ability of smaller enterprises to rebound (Cassedy, 1992), leave lasting psychological distress for industry operators, affecting the facilitation of certain activities, and can further divert tourists away from the impacted region or country due to negative public perception, effectively tarnishing the image of the 'destination' (Mair, Ritchie & Walters, 2016).

In the hazards literature, the definition of a disaster is outlined above; however, with a scope focused specifically on the tourism industry, the definition of a disaster may shift to be: a major disruption to the normal functioning of a community/society in which there are losses that exceed the coping capacity of the affected community (Becken & Hughey, 2013). Given that

tourism is one of the fastest growing industries worldwide, how does the industry cope with natural hazards? This research aims to focus on the lesser researched side of this correlation to capture the capacity of tourism as a positive facilitator of recovery. A successful disaster-management process is characterized both by a clear communication plan and the collaboration of multiple sectors to ensure needs are met before, during, and after the occurrence of a disaster (Chan, Nozu & Zhou, 2020), elements that dovetail with the unique strengths of the tourism industry and its robust social capital networks. First, the infrastructure used to support tourism activities, such as hotels, resorts and so forth, often have large stocks of vital resources that can quickly be transformed into emergency evacuation or refugee shelter (Chan, Nozu & Zhou, 2020). Secondly, tourism operators often have a wide array of connections both within and between their local communities which affords them the ability to "connect different actors of the affected destinations through the integration of individual actions" (Chan, Nozu & Zhou, 2020, p.3), utilizing bridging and linking social capital and thereby effectively bolstering long term recovery. Finally, given the definition of dark tourism above, the site of a disaster may be the catalyst for developing a tourism destination within the region, therefore positively impacting the local economy and subsequently long-term recovery efforts.

In all, there is a current lack of research which has examined the three-way nexus of disaster recovery, social capital, and tourism. The relationship between social capital and community-based disaster recovery is well-documented (Aldrich, 2017; Albrecht, 2018; Joakim 2013). Further the existence of social networks within the tourism industry has been shown to improve stakeholder engagement and promote industry standards (Filimonau & De Coteau, 2019; Mulligan et al., 2012). The destructive relationship between disasters and tourism has been clearly established, (Gurtner, 2016; Mair, Ritchie & Walters, 2016; Cassedy, 1992), yet it is theorized that a different, positive correlation exists. However, there is a paucity in the research with the three-way connection between these concepts.

2.0. Methods

This chapter will be split into three subsections: 2.1. research design, 2.2. an outline of the data collection methods utilized, 2.3. a robust description of how the data was analyzed, and 2.4. the limitations the research team faced through the duration of this study. This research received University of Waterloo ethics clearance (REB #45310).

2.1. Research Design

This study was conducted as a part of the SSHRC funded Ta-Sc-Dr project *Linking Tourism, Social/Cultural Capital, and Disaster Recovery: Comparative Perspectives from Nepal, Indonesia, and the Philippines* and thus was influenced from the onset, impacting the research design and its intended objectives. As a whole, the project seeks to gain a better understanding of the intertwined, reciprocal relationship between disaster recovery and tourism through a context-specific lens of social capital. Following, this study contributes to the project's inquiry while also allowing this specific case study to unfold in a unique manner.

As a qualitative study, it is important to understand that the strength in qualitative research lies in its ability to explore and vividly describe real-world phenomena and stories that would otherwise be lost in a sea of statistics. The depictions are rooted in worldviews (or world senses) that have long-standing theoretical backgrounds. By describing the frame in which this research is positioned, the reader will be able to comprehend the significance of any explanatory insight provided (Rule & John, 2015, p.2)

Therefore, given how critical social capital was to the foundational design of this research, this study followed a social constructivist worldview, recognizing that anyone's sense of being and knowing is inherently socially constructed. Humans are social creatures with an evolutionary need to socialize and therefore the rules by which we choose to interact are collectively created. This study thus chose to follow a phenomenological theory (Mitchell & Cody, 1993) which paired well with a descriptive case study methodology. By definition, a descriptive case study's intention is to describe "an intervention or phenomenon and the real-life context in which it occurred" (Singh, 2015, p.172). Descriptive case studies enrich academic literature because they act as snapshots of in-depth explorations into the complexity, uniqueness, or stand-out qualities of a particular

incidence (Simons, 2009 as cited in Thomas, 2011). Case studies are often excellent examples and act as a learning opportunity for academic audiences to understand certain complex relationships and phenomena (Singh, 2015).

The draw to this case study was due to its exceptional nature and fit with the basic need for a case study that featured disaster, recovery, tourism, and communities with social capital. Given that the Special Region of Yogyakarta, Indonesia is a cultural destination for both domestic and international tourists alike, the foundation for a strong tourism industry is well-rooted in this place. Coupled with the thriving cultural cohesion of the Javanese, otherwise known as *Gotong Royong*, these strong community bonds facilitated prosperous and collaborative tourism ventures. Finally, the key disaster incident, Mount Merapi's enormous eruption, catastrophically led to the fatalities of over 350 people, thousands of hectares of decimated agricultural land, and thousands of structures destroyed. This case demonstrated the trifecta of tourism, disaster recovery, and social capital and therefore, the research began. See *Figure 5* for a map contextualizing the research site.

2.2. Data Collection

In order to present this case in the most descriptive way possible, and to allow the lived experiences of local communities to shine through this work, semi-structured interviews (N=30) acted as the main form of data collection for this study. This data was then supported by the literature reviewed above and participant observations. To get a well-rounded picture from varying perspectives, this study categorized the key stakeholders involved. These stakeholders were separated into the following strata:

i) Tourism Operators (i.e., Tourism Businesses, Products, Destinations, Activities)
ii) Academia
iii) Governmental and Non-Governmental Bodies
iv) Tourism-related businesses/services (i.e., Food & Hospitality)

This categorization led to the method of non-representative strata sampling, with the intention of gaining 7-10 informants from each stratum. It was anticipated that each category of informant would have a different conceptualization of the post-disaster recovery, and therefore would contribute to a comprehensive analysis. The benefits of sampling this way include

incorporating diverse backgrounds of participants who have different levels of expertise, personal connections, and/or degrees of power, and it avoids prioritizing one set of voices over any other (Jones, 2023). Once the stratum was identified, participants were recruited from existing professional relationships, publicly available email addresses and data, and snowball sampling. Starting with a few key informants, snowball sampling expanded to fulfill the desired number of participants in each stratum (Bryman, 2012). There were no inclusion criteria to participate; however, this study excluded interviewing children aged 0-17 years, as the case study is based on an eruption which occurred in 2010, and therefore the memory recall for anyone under the age of 18 would be insufficient for data collection.

Semi-structured interviewing is routinely utilized in qualitative research and consistently found in many descriptive case studies, and as such, formed the framework with which each participant was interviewed. This framework also empowered interviewees to deviate from the questions asked, allowing participants to share what they deemed important in the explanation and understanding of certain events (Bryman, 2012). As interviews were conducted with the support of an interview guide exploring key themes, the research team was able to draw similarities between informant's responses without pigeon-holing or dead-stopping answers (Bryman, 2012). It also allowed for a greater connection between the researchers and the informants by providing space to share emotive insights. A copy of the Interview Guide is included in Appendix B to display the major themes discussed during each interview.

2.3. Data Analysis

In total, 30 participants were interviewed, with 3 interviews having 2 participants, resulting in 27 transcripts at the conclusion of the study. One transcript was discarded as consent was withdrawn. One additional transcript was removed due to the quality of the audio recording, communication errors, and the inability to obtain a complete transcription. In total 25 transcripts were left to analyze. As this was a qualitative study, interview transcripts were thematically coded during a thorough, iterative, manual process. Given the atmosphere and contents of many of the interviews, the anticipated results of the transcripts (i.e. many of the questions were derived from pre-determined themes) led to the development of preliminary codes using deductive reasoning.

The benefit of deductive reasoning is providing the process with a focus and starting point to decipher important messaging (Linneberg & Korsgaard, 2019). Deductive codes can also ensure a base level of consistency between informants, especially given that stratification may create widely different responses (Linneberg & Korsgaard, 2019). These codes pertained to the major themes and were *Tourism, Social/Cultural Capital*, and *Disaster Recovery.*

Once analysis began however, it was clear that there were major themes in the transcripts which could not be categorized into the preset codes and therefore, new codes were added through an inductive approach. Inductive codes ensure that the codes are representative of the themes present in the data, given they are derived from its contents, and can avoid preconceived notions or prior understandings from the research team (Linneberg & Korsgaard, 2019). These codes split *Disaster Recovery* into more specific themes being: *Eruption & Evacuation; Disaster Recovery (long-term);* and *Future Disaster Preparedness.* Finally, the process of relocation and resettlement was a major discussion topic for many participants, so the code *Resettlement* was also added. Coding, in combination with latent content analysis, allows the researcher to receive complete and thorough insights from the data and provides an opportunity for critical thinking to be interwoven into the results (Linneberg & Korsgaard, 2019). It also produces an inventory-like structure to otherwise lengthy transcripts which can promote transparency and assist with the sorting and structuring of the data and subsequent findings (Linneberg & Korsgaard, 2019). The manual coding performed for this analysis allowed the researcher to thoroughly explore the context embedded in each conversation and this created a greater sense of confidence in this study's reiteration and representation of the data. These methods, in combination with a literature review of relevant academic literature and participant observation, provided the basis for the manuscript that follows.

2.4. Limitations

Although this study performed robust data collection and analysis, there were external limiting factors that may have affected this work. The first limitation was time. As this research was conducted for the primary purpose of fulfilling a Master's degree, research was constrained to operate within a 2-year study period and the field portion was limited to 10 weeks (June 2023

to August 2023). The second limiting factor was lived experience. As a foreigner conducting research in Indonesia, there is the possibly that the representation of this data has a different sentiment to those with lived experience in the area. Similarly, the third limitation was language. As these interviews were conducted in Bahasa Indonesian and then translated into English, there is a chance that some sub-cultural meaning was lost during translation process. All of these limiting factors were combated by partnering with local research assistants who had an excellent command of both languages, and this ensured that all interviews were conducted with the utmost respect for our participants. It was the intention of the research team to reduce the impact of these limiting factors to preserve the integrity of this research.

3.0. *Merapi Always Provides: A Case Study of Tourism's Contribution to Disaster Recovery on Mount Merapi, Indonesia*

3.1. Introduction

"Volcanoes assail the senses. They are beautiful in repose and awesome in eruption; they hiss and roar; they smell of brimstone. Their heat warms, their fires consume; they are the homes of gods and goddess" (Decker, 1991 as cited in Spadone, 2019).

According to recent estimates, it is suggested that nearly 8.6 million Indonesians live within 10 kilometers of an active volcano; this distance is typically seen as the fatally hazardous radius from both pyroclastic flows, ash or debris fall (He, 2022). Consequently, eruptions at these active volcano locations have often necessitated large-scale recovery projects, both for physical and social infrastructure, often also resulting in the permanent resettlement of residents. These locations, like many seismically active mountainous regions throughout South-East Asia, are also important tourist destinations (Filimonau & de Coteau, 2019). Volcano tourism's contributions to these local economies demonstrates the essential role tourism can play both in pre-disaster and post-disaster community contexts; pre-disaster by providing an economic lifeblood to the community, linking social networks and facilitating international recognition, and post-disaster, by providing a motivation and means by which to contribute to efficient recovery (Mair et al., 2016; Robinson & Jarvie, 2008; Beirman, 2003). Straddling the provinces of Central Java and the Special Region of Yogyakarta, Mount Merapi is one of the most active volcanoes in the world (Mei et al., 2013). Despite its eruptive activity, this stratovolcano is home to hundreds of thousands of residents spread across both provinces. In late October 2010, Merapi began one of its most eruptive episodes yet, reaching a VEI 4 on the Volcanic Explosivity Index (Global Volcanism Program, 2011) and triggering hundreds of fatalities.

This study analyzes the resurgence of an innovative tourism industry in a post-disaster setting on Mount Merapi, Indonesia and the social/cultural capital that led to its success. Ultimately, the research investigates how tourism was positioned to fill the gaps left by traditional methods of government-led disaster management and recovery.

3.1.1. Background Literature

A review of key literature provides context to both research history and acknowledges the contribution of critical thinkers who have expanded and improved their fields in the natural hazards, social capital and tourism realms.

Disaster Management

Under the umbrella of disaster management is Disaster Risk Reduction (DRR). DRR is defined as "the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards [and] lessened vulnerability of people and property" (UNISDR, 2009, pp. 10-11). Vulnerability is not a static measure. It can be dependent upon the season, the occurrence of other extreme events, and the level of preparation against the hazard itself (Banholzer, Kossin & Donner, 2014). Further, an individual's vulnerability is highly dependent on socio-economic characteristics including that of class, ethnicity, disability, age, access to resources, gender, or caste (Blaikie et al., 2004). Disaster preparedness can be both proactive and reactive with the former being the most preferred. Disaster recovery, characterized often by the objective to Build Back Better (BBB), fosters future resilience and addresses weaknesses in exposure (UNISDR, 2017). Locations with frequent or compounding hazards are at risk of stacking vulnerabilities and often require complex and creative disaster management and risk reduction plans in order to protect the highest number of individuals. The goal during the facilitation of disaster recovery is to develop and implement strategies and actions by which to return the affected area back to normal conditions, physically, economically and socially, or to that of an improved state (Mair, Ritchie & Walters, 2016).

This study discusses disaster recovery and DRR in both its conventional and more spontaneous, locally contextualized forms. Conventional avenues of recovery often refer to official streams of international aid, including the distribution of basic needs (food, water, shelter), formalized managed retreat/resettlement orchestrated by a government body, and the reconstruction of physical assets that may have been damaged by the hazard. Spontaneous recovery and DRR can also be developed from grassroot origins that may benefit individuals or

entire communities. Depending upon the scale of the hazard and its resulting disaster, conventional forms of recovery may leave gaps in the ability of the affected populations to return to normalcy.

Volcanic Hazards

Indonesia has both the highest number and highest density of active volcanoes in the world (Malawani et al., 2021). Volcanoes are unforgiving, and their eruptive sequences can be unpredictable, long-term, and pose numerous threats (Depari & Lindell, 2023). Although Indonesia's volcanoes are primarily stratovolcanoes, which have a relatively typical eruptive pattern, many exceptions have occurred, making these eruptions particularly deadly. When a typical stratovolcano eruption occurs, the consequences may be threefold. The first wave is typically lava dome growth, followed by ash and tephra ejecta with a partial or complete summit collapse, vegetation burning from pyroclastic flows, and can result in numerous fatalities (Malawani et al., 2021). The second wave may bring micro-weather patterns, creating localized atmospheric cooling, extreme rainfall, and thunderstorms (Malawani et al., 2021). Severe rainfall, either in concert with the volcanic eruption or many months and years later, can cause lahar flows or "cool lava" to travel rapidly down the volcano's slopes causing secondary destruction, long after the ash and molten lava has ceased to erupt. Last, in the wake of the chaos, tertiary effects can result in fluvial flooding and inundation, famine, and or disease (Malawani et al., 2021). Fortunately, most individuals who reside on the flanks of these volcanoes have been there for generations and have become adept at recognizing the warning signs. This local knowledge in combination with technologically advanced early warning systems can be life-saving pre-eruption.

Social Capital

The social networks in society that promote cohesion and uphold complex, collective community systems are known as social capital (Albrecht, 2018). There are three distinct kinds of social capital, all of which connect different social spheres: bonding, bridging and linking. Bonding social capital refers to the social connections within a group with an exclusive identity, whereas bridging social capital is the linkage between two separate groups (Putnam, 2000; Baylis, Gong & Wang, 2013). Both bridging and linking, due to their connection between heterogeneous segments,

are "characterized by exposure to and development of new ideas, values and perspectives" (Hawkins & Maurer, 2010, p.1780).

In the immediate time period following a disaster, local communities mobilize their social capital to become the first to initiate hazard response plans before more official, bureaucratic systems, such as international aid organizations or the military arrive (Shaw, 2016). Social capital is integral to the effectiveness of these plans and to the on-going recovery initiatives that follow, often reducing existing or cascading vulnerabilities in the region (Gero, Mehéux & Dominey-Howes, 2011). The presence of strong social networks is often rooted in the cultural philosophy of a specific place and its people. The rules that a society subscribes to are inherently socially-constructed based on shared cultural norms.

In this case study specifically, Javanese culture emphasizes the importance of "Gotong Royong" or *mutual assistance*, which denotes the strong social cohesion and mutual dependency within communities. This spirit of reciprocity and the innate sense of communality was incredibly influential on Merapi post-eruption as described by Nainggolan, Subroto, and Marsoyo (2021). Gotong Royong was well documented during the recovery efforts of the 2006 Bantul Earthquake, located further south in Yogyakarta, as this mutual support facilitated recovery during initial response as well as long-term rehabilitation (Joakim, 2013). The same phenomenon occurred on Merapi post-eruption as resident volunteers across multiple communities were involved in the reconstruction and rehabilitation of public infrastructure, including roads, Mosques, and other essential services, as well as the redevelopment of individual private homes (Joakim, 2013; Slikkerveer, 2019). The willingness of residents to support each other creates a powerful and efficient social resource which is then matched with human and material ones, impacting not only the success but also the efficiency of recovery (MacRae & Hodgkin, 2011).

Community-based Disaster Risk Reduction (CBDRR) strategies rely on the social capital in communities to be successful. As outlined by Shaw (2016), key elements of CBDRR include the resident's active participation, measures for risk reduction which are community-specific, and the recognition of existing capabilities and coping mechanisms. Overall, the literature supports the notion that active participation from community-based organizations improves coordination

between stakeholders and increases education, awareness, and advocacy for community members (Berkes, 2006). As Aldrich (2017) states, there is a strong connection between investing in social infrastructure and better preparedness by residents and communities for future shocks. Resilience cannot be siloed solely on initiatives for advanced physical engineering, "instead, it will come from bottom-up responses built on local social networks" (Aldrich, 2017, p.363). The ability to employ positive cultural characteristics and utilize local or indigenous knowledge while also tapping into pre-existing social networks is an incredibly effective approach to bolster resilience for communities facing natural hazards (Becken & Hughey, 2013).

Tourism and Disasters

Tourists, by definition, are people who leave their home community and travel to new locations for a temporary period (Leiper, 1979), yet there are many kinds of tourists. Some travel for work or volunteer opportunities, while others travel predominantly to visit familial connections or those that travel for leisure and recreation (Leiper, 1979). An overwhelming majority of tourists who visit Mount Merapi would be categorized as recreation and leisure tourists. The leisure tourist leaves their place of residence on their own volition simply to enjoy the journey, and their leisure can include any number of activities from cultural and educational purposes to recreation and simple relaxation.

It follows that an industry dependent on leisure tourists may be vulnerable to disasters, as the impacts could affect operations, accessibility and reputation. This link is supported in the literature as tourism has been impacted by revenue loss from damaged infrastructure, negative public perception, and poor resource management (Mair, Ritchie & Walters, 2016). However, this research aims to focus on a less-documented angle, being the capacity of tourism as a positive facilitator of disaster recovery.

Attraction to sites that have been historically significant in mass tragedies, such as genocide, incarceration, disaster, or assassinations is known as Dark Tourism (Lennon & Foley, 2000). Dark tourism can be considered under the umbrella of leisure tourism, given tourists may incorporate one of these sites into their itinerary during a vacation. This being said, disasters can be catalytic events for the procurement of tourist destinations if tourists see value in traveling to

these sites. Once the value of a destination grows, adjacent businesses and services also arise to accommodate an influx of visitors. These peripheral services can be accommodation, restaurant and food services, or even art and cultural institutions (Tripon & Cosma, 2018).

Given that a successful disaster-management process is characterized by both a clear communication plan and the collaboration of multiple sectors ensuring needs are met before, during, and after the occurrence of a disaster (Chan, Nozu & Zhou, 2020), it follows that the tourism industry has the capacity to add value to recovery efforts. The tourism industry often employs social capital as seen by a wide array of connections both within and between local communities. It follows that these connections may allow different actors from disaster affected destinations to synergistically bolster recovery through the integration of individual and collective actions (Chan, Nozu & Zhou, 2020).

3.2. Research Methods

This study was designed to understand the complex intertwined relationship between the post-eruption disaster recovery and the resurgence of a thriving tourism industry through a context-specific lens of social capital on Mount Merapi Indonesia. The research was framed as an explorative, descriptive case study, in order to describe the unique phenomena rooted in this place. Descriptive case studies enrich academic literature because they act as snapshots of in-depth explorations into the complexity, uniqueness, or stand-out qualities of a particular incidence (Simons, 2009 as cited in Thomas, 2011). Case studies are often excellent examples of theorized phenomena and act as a learning opportunity for academic audiences to understand certain these complex relationships (Singh, 2015). This case study clearly demonstrated the correlation between tourism, disaster recovery, and social capital. The results will be presented in a timeline manner for the reader to understand how each event unraveled and led to the phenomenon seen in the present day.

3.2.1 Data Collection

With the support and guidance of the literature reviewed above, the majority of the data presented in this study came from primary research collected through semi-structured interviews

(N=30) and participant observation. In an effort to acquire a well-rounded conceptualization of the case, key stakeholders involved were categorized into four distinct strata:

i) Tourism Operators (i.e., Tourism Businesses Products, Destinations, Activities)
ii) Academia
iii) Government and Non-Governmental Bodies in the Disaster Management Sector
iv) Tourism-related businesses/services (i.e., Food & Hospitality)

Participants were selected through a method of non-representative strata sampling. This method allowed the research team to incorporate perspectives from diverse backgrounds, and to ensure that one set of voices was not prioritized over another (Jones, 2023). Participants were recruited from existing professional relationships, publicly available email addresses, and snowball sampling. Starting with a few key informants, snowball sampling expanded to fulfill the desired number of participants in each stratum (Bryman, 2012). As this is a historic case study in which the disaster event took place over 10 years ago; children under the age of 17 were excluded from participation.

Participants were interviewed with the use of a semi-structured interview guide. The interview guide varied slightly based on the strata; however, all interviews discussed the events that took place post-eruption as they pertained to the tourism industry, community cohesion, and disaster recovery, and interviewees were allowed to add extra responses via open-ended questions.

3.2.2. Data Analysis

In total, 30 participants were interviewed, with 3 interviews having 2 participants, resulting in 27 transcripts at the conclusion of the study. Interview transcripts were thematically coded using both a deductive and inductive approach. The deductive codes allowed for a focused cross-comparison, while the inductive codes stay true to the data and alert researchers to think beyond their pre-conceived notions by identifying emergent themes (Linneberg & Korsgaard, 2019). This coding provided the research team with thorough insights from the data, as well as creating an inventory-like structure, promoting both comparison and transparency (Linneberg & Korsgaard, 2019). Coding also empowered the researchers to explore the context embedded in each

conversation and therefore have a greater sense of confidence in the study's representation of the data.

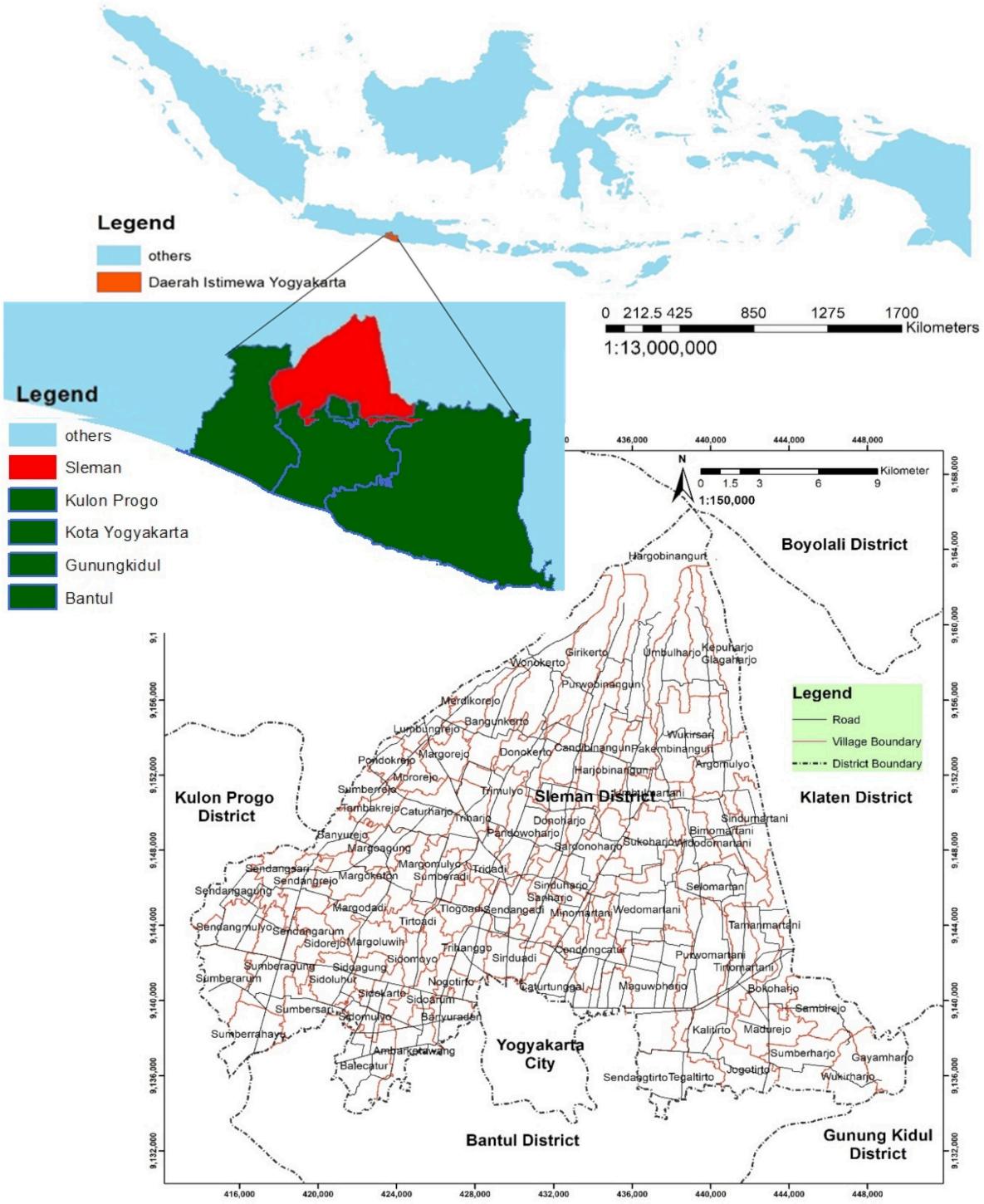
3.2.3. Limitations

Despite this study's robust data collection and analysis, there were external limiting factors that may have affected this work. The first limitation was time as this research was restricted to the parameters of a 2-year study period and 10-week field research period. The second limiting factor was lived experience. The research team was fortunate to have the support and insights of multiple Indonesian researchers; however, there is a possibly that the representation of this data has a different sentiment than those with lived experience in the area. Similarly, the third limitation was language. As these interviews were conducted in Bahasa Indonesian and then translated into English, there is a chance that some sub-cultural meaning was lost during translation process. The research team tried to reduce the impact of these limiting factors to preserve the integrity of this research, so the research process was conducted with the utmost respect for participants willing to share their stories.

3.2.4. Research Site Description

To provide context to the research site, Figure 5 depicts the districts, sub-districts, and village borders within the Special Region of Yogyakarta, on the southern flanks of Mount Merapi. As can be seen from Figure 5, the city center of Yogyakarta is approximately 25 km away, making the commute into the city for specific services accessible to more rural residents. Due to the concentration of post-volcanic impacts from the 2010 eruption, this study focused on the southern flanks, most notably communities within the Sleman District.

Figure 5: Map of District and Village Borders on Mount Merapi



Note: From "Geographic Information System Based Suitable Temporary Shelter Location for Mount Merapi Eruption" by Wigati et al. (2023).

Villages in this region can range in population density from 150-300 households (Mei et al., 2016). Prior to the 2010 eruption, an overwhelming majority of residents found their livelihood

in agricultural production and animal husbandry. Rich volcanic soil afforded communities the ability to successfully cultivate rice fields, salak farming, chilies and more.

Family connections and dynamics are important and multi-generational homes are not abnormal. In tandem with strong family bonds, the sense of community is vibrant, displaying closeknit connections, reinforced with the cultural capital backdrop of Gotong Royong.

The livelihood transition of many residents into an evolving, complex tourism industry and the influence of existing social connections during this transition, will be outlined throughout the results.

3.3. Results

Mount Merapi has long been admired for its natural beauty and breathtaking scenery making for a tranquil escape for those living in nearby urban landscapes, and for residents it fosters a sense of spiritual connection with the land. For decades, both locals and tourists alike enjoyed Merapi during leisure activities such as trekking or camping. In the early 2000s 'volcano tours' appeared sporadically (S1JP3, Personal Communication, July 2023), which offered visitors the chance to take in Merapi's unique topography and scenery, primarily via motorized tours. Other tourists came to the flanks of the volcano to pursue agrotourism, learning about animal husbandry, or prosperous agricultural production through the many residents who gained their livelihoods in the fields. During these nascent tourism activities, visitors often relied on the hospitality and generous nature of locals living on Merapi.

Despite this, "violent volcanic eruptions often become the core of legends" as is the case with Merapi (Troll, Deegan & Seraphine, 2021, p.103). Merapi has an auspicious and volatile reputation as one of the most active volcanoes in the world (Mei et al., 2013) and has had numerous catastrophic eruptions in modern history, making tourism a risky venture. Merapi can be loosely translated from the conjunction of two Javanese words; 'meru' meaning *mountain*, and 'api' meaning *fire.* Its eruptive history has claimed the lives of thousands, and although the circumstance of the eruptions changes over time, locals expect these frequent, recurrent outbursts, coining a phrase "Merapi never breaks its promise". Unexpectedly, Merapi changed its eruptive pattern during an eruption in 2006, during which Merapi's pyroclastic flows shifted south (Mei et al.,

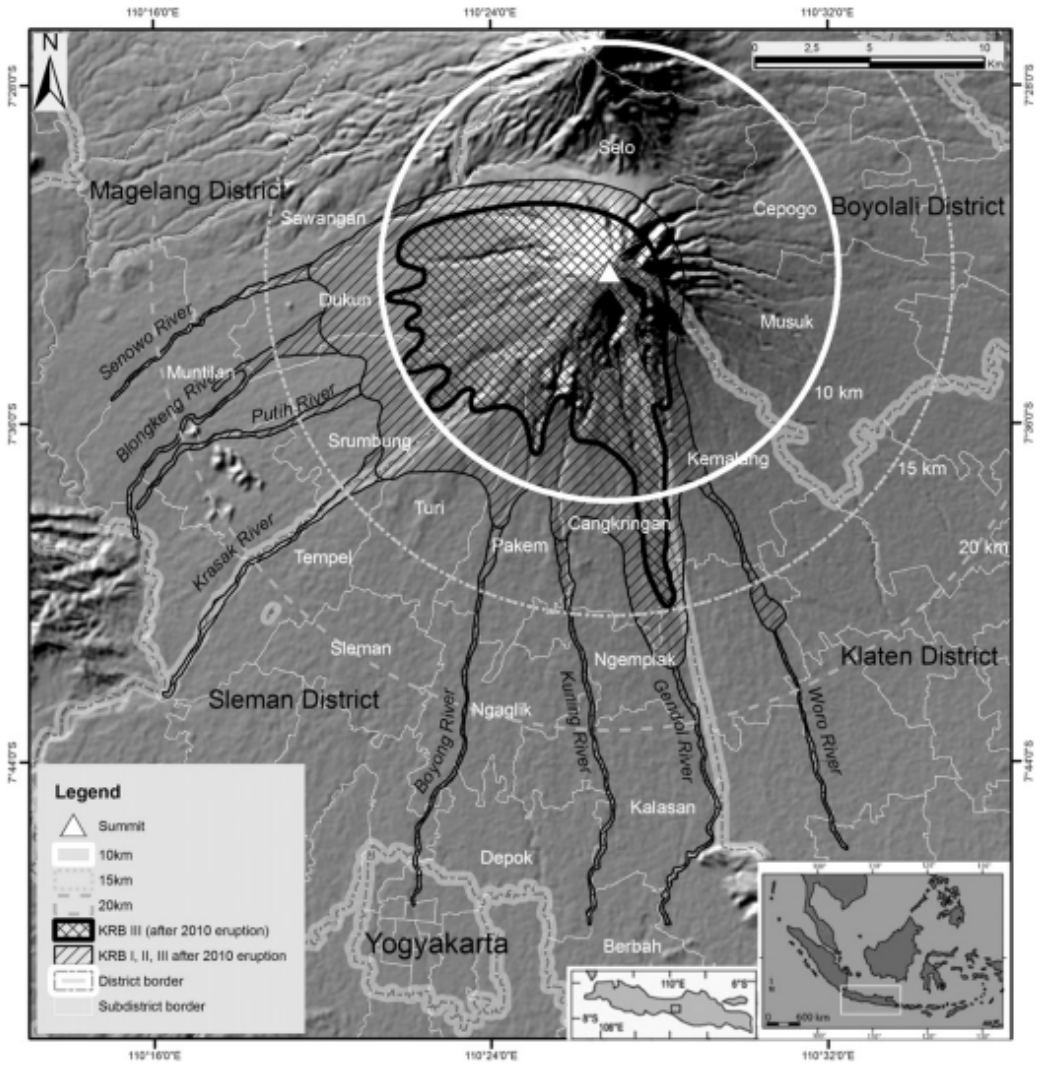
2013; Ratdomopurbo et al., 2013). This change in the summit's directional output altered the traditional warnings signs that many citizens had become familiar with, and this foreshadowed Merapi's next volatile eruption.

On October 26th, 2010, Merapi began a complex eruptive sequence when it discharged an explosive phreatomagmatic eruption, which resulted in an ash plume scaling nearly 12km high (Mei et al., 2013). Pyroclastic flows from this outburst reached approximately 8km down both the Gendol and Kuning rivers; located on the southern flank (Mei et al., 2013). Initial evacuation orders had been issued for thousands of residents approximately 24 hours before the eruption began; however, more orders followed suit as the eruption's unpredictable behaviour became a looming threat (Mei et al., 2013). Merapi continued to be categorized at an Alert Level IV ('Awas' or *beware)* as eruptive sequences continued through November 3rd and 4th with stronger degassing episodes and explosions that could be heard from the city center of Yogyakarta (Mei et al., 2013) approximately 25 kms away. The strongest eruption fell on November 5, reaching a VEI 4, resulting in numerous additional fatalities (Global Volcanism Program, 2011). Evacuation orders reached a peak when nearly 400,000 citizens were internally displaced and remained in place for almost 6 weeks (Bakkour et al., 2015; Mei et al., 2013).

As the ash settled, the extent of the damage was unfathomable. Merapi tragically took the lives of over 350 victims (Bakkour et al., 2015; Mei et al., 2013) and destroyed nearly 3,000 homes, thousands of domesticated animals, and hectares of farmland and forested land (Bakkour et al., 2015; Depari & Lindell, 2023). Lahar flows, both immediately after the November eruption and many months later, tore through major roads, diverting rivers and causing massive floods and mudflows which traveled downslope as far as 15kms (Bélizal et al., 2013). Wild animals migrated (Mei et al., 2013), lush vegetation was decimated, and the livelihoods of many lay among the rubble. Given the sheer scale of this eruption, national, regional, and local governments, with support from non-governmental organizations (NGOs) and international financial assistance, stepped in and began synergistically orchestrating recovery efforts (S3NGOP8, Personal Communication, June 2023).

During the complex eruptive phase, evacuation centers were often overwhelmed, and some were closed as the evacuation radius expanded from 10kms, to 15kms and then finally to the 20km mark as outlined in Figure 6. Over the following weeks, residents were slowly allowed to return home, and by December of 2010 the number of displaced persons dropped to 20,000 (Mei et al., 2013). Given the geographic distribution of impact, the study focused on the southern flanks, most notably within the Sleman District.

Figure 6: Revised Hazard Zone Map Post-2010 on Mount Merapi with Evacuation Radium

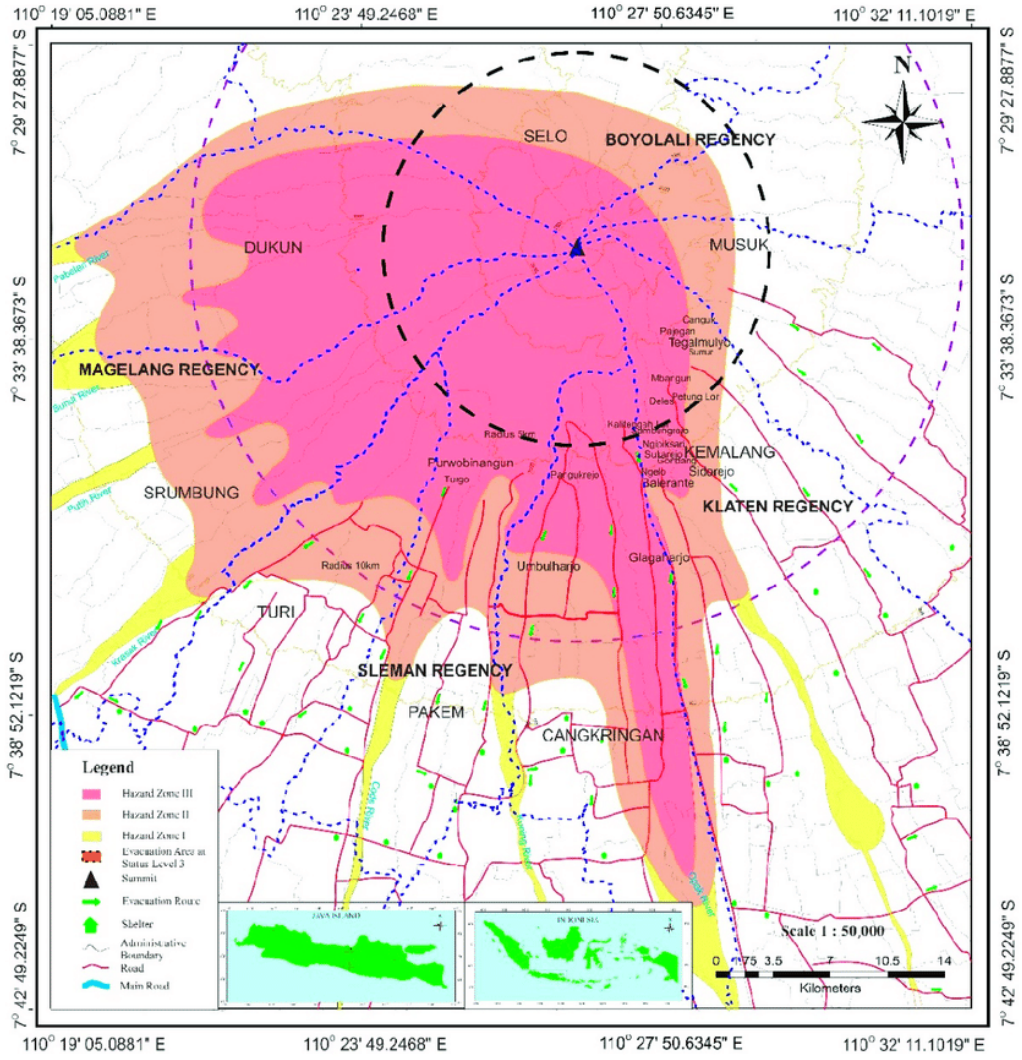


Note: From "Lessons Learned From the 2010 Evacuations at Merapi Volcano" by Mei et al. (2013).

By early 2011, Sleman's regional government had created and published a revised hazard map which outlined the latest data available as to the exposure of pyroclastic flows, lava flows and

lahars (Depari & Lindell, 2023). The maps depict the disaster-prone areas or '*Kawasan Rawan Bencana'* (KRB) which range from a scale of I to III ascending in severity as colour-coded in Figure 7. Within KRB III, the most hazardous areas were then rezoned and designated as protected forests, resulting in the required permanent resettlement of nine communities: "Pelemsari, Pangukrejo, Kaliadem, Petung, Jambu, Kopeng, Kalitengah Lor, Kalitengah Kidul, and Srunen" (Depari & Lindell, 2023, p.8).

Figure 7: Revised Hazard Zone Map (Coloured) Post-2010 on Mount Merapi



Note: From "Implication of Mutual Assistance Evacuation Model to Reduce the Volcanic Risk for Vulnerable Society: Insight from Mount Merapi, Indonesia" by Chasanah & Sakakibara (2022).

Once identified, a large-scale resettlement project began its surveying and consultation stages. Although the national Indonesian Disaster Management Authority (BNPB) and regional disaster management agencies (BPBD) had only become operational a few years prior, throughout the disaster recovery phase, both the BNPB and BPBD Sleman worked together. REKOMPAK, a community-based rehabilitation and reconstruction organization, assisted these agencies in the construction of 'Huntara' or temporary relocation shelters (Maly, Iuchi, Nareswari, 2015). By April 2011, all temporary housing was completed (Paramita, 2011).

During this 6-month period, between the first evacuation order to the completion of temporary housing, the creativity and contributions of communities and local leaders began to flourish. Recognizing that their extensive agricultural land had been destroyed, and that it could be months or even years before it could be restored, communities realized they would need to find a new way to sustain their livelihoods. After the initial three months of chaos, restlessness brewed innovation. Road reconstruction and maintenance was already underway during this time period, with substantial manual labour contributed through Gotong Royong (S1JP7, Personal Communication, July 2023). The curiosity of outsiders grew as roads became more accessible, and some of the first 'tourists' to Merapi post-eruption were researchers (S1TVP1, Personal Communication, June 2023). From volcanologists to anthropologists, these visitors wanted to witness the damage for themselves.

Recognizing a captive audience, locals who had access to personal motorbikes or 4-wheel drives offered to take tourists up to view the decimated landscapes, their buried homes, and the post-eruption volcanic damage – all for a price (S1JP3, Personal Communication, July 2023). As popularity increased, more and more locals offered guided trips up the mountain, charging per ride. These trips became known as 'Lava Tours' adapted from the 'Volcano Tours' offered pre-eruption. It was then that communities began to charge regular entrance fees on Merapi. Multiple participants noted that there were only two major roads that could take tourists north into the KRB III region (S1TVP1, Personal Communication, June 2023). Ingeniously, local communities would set up roadblocks, otherwise known as 'toll booths', and charge visitors to pass. This set-up became so popular that many participants recalled "traffic jams", due to the sheer number of

visitors. These traffic jams created ample opportunity for tourists to take ‘rest stops’ and access basic amenities.

Box 1: Pentingsari Tourism Village - Lingering to Livelihood

Pentingsari Tourism Village was a tourist destination prior to the 2010 eruption of Mount Merapi. At the time of the eruption, the village was hosting a group of students, visiting from Surabaya on an educationally focused school trip.

The village preemptively evacuated the students, and they were safely returned home. As time passed, the villagers patiently waited for their evacuation orders to be lifted. Once allowed, they began to clear away the debris left behind from the eruption which took nearly 6 months. By that time, visitors had begun taking ‘lava tours’ whose popularity created local traffic jams. Innovatively, understanding their draw as a tourist destination and their geographic proximity to one of two major roads up Merapi, Pentingsari village began to invite guests to visit and even extend their stay overnight. Residents opened their homes, catered to their guests, and from there the tourism village began to really flourish.

The evacuated students, who had enjoyed their previous experience so much, arranged a fundraiser to provide aid, and encourage their school teachers to return with new classes. In the present day, Pentingsari sees many repeat visitors from school classes across the country. They've created package deals that include educational workshops, visiting the Kuning River, planting rice in the fields, sunrise Jeep tours and more. Pentingsari has since been awarded the Indonesian Sustainable Tourism award and recognized by the Sleman Regency for their exceptional management and service to the community.

Note: Adapted from Participant Interview (S1TVP1, Personal Communication, June 2023).

Concurrently, some local leaders took photos and videos of the eruption, evacuation, and resulting damage and then burned these photos and videos onto CDs and DVDs to be sold to the masses (S1JP3, Personal Communication, July 2023). CDs and DVDs would be offered at rest stops, toll booths, and sold at markets further south in Yogyakarta city (S1JP3& S4VP13, Personal Communication, July 2023). The profit from these media sales supported families and communities in village reconstruction, accessing vital services and more.

As time passed, recovery priorities began to shift from immediate relief to long-term recovery. For government agencies the main focus shifted to resident resettlement and permanent housing reconstruction to ensure the safety of Merapi residents. Many of the international and domestic NGOs and aid agencies who assisted during the relief phase, slowly tapered off their

presence, and volunteers who had assisted with evacuations and the delivery of basic needs, started to return home (S3NGOP8, Personal Communication, July 2023). The disaster management agencies (BNPB & BPBD) in partnership with REKOMPAK conducted intensive community consultation in order to gauge and then reflect the needs of the communities in their new homes (S2AP26, Personal Communication, August 2023). Community members were integral to these consultation and planning sessions and constituted a majority of the manual labour needed when building the new homes. Although locals continued to serve tourists while in their temporary housing, nearly 1-year post-eruption, permanent resettlement villages or 'Huntaps' were approaching completion. As noted by an expert participant, Gotong Royong was "indeed a part that [was] inseparable in the matter of co-planning" (S2AP9, Personal Communications, June 2023).

As the short-term relief phase began to transition into long-term recovery, the tourism industry began to grow in popularity. Personal rides or 'Ojeks' grew substantially in the Merapi region, reaching not only researchers and domestic travelers, but also extending into the international adventure tourism market. Starting with just a few 'basecamps' (i.e. places where tour providers would start and finish tours), the aforementioned concept of Lava Tours on Merapi expanded dramatically. Revenue earned from the original tours (i.e. Motorbikes as 'Ojeks') allowed a few residents to purchase Willys Jeeps, and their off-roading capacity, ability to take multiple passengers, and the accessibility they provided compared to a motorbike triggered a tourism boom. Over the next year, multiple new Jeep basecamps popped up across the lower slopes of Merapi, creating greater revenue from tour fees, entrance fees, and parking fees, while also creating a market for amenities like food stalls, beverage vendors and souvenir sellers.

These Jeep tours began to coalesce into a more formalized product, mapping routes around Merapi that would stop at multiple popular local destinations (S1JP3, Personal Communication, July 2023). A standard tour would stop at three major sites over the course of approximately one hour. One of the primary stops is an underground bunker located in the high-mountain village of Kaliadem which was destroyed in the 2010 eruption (S4VP11, Personal Communication, July 2023). The bunker was constructed during the Dutch colonial area, as a form of disaster

preparedness if and when Merapi erupted. Unfortunately, this approach proved to be unsuitable for large-scale eruptions. In 2006, the bunker was buried in pyroclastic flows, and two victims were trapped inside while the temperature inside the bunker rose to lethal levels (Putra, 2008). The bunker has since become an educational site for tourists to learn about new volcano eruption detection technology and early warning systems. The site is complemented by streets full of shops and 'warungs' (*roadside stall/restaurants)* that sell small souvenirs and quick instant meals, respectively. The next stop called "Batu Alien" (*Alien Rock)* is a large rock with an unusual shape and human-like markings (Ministry of Tourism, Republic of Indonesia, 2021). The site location provides a clear view of the Gendol River, flowing down a deep ravine morphed from the 2010 eruption. A parking fee for Jeeps to stop at this destination is charged, with revenue going back into the community, as this tourist venture is entirely locally operated. One Jeep driver noted simply that "we drive to areas impacted by the disaster and automatically we bring tourists with us" (S1JP17, Personal Communication, July 2023). The driver also confirmed that tourists shop at local vendors or purchase food, drink and lavatory services, with the income directly benefitting the community.

The third popular stop on the Jeep route is at the late Mbah Maridjan's house, which has since been curated into a mini museum with the support of the local community. Prior to 2010, Mbah Maridjan was the gatekeeper of the spirit world of Merapi (Troll et al., 2015). Tragically, himself and multiple family members perished during the eruption, while performing his duties in prayer (Troll et al., 2015). 'Musium Petilasan Mbah Maridjan' contains the scorched contents of his house, other household items from surrounding neighbours, and even a 'frozen in time' clock displaying the time of eruption as shown in Figure 8.

Figure 8: Clock Artifact at Musium Petilasan Mbah Maridjan



Note: Photo of a clock damaged in the 2010 eruption of Mount Merapi. Own work.

One final stop, if tourists choose the thrill-seeking experience, is an off-roading adventure through volcanic sand deposited in the river as seen in Figure 9. At the end of the tour, Jeeps either return to basecamp or offer recommendations and transportation to restaurants and accommodation in the area.

Figure 9: Merapi Jeep Lava Tour



Note: From "Mau Liburan Seru di Jogja? Cek Pilihan Rute & Harga Lava Tour Merapi 2023" by Xperience Team (2022).

The second and third year post-eruption saw continued growth in the tourism industry and livelihood recovery. In particular, 2013 was seen as the peak of tourism's contribution to post-eruption economic recovery (S1JP3, Personal Communication, July 2023). The number of Jeep tour base camps grew as families and communities took out loans to purchase additional Jeeps and join the industry. As of 2023, there are approximately 36 base camps with nearly 1000 Jeeps in operation all over the lower slopes of Merapi (S1JP3, Personal Communication, July 2023). Moreover, other villages donned their 'tourism village' moniker via the local tourism board and began to welcome school students and others interested in an immersive Merapi experience (S1TVP2, Personal Communication, June 2023). Each village was then able to promote their own specialty; whether it be edutourism or ecotourism, there were options for students to engage in salak farming, river adventures, or animal husbandry. Interviews with members of both Pancoh and Nganggring Tourism Villages revealed how much village

members enjoy welcoming back former students who come to visit their homestay families (S1TVP2 & S1TVP4, Personal Communication, June & July 2023).

The number and types of peripheral, secondary businesses connected to the tourism industry is extensive. Hotels and homestays are common, along with a wide variety of restaurants, cafés with the draw of unique Kopi Merapi (*Merapi coffee*), and forms of local entertainment such as Labuan Merapi (*local dance performance)* and Karawitan (*traditional music group).* Tourists are also able to enjoy the natural beauty of Merapi through hiking, cycling, camping, or "glamping", and there are observation sites to watch the dome reformation each night.

Figure 10: Merapi Dome Reformation & Lava Avalanche



Note: From "Merapi Volcano 7-9 April 2023 – Incandescent Lava Avalanches" by Andersen (2023).

Further, other recreational pursuits such as Merapi Golf allows clientele to play a round of golf on the flanks of an active volcano, and Lost World Castle, is a mixed amusement-adventure destination park which hosts replicas of world-famous sites, such as Stonehenge. There has also been a rejuvenation of traditional arts and culture activities, with many becoming small-business ventures to display unique crafts or artisanal goods, or simply to host educational workshops on their production, including but not limited to milk processing, stone and stoneware production,

coffee and tea harvesting, and mushroom cultivation (S1JP3 & S2AP24, Personal Communication, July & August 2023).

Box 2: RBM Jeep - Creativity and Convenience

In 2013, a restaraunt called Resto Benda Merapi (RBM) was established at the peak of economic recovery post-eruption. Innovatively, the restaurant creator capitalised on the fact that tourists who booked local Jeep Tours only had snacks available to them and more established restaurants were located closer to the city center.

Knowing that Umbulharjo's village had extensive foraging experience and a plethora of wild mushrooms, RBM rejuvenated this local income stream, developed the conceptualization of their business venture, and the result was a unique menu focusing on local produce - predominantly mushrooms - as a special experience for guests.

By establishing a restaurant, RBM realized they could save visitor's time, and offer a convenient dining experience after a day of adventure. After some time, RBM realized they could offer their own Jeep basecamp and increase their revenue. Initially starting with 4 jeeps, overtime they built their fleet to 30 jeeps in present day.

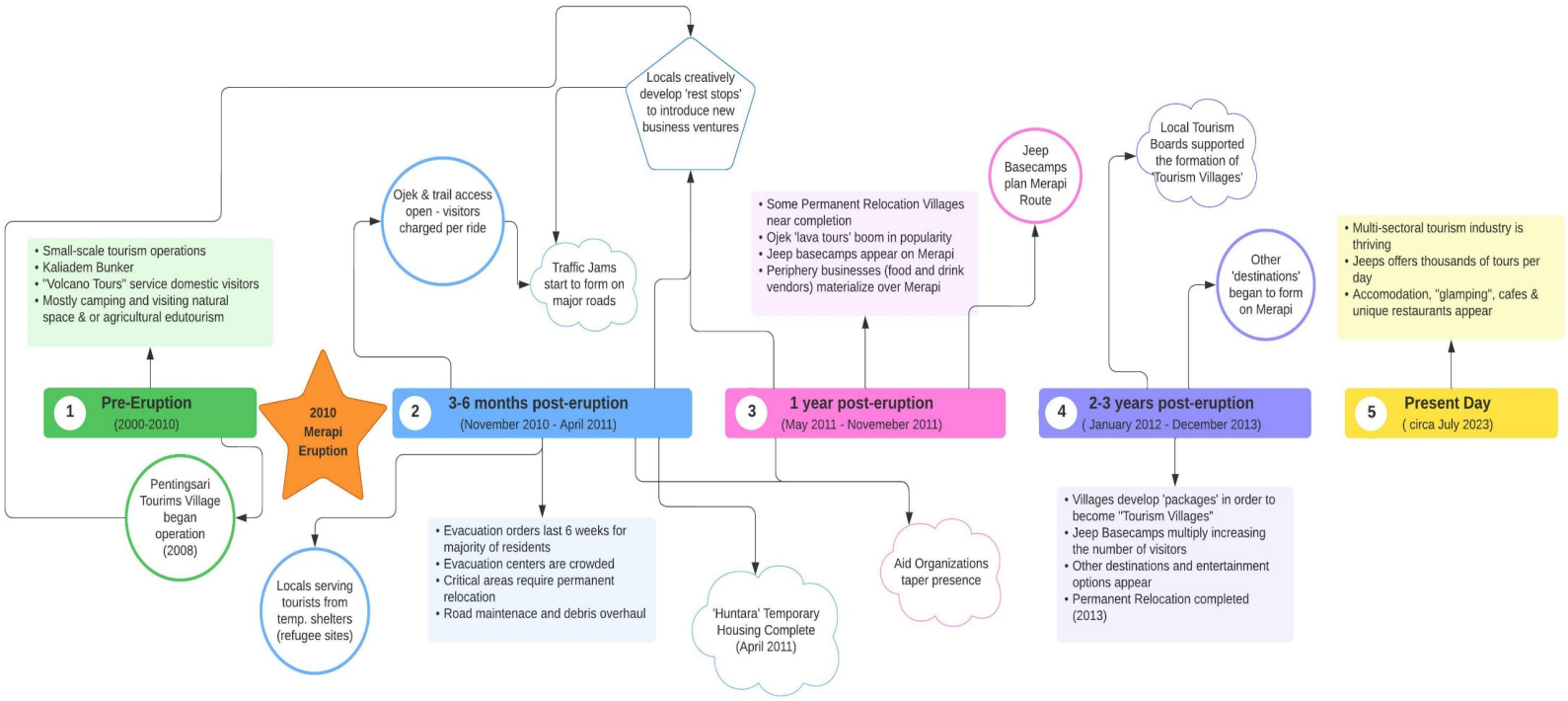
This venture greatly supported the income of local community members as they cooperatively participated in the business. The owner of RBM fondly discusses its connections with other tourism destinations and owners in the area and is thankful for the blessings Merapi provided.

Note: Adapted from Participant Interview (S1JP3, Personal Communication, July 2023).

In summary, tourism on Mount Merapi started as a post-eruption necessity for survival and a lifeline to surviving the impacts of a disaster, and has now become a thriving, robust, multi-sectoral industry, which continues to grow each day. In present day, domestic tourists comprise the majority of visitors, yet international tourists are common. The number and type of tourism products has creatively evolved overtime, attracting those interested in immersive educational opportunities, rich arts and culture, adventure activities, unique culinary and hospitality experiences and more. A majority of participants noted that tourism has supported their quality of life in a post-disaster landscape, remarking how the revenue from their ventures supports their lifegoals, basic needs, and even their children's education expenses. As noted by an expert informant, "disasters have a lot of opportunity, but opportunity needs creativity" (S2AP24, Personal Communications, August 2023). The imagination of Merapi's local communities to

support themselves through this transition is nothing short of remarkable. Below is a succinct timeline, as a summary of the information described above, in an effort to demonstrate how these tourism activities evolved over time.

Figure 11: Timeline of Tourism Activities Post-Eruption on Merapi



Note: Flowchart Image of Tourism Activities on Merapi Post-Eruption. Own Work (2024).

3.4. Discussion

This study set out to identify the impact of tourism activities on the recovery on Mount Merapi, and it is clear that tourism played a vital role in the long-term longevity and livelihood recovery for thousands of residents. The quick initiation of government relocation programs and the subsequent development of permanent relocation villages safeguarded survivors, effectively reducing future risk. Further, the efforts and dedication provided through countless aid organizations, international and domestic volunteers, and the extended community support during crisis stages played a major role in preventing further damage and speeding up recovery. Nonetheless, the innovation of local communities to capitalize on Merapi's natural resources, create unique business ventures with sustained revenue and income, and facilitate community-

recovery is the focal point of this work. It became clear during interviews that residents joining the tourism industry were able to meet their needs, pay for daily life, and even fund their children's school tuition as a result of the revenue they received through these ventures.

Furthermore, interviewees frequently explained how common-pool tourism-related resources were shared in order to benefit the community as a whole, as was evidenced at Alien Rock where parking fees are communally collected, and at Pancoh Tourism Village where portions of the revenue are pooled and used for community maintenance, and shared funds. As explained by a tourism village member, "We set aside 2 thousand Rupiah for village treasury, we set aside 1 thousand rupiah for the hamlet treasury and we also have THR [*holiday allowance]* for the residents", all which are collected from the guest's fees (S1TVP2, Personal Communication, June 2023). It was also explained that community members would take turns conducting modifications or renovations on personal properties in the community, such as new roofs when needed. Similarly, stakeholders participating in the Lost World Castle venture were able to set up an education fund to support their community's children, not only for tuition but also for much needed school supplies and extracurricular activities. As noted by a member of Lost World's operations management "after [starting the] the Lost World [in Kepuharjo Village] we [now] have a social budget to cover education" (S1TBP6, Personal Communication, July 2023). They continued to explain that tourism initiatives to support the community are "100% from the village and 100% for the village" (S1TBP6, Personal Communication, July 2023). Recognizing not every member of a household may be involved directly in the tourism sector, due to the shared revenue structure, it follows that everyone still benefits from the communal revenue which supports community maintenance such as road reconstruction, or the upkeep of shared spaces. The benefits of shared resources, complex governing systems for common goods, and community-based resource management are supported in the literature as outlined by Berkes et al., (2003) and Dietz et al., (2003).

The research revealed that although there are limits to the amount of financial capital a government may be able to devote to disaster preparedness or response, tourism can be a sustainable and beneficial addition to recovery. Tourism alleviated pressure on governmental and civil society funding (S3GP28, Personal Communication, August 2023), created a window of

opportunity to repair social infrastructure (Birkmann et al., 2010), promoted communication channels industry wide, and allowed survivors to receive regular, life-sustaining financial capital quickly and directly (S3GP28, Personal Communication, August 2023). Returning to work, even if that involves a shift into a tourism-based livelihood, can also give residents a sense of purpose, bolster community spirit, and allow the outside world to marvel in unique and exciting post-disaster cultural and adventurous experiences.

An overwhelming majority of participants saw tourism as a positive influence in their lives; however, this study would like to highlight the importance of monitoring the growth of Merapi's tourism industry, and potentially regulating the industry, in order to mitigate potential exploitation and further degradation in future. Although outside the scope of this study, the scale of tourism's operations, in combination with mass tourists, can increase the risk for environmental degradation concerns (Wall, 2019). Emissions from thousands of jeep tours, the increased demand for single-use plastics, and solid waste removal all becoming looming threats on the horizon of an exponentially growing industry. Further the process of over-tourism, effectively operating outside the carrying capacity of a destination and its tourism assets, could result in a disintegration of culture and customs (Chong, 2020), social infrastructure, or create hazards and risk concerns (Mei-Singh, Mostafanezhad & Jamal, 2024) as is well documented in the literature. Additional research on the impacts of the tourism that has emerged since 2010 is needed, and based on that research, there may be the need for policies and regulations that could control negative impacts.

The research also intended to recognize the role of social capital specifically within the tourism industry and its effectiveness in various recovery initiatives. As said above, tourism has the capacity to help bolster social and culture infrastructure and center local knowledge (Ningsih & Rizki, 2020). In the present day, almost all Merapi-based tourism ventures work together. Word of mouth marketing is incredibly common across all businesses, whether it be new destinations to try, or recommendations for places to stop and eat. Interviewees regularly noted the supportive community within different tourism ventures, displaying strong tourism-based bonding and bridging social capital.

Arguably, the clearest example in the research of the importance of tourism-related social capital came from the Merapi Jeep Tour network. There is a Jeep Tour Association, of sorts, through which most of the owners or lead operators of each basecamp communicate and coordinate operations. When one basecamp has too many visitors, it will reach out to others in the area to help accommodate the guests. Further, if a Jeep breaks down, needs repairs, or there is a warning about Merapi, the Jeep Association is in constant communication to help solve the problem.

Additionally, it was noted that all villages in Giriketo (see Figure 5) have a volunteer representative who participates in a 'community service' called Bolo Tetulung ('*help guys'* in Javanese). This group of men, all connected through radios or walkie talkies, take shifts answering calls when neighbours are in need; whether a car breaks down, a tree falls and blocks a road, or someone's roof caves in, Bolo Tetulug will respond. One participant from a tourism village explained "we have a high level of mutual cooperation, and concern is very high in turn" (S1TVP2, Personal Communication, June 2023). This group is also well prepared for future disasters, had training from the official village government, and has memorized each hamlet's evacuation route. This backdrop of social and cultural capital vibrantly displays how tourism-related resources may extend further to address other community needs, transfer knowledge naturally, and help communities work synergistically towards common goals.

This experience is supported in literature, as seen by Agnitsch, Flora & Ryan (2006) in which social capital is a necessary component of community-based living. Recovery plans are infinitely more rewarding when performed *alongside* a community as opposed to *for* a community. Researchers and policy makers alike, who recognize that meaningful change must account for cultural norms, noted that Gotong Royong is embedded into post-disaster management plans on Java (S3GP28, Personal Communication, August 2023). During the post-eruption landscape on Merapi, Gotong Royong was prominent in the reconstruction and rehabilitation of homes, public services, and public buildings such as Mosques and roads. This mutual assistance was present in regular village management for activities, such as providing manual labor required for road and street maintenance, and the redistribution of finances based on the needs of community members (S1TVP2, Personal Communication, June 2023).

Due to their unique services and hospitality, Merapi's tourism businesses often see repeat visitors who, in times of need, are able to reach out to network connections and access support from far beyond the Merapi region. This bridging connection was shared during many stories from the participants in which students from other cities donated funds and relief post-eruption, professors who had made friendships and strong connections during research ventures who then supported when possible, and other generous benefactors who donated multi-purpose grants to aid in recovery. Below is a table summarizing the types of different social capital present on Merapi post-eruption and several resulting examples.

Type of Social Capital	*Resulting Action, Behavior or Example*
Bonding (including *Gotong Royong*)	• Village clean ups • Manual labour for debris and rubble removal, road maintenance, settlement reconstruction • Shared village funds & treasuries • Village Security
Bridging	• Jeep Tour Association • Bolo Tetulug • Repeat visitors and tourists who donate during crisis
Linking	• Monetary support from government agencies • Universities and professors supporting business development • Domestic and International NGOs providing relief and volunteer support

In all, it is the belief of the research team that this phenomenon is due to an extraordinary set of characteristics which lay the groundwork for disaster recovery success: the existing social capital in Merapi's communities, the additional tourism-specific social capital that mobilized post-eruption, the abundance of natural resources, the value of Merapi as a tourist destination, and a disaster which presented a window of opportunity for a new way forward.

3.5. Conclusion

In conclusion, this research described how a predominantly agriculturally-based region on Mount Merapi rapidly and collectively developed a complex, multi-sectoral tourism industry, and how these activities impacted the livelihood recovery of residents after a volcanic eruption. Furthermore, this study outlined the ways in which social and cultural capital lay the groundwork

for Merapi's post-eruption tourism success; as was stated eloquently by a participant, it "turns out the character of the local people was a determining factor" in recovery and ongoing disaster management (S3GP28, Personal Communication, August 2023). In all, this paper upholds the sanctity of Merapi's local knowledge and ingenuity, while positing that tourism and disaster recovery may in fact have a positive, reciprocal relationship, and that greater attention be given to locally-based social capital in disaster management and recovery in order to see more context-specific success.

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4.0 Conclusion

This study set out to discover the interconnected relationship between post-disaster emergent tourism activities and long-term post-disaster recovery, while recognizing the fundamental role social and cultural capital play in this exchange. The case study clearly outlined how such a relationship can be a positive and life-changing alternative to traditional, government-led methods of disaster management. Throughout the interview process, it was well documented that a majority of residents believed that the development of tourism in the community has improved their quality of life. Furthermore, this research carefully outlined how the unique social and cultural capital on Merapi displayed strong community cohesion and the backdrop of Gotong Royong was an integral factor contributing to the success of these ventures.

The manuscript met Objective 1: to identify the involvement of the developing tourism industry in facilitating recovery and its scope (i.e., short term or long term). It did so by describing the numerous pathways communities chose to enter into or to expand the tourism industry, and how each of these activities resulted in the benefit of not only greater household income, but also wider community benefits. The tourism industry as a whole was involved in facilitating recovery throughout the entire temporal scope of this study. Tourism supported during short-term relief, as was described by the initiatives which were developed 3-6 months post-eruption and was further, seen in long-term recovery as these businesses continue to thrive to the present day.

The manuscript met Objective 2: to recognize social capital in the emergent tourism industry and its effectiveness for various recovery initiatives. The benefits of community cohesion, social capital networks, and Gotong Royong for disaster recovery demonstrates how communities were able to rely on each other for support, form tourism-specific cross-village associations, develop creative volunteer service groups, and govern profit-sharing systems. Knowledge transfers and professional network connections were instrumental for the continued development of popular tourism businesses.

During the research, it became apparent to the research team that there were many similar stories and or concerns voiced by participants, which this study would like to amplify for researchers and practitioners alike, in the hope that these concerns can be mitigated in the future.

Therefore, the research team proposes multiple recommendations to preserve the remarkable nature of this post-disaster tourism-led recovery phenomenon for years to come. Firstly, based on feedback from participants, it is recommended that government bodies enact stronger tourism-specific policy regulations. As Merapi's tourism product has matured, foreign investors have begun to recognize the potential profits from tourism activities on Merapi. In recent years, interviewees noted that there has been a greater 'foreign' presence in tourism, and an influx of businesses owned by non-locals. Wealthy stakeholders from other major cities such as Jakarta and Surabaya have started competing in the same tourism industry, effectively diluting the income seen by local residents, and impacting ongoing financial stability (S2AP9, Personal Communication, July 2024). It is therefore recommended that tourism regulations promote the sanctity of locally led ventures, to preserve their place in long-term disaster recovery and to ensure that the benefits of tourism stay local. This could also be seen as an area of further research, to explore pathways that could prevent the exploitation of Merapi's tourist destinations in the future. Naturally, as described in Butler's curve (see Figure 3), destinations can mature and then fall into either decline or rejuvenation trajectories. One undesirable possible future could be that with the rise of potential foreign influence, and diluted ownership outside of local communities, this could result in overexploitation of natural resources and the disintegration of local cultural norms. Environmental degradation concerns could also be avoided with stronger tourism-related policies. More research in this area could assist with potential policy solutions moving forward.

The second recommendation pertains to potential aid-distribution pathways post-disaster. Given the results of this study, and other Indonesian studies (Ningsih & Rizki, 2020; Rindrasih, 2018), which continue to reveal the benefits of community-based tourism, it is proposed that small business stimulation packages, especially those focused on tourism, should be included in the disaster recovery budget given this industry's economic resilience in a post-disaster landscape. Many participants noted that there was monetary support funneled through the 'Huntaps' *(permanent relocation villages program),* in the form of cash grants for basic necessities which were lifesaving for residents. It was further noted that there was monetary and other assistance for the agricultural sector's rehabilitation and reforestation. However, no similar support was

described for tourism entrepreneurship. Small business-specific support should be provided as part of disaster recovery budgets, since these businesses may act as a catalyst for long-term sustainable livelihood transition and recovery.

Further, this study strongly recommends the development of long-range settlement and population planning in the region. A major theme shared by participants during this study was the absence of long-term future planning in the permanent relocation villages. Many community members noted that their now adult children, being 10+ years post eruption, have begun to outgrow their parents' homes, putting pressure on housing availability. This trend has pressured numerous families to return to their original homes, inside the hazard zone, while passing on the safer resettlement village homes to the new generation (S2AP25, Personal Communication, August 2023). This undesirable return-migration will inevitably become problematic, as the local belief expresses 'Merapi never breaks its promise', warning that another eruption is always on the horizon. A more critical analysis of policy and planning is needed to protect vulnerable residents.

Another area of desirable future research would explore the current gap in Indonesian village-level knowledge about climate-related hazards. It became apparent throughout the interview process that residents were extremely prepared for future volcanic activities, being knowledgeable about the warning signs, and emergency planning if there were to be another eruption. However, when asked about other extreme climatic events, such as unusually prolonged droughts, wildfires, or flooding, residents were either unaware of the risks or did not believe they would be impacted. This study is a proponent of the theory that disaster may create a 'window of opportunity' to change societal norms, and therefore, further research could be directed to create more robust education and training plans for future climatic hazards. Changing climate trends have alerted researchers to the compounding effect of climate change coupled with the risk of known hazards, the combination of which can create considerable overlapping and enhanced vulnerabilities. Understanding the feasibility of this research to impact not only the tourism literature, but also the natural hazards literature, the interlinkage of climate change adaptation and disaster risk reduction frameworks is highly suggested. Climate change adaptation can assist disaster management specialists with better plans for extreme hazard events, carry out more robust

flood plain mapping, rezoning, evacuation and relocation programs, and provide guidance in retrofitting buildings and homes, improving natural storm barriers, and more.

Overall, this study made unique contributions to the literature and research discipline in two facets. First by contributing to the literature in a conceptual manner by exploring the three-way nexus between the three concepts of: Disaster Management, Tourism and Social Capital. The framework used to shape this study was original and thus helped to shrink the paucity in the research between the multidimensional relationship described. Second, this research provided empirical contributions with the study's results in which the recommendations provided could affect policies in the future. In conclusion, this case study adds to the growing repository of literature regarding successful community-based tourism within a post-disaster landscape, all while recognizing the strength of collective and cooperative communities.

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APPENDIX A – List of Research Participants (coded)

DATE OF INTERVIEW	STRATA NUMBER	STRATA TYPE	SUB STRATA	PARTICIPANT #	CODE
11-June-23	S1	TOURISM OPERATORS	TOURISM VILLAGE	1	S1TVP1
20-June-23	S1	TOURISM OPERATORS	TOURISM VILLAGE	2	S1TVP2
06-July-23	S1	TOURISM OPERATORS	JEEP OPERATOR	3	S1JP3
09-July-23	S1	TOURISM OPERATORS	TOURISM VILLAGE	4	S1TVP4
12-July-23	S2	ACADEMIC/EXPERT	PROFESSOR	5	S2AP5
14-July-23	S1	TOURISM OPERATORS	TOURIST ATTRACTION	6	S1TBP6
14-July-23	S1	TOURISM OPERATORS	JEEP OPERATOR	7	S1JP7
20-July-23	S3	NGO	HUMANITARIAN ORG	8	S3NGOP8
24-July-23	S2	ACADEMIC/EXPERT	PROFESSOR	9	S2AP9
26-July-23	S3	GOVERNMENT	BAPPEDA SLEMAN	10	S3GP10
28-July-23	S4	TOURISM BUSINESS	VENDOR	11	S4VP11
28-July-23	S4	TOURISM BUSINESS	VENDOR	12	S4VP12
28-July-23	S4	TOURISM BUSINESS	VENDOR	13	S4VP13
28-July-23	S4	TOURISM BUSINESS	VENDOR	14	S4VP14
28-July-23	S4	TOURISM BUSINESS	VENDOR	15	S4VP15
28-July-23	S1	TOURISM OPERATORS	MUESEUM TOUR	16	S1MP16
28-July-23	S1	TOURISM OPERATORS	JEEP OPERATOR	17	S1JP17
28-July-23	S4	TOURISM BUSINESS	VENDOR	18	S4VP18

3-August-23	S3	NGO	PROFESSIONAL CO-OP	19	S3NGOP19
				20	S3NGOP20
3-August-23	S2	ACADEMIC/EXPERT	EXPERT INSIGHT	21	S2EP21
4-August-23	S3	NGO	NON-PROFIT	22	S3NGOP22
				23	S3NGOP23
4-August-2023	S2	ACADEMIC	PROFESSOR	24	S2AP24
4-August-2023	S2	ACADEMIC	PROFESSOR	25	S2AP25
7-August-2023	S2	ACADEMIC	EXPERT INSIGHT	26	S2AP26
				27	S2EP27
8-August-2023	S3	GOVERNMENT	DISASTER MANAGEMENT	28	S3GP28
10-August-2023	S2	ACADEMIC	PROFESSOR	29	S2AP29
11-August-2023	S2	ACADEMIC	PROFESSOR	30	S2AP30

APPENDIX B – Example of Interview Guides

Interview Guide (Strata 1 & 4)

Context for ***tourism business:***

Question 1: Can you tell me a little bit about the services or goods you offer?

Question 2: To date - how long have you been operating this business?

Question 3: Can you tell me if there are other businesses that you cooperate with/have relationships with?

Question 4: Are you aware as to some of the threats a changing climate may bring to this region?

Framing Question 1: Can you tell me about how this business was affected by the Mt. Merapi eruption and the recovery efforts that followed?

Follow-up Questions:

A. Were there recovery initiatives specifically focused on the tourism industry, or led by the tourism industry?
B. Were there ways in which this/your business supported recovery initiatives?
C. Did you see any noticeable change in your ability to operate and or the number of tourists in the region (3 months post-eruption, 1-year post-eruption, 2 years post-eruption)?
D. *If yes to change:* Were there other operations that you were involved in given a change in business?

Framing Question 2: Can you tell me about *who* or which agencies/institutions were involved in the recovery process?

Follow-Up Questions:

A. Did you personally feel a need to contribute to the recovery efforts?
B. Was there a cultural or societal norm or expectation of shared responsibility?
C. Did other relatives, friends, community members from other areas assist in the recovery process?
D. Did any foreign tourists contribute resources or goods to assist in recovery?
E. Did you personally contact powerful individuals (e.g. Mayor, religious leader) to get help with the recovery process?

Framing Question 3: Can you tell me about how prepared you feel for future disasters?

Follow-Up Questions

A. Do you think that the response that was seen post-disaster would be the same if there was a drought, flooding or extreme heat in the region?
B. Can you tell me how the Merapi recovery experience has helped you prepare for future hazardous events?

Interview Guide (Strata 2)

Context

Question 1: Your position, department and your field of expertise?

Framing Question 1: Can you tell me about the Mt. Merapi eruption and the recovery efforts that followed - specifically in terms of social networks and cohesion?

Follow-up Questions:

A. Are you aware of any recovery initiatives that specifically focused on the tourism industry, or that were led by the tourism industry?
B. Were there ways in which the academic community could or did support recovery initiatives?
C. Did you see any noticeable change in your tourism within the region (3 months post-eruption, 1-year post-eruption, 2 years post-eruption)?

Framing Question 2: Can you tell me about *who* or which agencies/institutions were involved in the recovery process?

Follow-Up Questions:

A. Did you personally feel a need to contribute to the recovery efforts?
B. Do you believe there is a cultural or societal norm or expectation of shared responsibility?
C. From your research- you notice a pattern in which relatives, friends, community members from other areas assist in the recovery process?
D. Did any foreign tourists contribute resources or goods to assist in recovery?
E. Were you aware of any partnerships with any powerful individuals (e.g. Mayor, religious leader) to get help with the recovery process?

Framing Question 3: Can you tell me about how well prepared you feel this region is for future disasters?

Follow-Up Questions

A. Do you believe that the Merapi recovery experience has helped prepare for future hazardous events?
B. Do you think that the response that was seen post-disaster would be the same if there was a drought, flooding or extreme heat in the region?

Interview Guide (Strata 3)

Context:

Question 1: Can you tell me a little bit about the work this office is in charge of?

Question 2: To date - how long has this office been operating?

Question 3: Can you tell me if there are any other businesses/organizations that you cooperate with or have relationships with?

Question 4: Are you aware of the threats a changing climate may bring to this region?

Framing Question 1: Can you tell me about how tourism businesses were affected by Mt. Merapi eruption and the recovery efforts that followed?

Follow-up Questions:

A. Were there recovery initiatives specifically focused on the tourism industry, or led by the tourism industry?
B. Were there ways in which businesses/operators contributed to recovery initiatives?

Framing Question 2: Can you tell me about *who* or which agencies/institutions were involved in the recovery process?

Follow-Up Questions:

A. Can you tell me about how this office supported the recovery efforts?
C. Did other communities from other areas assist in the recovery process?
D. Did any foreign tourists contribute resources or goods to assist in recovery?
E. Did your office work with any other formal institutions and or other government agencies?

Framing Question 3: Can you tell me about how prepared you feel for future disasters?

Follow-Up Questions

A. Can you tell me how the Merapi recovery experience has helped this office prepare for future hazardous events?
B. Do you think that the response that was seen post-disaster would be the same if there was a drought, flooding or extreme heat in the region?
C. Do you believe there are any downsides or negative aspects to rely on Gotong Royong as a Disaster Management tool?

APPENDIX C – Further Reading

For more detailed information on the 'Huntap' permanent resettlement program please refer to the following literature:

Maly, E., Iuchi, K. & Nareswari, A. (2015). Community-Based Housing Reconstruction and Relocation REKOMPAK Program after the 2010 Eruption of Mt. Merapi, Indonesia. *Regional Safety and Security Society Papers J-stage,* (27), 1-10.

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