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Abstract

This study seeks to explore the resilience of the inhabitants of the Indonesian village Kemiri, situated 8 km away from Mount Merapi's crater. More specifically, it focuses on how gender relations affect people's resilience towards volcanic eruptions at the community level. While acknowledging the intersectionality with factors such as age, ethnicity, race, religious beliefs, and socioeconomic status when determining vulnerabilities and capacities of communities, the aim of this paper is to examine whether women and men differ in how they experience, respond to, and recover from disasters.

Under the Ash Cloud

Gender distinctions in the resilience of Kemiri community towards Mount Merapi volcanic activity

Content

List of Acronyms

ACICIS	Australian Consortium for 'In-Country' Indonesian Studies
CDC	Centers for Disease Control and Prevention
DRR	Disaster Risk Reduction
HFA	Hyogo Framework for Action 2005–2015: 'Building the Resilience of Nations and Communities'
HT	Handheld transceiver
IDNDR	International Decade for Natural Disaster Reduction
LGBT	Lesbian, gay, bisexual, and transgender
NGO	Non-governmental organisation
PNG	Papua New Guinea
PoHA	Programme on Humanitarian Actions
SAR	Search and Rescue
SOP	Standard Operation of Procedures
UGM	Universitas Gadjah Mada
UN	United Nations
UNDESA	United Nations Department of Economic and Social Affairs
UNGA	United Nations General Assembly
UNISDR	United Nations International Strategy for Disaster Reduction
UNISDR AP	United Nations Office for Disaster Risk Reduction – Regional Office for Asia and Pacific

Glossary of Indonesian and Javanese terms

Arisan	Women's gathering
Awas	Beware
Badan Nasional Penanggulangan Bencana (BNPB)	National Disaster Management Agency
Badan Penanggulangan Bencana Provinsi (BPBD)	Provincial / local Disaster Management Agency
Balai Desa	Village Hall
Dati	Level (in regards to Governement)
Gethok Tular	Communicating information person-to-person
Hormat	Respect
Gotong-Royong	Co-Operation
Kabupaten	Districts
Kota	Municipalities
Kuliah Kerja Nyata (KKN)	Student Community Service
Lahar Dingin	Cold Lava
Lahar Hujan	Lava Rain
LINMAS: Perlindungan Masyarakat	Community Protection Organisation
Musyawarah	Mutual Deliberation
Pengamat Gunung Merapi	Mount Merapi Observers Pasak Merapi (local organisation involved in developing community-based contingency plans)
Ruku	Harmony
Rukun-Tetangga (RT)	Neighbourhood
Rukun-Warga (RW)	Sub-village
Salak	Snake Fruit
Siaga	Standby (Level III)
Siaga Bencana Berbasis Masyarakat (SIBAT)	Community-based disaster mitigation program under Indonesian Red Cross
Tetulung	Accommodating
Warias	Members of the LGBT community in Indonesia
Waspada	Alert (Level II)
Wedhus Gembel	local name for the ash cloud/pyroclastic flows (direct Javanese translation: 'shaggy goat')

1. Introduction

Mount Merapi on the island of Java, Indonesia is known for its fertile soil, providing rich farming land and picturesque scenery for tourists. Four years ago Merapi erupted leaving a trail of destruction within a 20km radius of the crater – its biggest eruption in 150 years. After the eruption an eerie white and grey layer obscured the mountain. Acid rain merged with ash, rocks and dirt, covering whole villages, trees, cars, and dead farm animals. The residents of the mountain were left to clear the debris and start again.

This Working Paper will explore the resilience of the inhabitants of Kemiri village, situated 8km away from Merapi's crater. More specifically, it focusses on how gender relations affect people's resilience towards volcanic eruptions at the community level. This approach to examining community resilience will involve exploring the vulnerabilities and capacities of different groups in society, specifically looking at the men and women in Kemiri village and how they interact with the hazards of Merapi.

The central research question of this Working Paper is: How do gender relations impact people's resilience towards the Mount Merapi volcano in Kemiri village?

This study seeks to explore whether women and men vary in how they experience, respond to, and recover from disasters. It seeks to develop a deeper understanding of what happens at the community level when disaster in the form of volcanic eruption occurs. Additionally it endeavours to shed light on how abilities and techniques of responding differ between women and men. Meanwhile, it acknowledges that gender is just one lens through which one can view disasters. It is also important to recognise the intersectionality with factors such as age, ethnicity, race, religious beliefs, and socioeconomic status when determining vulnerabilities and capacities.

John Twigg's 2007, Characteristics of a Disaster-Resilient Community (CDRC): A Guidance Note, was selected as the theoretical framework to approach answering the research question. The CDRC was chosen because it is based on an internationally agreed framework, the Hyogo Framework for Action (HFA) 2005–2015: 'Building the Resilience of Nations and Communities.' Furthermore it was written to reflect organisations' knowledge and experiences and in an examination of several frameworks CDRC was identified as one of the most comprehensive frameworks for looking at resilience (Djalante & Thomalla 2011).

As well as providing a succinct yet detailed description of key concepts used: disaster risk reduction, resilience and the disaster-resilient community, and community, CDRC provides five thematic areas that identify relevant characteristics of resilience. These five thematic areas, namely (1) governance, (2) risk assessment, (3) knowledge and education, (4) risk management and vulnerability reduction, and (5) disaster preparedness and response, provided the structure for the interview questions and guided the analysis leading to the overall research question.

The study uses people's past and current experience to examine how this affects and influences participation in decision making processes. Ten interpreter assisted semi-structured interviews (female (n=6) and male (n=5)) were conducted with 11 Kemiri residents to compare the way in which men and women responded to previous disasters

and the threat of new eruptions. The village of Kemiri was chosen as the research location because of its proximity to the volcano's crater and lived experience of eruptions.

The significance of this Working Paper lies in the enabling of a broader understanding of community resilience with a gendered lens. Neither gender nor resilience are new concepts. Yet much of the information about these terms in the humanitarian setting is anecdotal rather than analytical. This Working Paper contributes to the current debate, amongst academics and practitioners, and seeks to provide a practical example of a working framework that addresses both community resilience and gender. Disaster risk reduction initiatives are context-specific, so generic assessment schemes will always have to be customised to fit the context to which they are applied; this Working Paper seeks to understand how resilience can be better understood in regards to gender and how both concepts can be integrated into programming to ensure better outcomes for disaster affected populations.

While the research findings will not necessarily be generalizable outside the sampled participants, the overall consideration of resilience and gender in the village of Kemiri adds to the literature seeking to enhance focus and agency on gender and community resilience. Additionally, it hopes that by adapting the CDRC characteristics to the Kemiri circumstance, it can assist those working towards improving disaster mitigation and response programming in other disaster contexts. While the overall goal of integrating gender and resilience in programing can only be achieved with the cooperation of many different actors – politicians, donors, humanitarian organisations and academics alike – this Working Paper contributes by illustrating both the importance of considering gender in disaster contexts and how resilience is influenced by gender norms within society.

This Working Paper is divided into six chapters, which are briefly outlined below.

The first chapter provides a brief introduction to disaster risk reduction and sets the Indonesian context before examining the record and significance of Mount Merapi. After an examination of Merapi's volcanic activity and the subsequent hazard, it provides a snapshot into the principal of community response and recovery.

Disaster literature is prolific: it highlights the extensive reach of disaster, relief and development studies, as well as its technical and subject specific nature. The second chapter introduces Twigg's CDRC model for resilient communities, and provides an analysis of key concepts utilised in the guidance note contextualised within the wider discourse.

The following section will canvass pre-existing literature on the key concepts used throughout this Working Paper: resilience, vulnerability, community and gender. A discussion on the current discourse will examine the criticism, limitations and their position within global agreements.

The fourth chapter then describes the research framework, providing an in-depth explanation of the sections of the CDRC model (Twigg 2007). The limitations and criticisms of CDRC will be examined before discussing the operationalisation and elaborating on the questionnaire used in the research. This chapter also includes a methodology section, which will introduce the subject of qualitative research. An outline

of the research location, cross-language interpretation methods and the interview process is provided. This is followed by an assessment of the validity of the interviews and an analysis, including a discussion of the MaxQDA codes, of the collected data.

The fifth chapter presents the findings of the field research and discusses its relevance in regards to the literature. The chapter is divided into analytical parts based upon the five thematic areas as outlined in the CDRC and a sixth section that explores other themes that emerged from the interview process. The chapter concludes with a summary of the research findings.

The final chapter provides an outlook and further recommendations. It outlines possible future steps to ensure disaster resilience and gender aware programming. It then discusses some future research ideas before concluding the study.

2. Background on Indonesia

Starting in 1990 with the International Decade for Natural Disaster Reduction (IDNDR), the effort to build frameworks for disaster risk reduction (DRR) has progressed both at the national and international level. The 1994 World Conference on Natural Disaster Reduction, held in Yokohama, Japan, was the first United Nations (UN) World Conference that specifically addressed DRR and the importance of the social and human dimensions of risk reduction, replacing the dominant engineering focus (Cutter et al. 2008: 599). The adopted 'Yokohama Strategy for a Safer World: Guidelines for Disaster Prevention and Mitigation' (IDNDR 1994) obligated nations to view the management of disasters holistically, from prevention and mitigation through to rehabilitation and reconstruction.

The United Nations Office for Disaster Risk Reduction defines DRR 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, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events (UNSIDR 2009: 10).

As the most prominent paradigm in disaster management, DRR 'offers a systematic approach to identifying, assessing and reducing the risks of disasters' (Djalante & Thomalla 2011: 341).

2.1. The Indonesian context

In 2008 Indonesia had 645 organisations (government, non-government and donor agencies) listed as working on DRR on the UN Office of Coordination of Humanitarian Affairs database (Djalante et al. 2012: 784). This is hardly surprising considering Indonesia is situated in one of the most geologically volatile regions in the world. The establishment of the National Disaster Management Agency (*Badan Nasional Penanggulangan Bencana*, BNPB) and its provincial and local level equivalent, *Badan Penanggulangan Bencana Provinsi* (BPBD) in 2008 as well as the enactment of the Disaster Management Law (No 24/2007) in 2007 illustrates Indonesia's recognition of the need for comprehensive risk reduction strategies. Indonesia is pursuing this through the sharing of responsibilities between national and local government bodies, and by

recognising the importance of non-government actors and affected communities. The law also transferred responsibility for disaster management from the national to the local government (Djalante et al. 2012: 784).

While Indonesia is performing well in terms of legislation and political commitment to the idea of DRR, the problem with natural hazards is the level of uncertainty they pose for both scientists and key officials managing crisis. A significant threat comes from the many volcanoes dotted along the Indonesian archipelago. Active volcanoes, due to the unreliable nature of eruption indicators, are a classic example of a natural hazard that presents a challenging environment for decision-making, effective response, and emergency management planning. The uncertainty about volcanoes also presents challenges for long-term management and communication with communities who live alongside the volcano. In addition, an event such as an eruption

> requires inter-disciplinary interaction, and if relationships and procedures are not well established and practiced before, considerable uncertainty can arise in its management due to problems with inter-agency communications, collaborations, and the understanding of each other's roles, responsibilities, and inter-dependencies (Doyle et al. 2014: 75-6).

2.2. Mount Merapi

Located at the heart of this Working Paper and the Sunda arc in Central Java, Merapi is one of the most notorious Indonesian volcanoes. Merapi eruption events have been documented since 1822 (Voighta et al. 2000: 72 and Gertisser et al. 2011: 57).

Eruptions in 1822, 1872, 1930 and 1961 destroyed the settlements on the higher western regions of the volcano. However, the more recent eruptions in 1994, 2006 and 2010 have shifted towards the highly populated southern side (Donovan 2012: 305-307). The interpretation of geophysical and satellite observations in 2010 lead to timely warnings that saved between 10,000 and 20,000 lives. At the same time inexperience with regard to hazards and evacuation procedure in settlements on the southern side of the mountain lead to greater vulnerability (Surono et al. 2012: 123).

Merapi continues to have hazardous volcanic activity and poses a permanent threat to the over one million inhabitants in the surrounding area. Gertisser et al. (2011: 57) argue that the most likely hazards are primarily the devastating pyroclastic flow generated by gravitational or explosive lava dome failures and subsequent *lahars* (the Javanese term for hyper-concentrated flows or debris flows). Voight et al. (2000: 74) explains that *lahars* are usually caused by rain that mobilises loose pyroclastic debris on the volcano flank. Merapi's more powerful past eruptions, like the one in 2010, highlights the possibility of violent eruptions affecting areas further away from the volcano summit.

The early warning system for the Merapi area, as for all volcanoes in Indonesia, consists of analysis of instrumental and visual observations. As described by Surono et al. the system comprises four alert levels:

> Level I[1] indicates the activity of the volcano is in normal state, with no indication of increasing activity, although poisonous gasses may threaten the area close to the vent or crater. Level II is set when visual and seismic data indicate that the activity is increasing.

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[1]   The Indonesian system is: Normal (level I), *Waspada* (level II), *Siaga* (level III) and *Awas* (level IV).

> Level III is set when a trend of increasing unrest is continuing and there is concern that a dangerous eruption may occur. Level IV is set when the initial eruption starts (i.e., ash/vapor erupts which may lead to a larger and more dangerous eruption) (2012:124).

An early warning is announced to the public through the National Agency for Disaster Management and local government institutions. For each level, a recommendation is given informing people living near or in the surrounding area on their best course of action. BPBD give evacuation orders, and are also responsible for the evacuation centres (Surono et al. 2012: 124).

This does not mean however that residents will evacuate. Donovan et al. (2012: 316) found that the inhabitants of the northern region of Merapi were more likely to refuse to evacuate because they consider it completely unnecessary, while in the west residents were suspicious of the government's agenda and anxious about abandoning their livelihoods. As Donovan et al. (2012: 310) points out reluctance to leave livestock (and thus livelihoods) is not an uncommon reaction during evacuations. This will be discussed in greater detail in the analysis section of this Working Paper.

Dove (2010: 121) argues that the belief that there is a spirit world inside the crater of Merapi also adds a dimension to how the residents perceive hazards. While, traditional beliefs part of people's attitudes to hazard, complex combination of folk beliefs (or spirit guardians), assessments based on past hazard location and frequency, anxiety about loss of property, attitudes towards the government, and societal norms also play a role in how people respond.

2.3. Living with Merapi

It is not a matter of 'if' Merapi will erupt again, but 'when', and how destructive the volcanic eruption will be. There has been a range of efforts in Indonesia to build a culture of safety through DRR, including targeting the residents on the flanks of Merapi. The objective of disaster risk reduction is to minimize the loss of life and livelihoods and within the shortest possible time allow the affected community or system to return to 'normal'. In this respect Manyena (2006: 438) observes that disaster management interventions have a susceptibility to paternalism, leading to the 'skewing of activities towards supply rather than demand.' He argues that it is imperative that activities like community capacity building, mitigation and emergency preparedness planning that impact on response and recovery processes are not neglected.

This Working Paper examines how the risk of volcanic activity influences the people who live within its proximity, chiefly how this plays out in terms of gender relations. Whilst it is essential to have an appreciation of the hazard posed by Merapi it is also important to have a clear understanding of the key concepts used throughout the Working Paper. Thus before analysing the research findings, the following section will discuss and scrutinise these elements.

3. Theoretical Concepts

The following section introduces Twigg's 'Characteristics of a Disaster-Resilient Community (CDRC): A Guidance Note' (2007). It examines the origin and structure of

what is essentially a guidance note for practitioners, and to some extent researchers, on resilient communities. The section also canvasses the current discourse on the terms 'resilience', 'vulnerability', 'community' and 'gender', and explores how they intersect with global agreements.

3.1.   Characteristics of a Disaster-Resilient Community: A Guidance Note

Shared problems with monitoring and evaluation of the Hyogo Framework for Action (HFA) particularly at the community level, resulted in a group of six[2] not-for-profit agencies commissioning Twigg to develop 'Characteristics of a Disaster-Resilient Community (CDRC): A Guidance Note' (2007). Each of these organisations have long working histories in disaster risk reduction (DRR) initiatives, yet they shared the view that it would be beneficial to define what a disaster-resilient community actually looked like and work towards the development of indicators (Twigg 2007: 2).

CDRC is set out in three sections. Section A provides an introduction, discussing the applications and how they are organised. It then details the key concepts used in the guidance note: disaster risk reduction, resilience and the disaster-resilient community, and community. Section B discusses each of the five tables, which cover a different thematic area relating to resilience and DRR, namely (1) governance, (2) risk assessment, (3) knowledge and education, (4) risk management and vulnerability reduction, and (5) disaster preparedness and response. As the scope of each thematic area varies each of the five thematic tables are divided into three columns: Components of Resilience, Characteristics of a Resilient Community, Characteristics of an Enabling Community Environment. The number of components and characteristics varies according to the scope of the area. Section C contains tables developed along the thematic areas. These will be discussed further in the operationalisation section of this paper.

Twigg (2007: 10) writes that 'the complete set of characteristics is intended to represent an ideal state of resilience.' In short, a community that demonstrates each of the characteristics under all of the headings (themes and components) would have attained the most feasible level of safety. Yet not all components of resilience are necessarily of equal significance. Taking into account that there are no universally agreed priorities for resilience or DRR, the prominence of each element in a given project depends on the specific location, time and circumstances (including different hazards). Therefore Twigg argues that for operational purposes it is more advantageous to work with all-encompassing definitions and commonly understood characteristics. Using this approach resilience can be understood as the

> capacity to absorb stress or destructive forces through resistance or adaptation; capacity to manage, or maintain certain basic functions and structures, during disastrous events, or capacity to recover or 'bounce back' after an event (Twigg 2007: 6).

While this Working Paper will apply Twigg's CDRC model for resilient communities in the context of Kemiri village, it is important to consider the terminology outside of

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[2]   ActionAid, Christian Aid, Plan UK, Practical Action and Tearfund, in cooperation with the British Red Cross/International Federation of Red Cross and Red Crescent Societies.

Twigg's tables. The following sections will review the terms and contextualise them within the wider discourse.

3.2.   Resilience – more than 'bouncing back'?

Much of the literature on resilience investigates the origin of the term as well as the theoretical application. Academics (Aldunce et al. 2014, Cutter et al. 2008, Klein et al. 2003 and Manyena 2006) maintain its roots can be found in a number of disciplines. It is generally accepted in disaster literature that the word resilience has its origins in the Latin, *resiliere*, 'to bounce back after a shock'.

Since the 1970s resilience has become a desirable attribute of natural and human systems and is increasingly used in a metaphorical sense, describing 'systems that undergo stress and have the ability to recover and return to their original state' (Klein et al. 2003: 35). This development is integral to the definition of resilience provided by the United Nations Office for Disaster Risk Reduction:

> [T]he ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and function' (UNISDR 2009a: 24).

The theoretical expansion of resilience illustrates that what may have once been a straightforward term, used only by physicists, is now a multifaceted concept with disputed definitions and applicability. While most definitions include the ability of 'bouncing back', Klein et al. (2003: 40) argue that over the past thirty years the most significant development has been the

> increasing recognition across the disciplines that human and ecological systems are interlinked and that their resilience relates to the functioning and interaction of the systems rather than to the stability of their components or the ability to maintain or return to some equilibrium state.

Sudmeier-Rieux (2014: 67) argues that 'resilience' used as a link between development, humanitarian efforts, climate change and DRR, offers a more hopeful, systematic and positive approach. Similarly Aldunce et al. (2014: 257) favours the element of the concept that allows for preparation in 'order to mitigate, prevent and minimize losses, suffering and social disruption.' Manyena (2006: 436) argues that the concept of resilience aids the comprehension of risk and vulnerability. He asserts that resilience fills a void by addressing the despairing element associated with vulnerability and 'allows us to rethink the prevalent "risk = hazard x vulnerability" equation.'

Manyena (2006: 446) goes on to argue, 'people want more than simply to attain the minimum standards associated with coping'. He maintains that practitioners are increasingly becoming aware that interventions that have their emphasis on building local knowledge and augmenting existing capacity are more likely to be successful.

3.3.   Criticism of resilience as a concept

While the concept of resilience has become popular in international discourse with many considering the term to be synonymous with enabling learning from experiences

and mitigating against future disasters, reservations in both academic and practitioner groups have been expressed. Objections have been made about the limited theoretical understanding, multitudes of different and often contradictory definitions as well as the corresponding issues of measurement, testing and formalisation. Klein et al. (2003: 41-2) dispute its adoption by organisations, such as United Nations International Strategy for Disaster Reduction (UNISDR), because of the implications it has in validating it as a useful concept. In their view this 'unrelenting devotion' to the term is unfounded because of remaining challenges to transform the concept into a measureable management and policy tool.

Sudmeier-Rieux (2014: 75-6) also interrogates the applicability of the term; she argues the 'verdict is still out on whether resilience really brings hope of a more comprehensive systems approach' questioning 'whether the concept brings danger of averting attention away from transformative measures needed to address disaster and climate risks, i.e. Band-Aid approaches rather than cures.' While advocating for a 'transformational resilience' (which addresses underlying risks and vulnerabilities) rather than a 'passive resilience' (recovery and reconstruction focussed), she reasons that researchers and practitioners should fill the research policy void by specifying examples of resilience at different scales and contexts on how to operationalise, which would in turn provide conceptual clarity. Cutter et al. (2008: 601) maintain that several works[3] have tried to explore the multidimensional nature of resilience and highlight its fundamental components.

This question of how to measure, monitor and evaluate resilience is also examined by Djalante & Thomalla (2011: 352). They recommend more research to improve the concept both practically and conceptually. Suggesting that resilience assessment methodologies, indicators, guidelines, procedures and tools for practitioners and decision makers need to be studied so science and practice can inform each other to enable knowledge integration. Additionally they call for a better understanding of the risks against which resilience is to be built and contend that a clearly defined and agreed upon definition would improve outcomes.

While both academics and practitioners have criticised the term resilience for being a vague concept, Manyena (2006) argues that it is more beneficial as 'a lens or entry point' to new ways of thinking about disaster risk reduction. Manyena (2006: 436) also comments on the problem of using words without a clear definition or categorisation but takes a more philosophical approach, arguing that new ways of expressing things can encourage or assist people to grasp ideas. So while Klein et al. (2003: 42) view resilience as an umbrella concept, which covers a range of system attributes that are deemed desirable but without an explicit operational definition, Manyena (2006: 436) disputes the confusion argument, claiming that it offers the 'beginning of a search for a new paradigm' to improve the outcome of disaster affected population.

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[3]   Cuter et al. name Berkes, Colding, & Folke 2003 and Plummer & Armitage 2007.

3.4. Vulnerability – the flip side of resilience or the other end of the same spectrum?

It is insufficient to discuss the term resilience without talking about vulnerability. Both terms are common in disaster dialogue and the relationship between them is often debated. The term vulnerability, while originally used by mechanical and systems engineers in relation to different forms of construction, entered the disaster discourse in the 1970s (Manyena, 2006: 439-40). The United Nations Office for Disaster Risk Reduction defines vulnerability as 'the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard' (UNISDR 2009a: 30). The most cited conceptual vulnerability model is Ben Wisner et al.'s 'pressure and release model' (Wisner et al. 2004). They provide the following working definition:

> [T]he characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard (an extreme natural event or process). It involves a combination of factors that determine the degree to which someone's life, livelihood, property and other assets are put at risk by a discrete and identifiable event (or series or 'cascade' of such events) in nature and in society. (Wisner et al. 2004: 11)

Cutter et al. (2008: 601) observe that the pressure and release model follows the development of 'vulnerability from root causes to dynamic pressures to unsafe conditions'. They note it 'fails to adequately address the coupled human–environment system associated with the proximity to a hazard.' On the other hand Manyena (2006: 439-40) asserts that it takes the 'naturalness out of natural disasters'. The use of vulnerability in this sense acknowledges that disasters are more a consequence of socioeconomic vulnerability than natural factors.

Wisner et al. (2004) argue that people who are affected by disaster are disproportionately drawn from sections of society already marginalised in daily life. This marginalisation is geographical (they live in hazardous places); social (minority groups, like ethnic minorities or disabled individuals); economical (the poor, homeless and jobless) and political (the voices of women, non-heterosexuals, children, and elderly are often disregarded) by those with political power. Gaillard (2010: 222) contends that while vulnerability changes in regard to time and space, it is determined by structural constraints that are social, cultural, economic and political.

For the purpose of this Working Paper however, the issue is the relationship between resilience and vulnerability. Is resilience the opposite of vulnerability? Or is resilience the positive 'flip side' side of vulnerability? Or is resilience a component of vulnerability or the other way round (Gaillard 2010: 220-21)? Klein et al. (2003: 40) reason that understanding resilience as the flip side of vulnerability does not add innovation or substance to the discussion, rather it appears to be driven by an aspirational positivity: enhancing resilience as opposed to reducing vulnerability. The problem, according to Klein et al. (2003: 40) and Manyena (2006: 440), of this rather simplistic interpretation, is that it lends itself to circular reasoning: a system is vulnerable because it is not resilient; it is not resilient because it is vulnerable. However, as Cutter et al. (2008: 602) point out, there are social characteristics that influence both vulnerability and resilience, for example socioeconomic status, education, and insurance.

Sudmeier-Rieux (2014: 67) also discusses the attractiveness of resilience, indicating the more positive focus on local capacities rather than the negative connotation attributed to the vernacular 'vulnerable'. She raises the issue of achieving vulnerability reduction, describing problems with entrenched root causes and the challenges of efficient targeting of programs. In addition, she observes that many communities deemed vulnerable and isolated already are responding to hazards and it is more advantageous to provide tools to overcome adversity.

This Working Paper, whilst acknowledging the conceptualisation differentiation in the literature takes its definitional lead from CDRC. Twigg (2007: 6) reasons that both terms are 'complex and multifaceted'. He argues that placing emphasis on resilience corresponds to a greater focus on what communities can do for themselves as well as how to 'strengthen their capacities, rather than concentrating on their vulnerability to disaster or their needs in an emergency'. Twigg also acknowledges the debate around terms but chooses instead to favour asking 'what individuals, communities and systems are vulnerable or resilient to, and to what extent' (2007: 6).

On the other hand Twigg (2007: 6) acknowledges that no community can ever be completely safe from natural and/or man-made hazards; he contends that a disaster-resistant community, 'the safest possible community that we have the knowledge to design and build in a natural hazard context', should still be strived for. In line with this, the following section will explore the literature on 'community'.

3.5.   Community - acts of people, not acts of God

Paton & Johnston (2001: 273) maintain that communities are capable of using their own resources and competencies to manage the challenges and demands faced when responding to adversity. To use a definition by Cutter et al. (2008: 599) community is understood as 'the totality of social system interactions within a defined geographic space such as a neighborhood, census tract, city, or county'.

A good discussion of the discourse around community resilience can be found in Djalante & Thomalla's (2011) article that examines resilience in the context of natural hazards and climate change. They illustrate how the resilience within communities to disaster is not just about bouncing back, but also mitigation practices and processes for recovering from disasters. Like Twigg, Geis (2000: 152) proposes that a disaster-resilient community is 'the safest possible community that we have the knowledge to design and build in a natural hazard context.' Yet it is important to acknowledge that one community, within a geographically defined space, may include diverse communities or sub-populations, with varying levels of vulnerability and resilience that may result in disparities in recovery (Cutter et al. 2008: 599). Furthermore, increasing empirical evidence for positive outcomes in the resilience discourse should not be a sign to dismiss the loss and disruption from disaster felt in affected communities. There needs to be a balance between intervening to facilitate resilience and allowing for the recognition of loss (Paton & Johnston 2001: 273).

In a Papua New Guinea (PNG) based research project, Mercer et al. (2010) examine how indigenous and scientific knowledge bases may be integrated to reduce vulnerability to environmental hazard. They employ Wisner et al.'s (2004) notion that the communities

directly affected by hazards should decide and develop the policies that deal with them. Mercer et al.'s research demonstrates that supporting communities is essential for effective and applicable disaster risk reduction and preparedness strategies (2010: 421).

Twigg (2007: 6) also reasons that clearly identifying a 'community', notwithstanding a hazards perspective, requires an understanding of not just the spatial dimension, but also the socioeconomic differentiations, linkages and dynamics within the area at risk. He contends that minimising vulnerability by maximising the application of DRR measures will contribute to achieving resilience.

Despite research efforts like the PNG study, and Twigg's guidance note, examining different dimensions of community resilience remains problematic. A standard metric that could be used in the evaluation of community resilience to disaster continues to cause challenges. Yet Cutter et al. argue the discourse illustrates the 'interactive nature of natural and human systems, the built environment, and the role of human agency in producing hazards and disasters' (2008: 599).

As communities do not exist in isolation, as Twigg explains 'the level of a community's resilience is also influenced by capacities outside the community' (Twigg 2007: 7). The next section will explore global influences.

3.6.   Global agreements for addressing DRR

The discussion above highlights the diverging ways concepts are used by academics, policy makers and practitioners. It also illustrates that concepts are used for different purposes often without robust conceptual or theoretical frameworks. Events like the 2004 Indian Ocean earthquake and tsunami, although an unprecedented historical event, revealed how vulnerable nations and communities are to natural hazards. At the same time, this event forced the issue of developing more integrated approaches to reduce vulnerability and build resilience and in many ways offered a window of opportunity for DRR both internationally and nationally (Djalante et al. 2012: 780). This culminated in the adoption of the Hyogo Framework for Action (HFA) 2005–2015: 'Building the Resilience of Nations and Communities' at the United Nations World Conference on Disaster Reduction in 2005 in Kobe, Japan.

The HFA is a ten-year strategy, which by 2015 aims to reduce disaster losses in lives, and in the social, economic, and environmental assets of communities. It strives to integrate DRR at all levels by prioritising it and recognising capacity development as central to risk reduction.[4] The five priority actions identified by the HFA are to:

1. Ensure DRR is a national and a local priority.
2. Identify, assess and monitor disaster risk and enhance early warning.
3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels.
4. Reduce underlying risk factors.

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[4]   This thesis examines the national context and government engagement further in the research findings chapter but with respect to HFA, Indonesia is currently ranked at the lower mid-point of the progress spectrum, with a score of 2.8, (3.0 is the world average) (UNISDR 2011 cited in Djalante et al. 2012: 784). An in-depth analysis of Indonesia's progress and challenges in implementing the five HFA Priority Actions for building safer and more resilient communities can be found in Djalante et al. (2012).

5. Strengthen disaster preparedness for effective response at all levels (International Strategy for Disaster Reduction 2005).

Additionally four priority-crosscutting areas for reducing disaster risk have been identified: gender; capacity development; communities and volunteers, and climate change adaptation (International Strategy for Disaster Reduction 2005).

Despite the fact that gender has been identified as one of four 'priority-crosscutting areas for reducing disaster risk' it is surprisingly absent from CDRC. It is mentioned three times in the document, once in an outline of HFA, the second time in reference to 'different factors' within communities (Twigg 2007: 6) and as a 'Characteristics of an Enabling Environment' – one of the crosscutting issues to be included in contingency plans – under Thematic Area 5: Disaster Preparedness and Response (Twigg 2007: 34). This suggests that gender has been given lip service (i.e. acknowledged but not put into practice) but is not integrated into the model.

3.7. Gender - the latent element?

Unlike the other key concepts used in this Working Paper, at the time of writing there was no gender definition on the United Nations Office for Disaster Risk Reduction terminology page. Considering there have been numerous calls for gender mainstreaming since the 1990s this omission from the UN terminology page on DRR was unexpected. Gender mainstreaming has been a key UN policy since the late 1990s and is defined as:

> [T]he process of assessing the implications for women and men of any planned action, including legislation, policies or programmes, in any area and at all levels. It is a strategy for making the concerns and experiences of women as well as of men an integral part of the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and societal spheres, so that women and men benefit equally, and inequality is not perpetuated. The ultimate goal of mainstreaming is to achieve gender equality (UNGA 1997).

In line with the movement over the past three decades to recognise vulnerabilities and acknowledge the capacity people have in resisting and overcoming socially constructed disaster impacts (Fordham 2000: 4), a number of organisations and academics have developed a range of gender definitions contextualised within disaster discourse. Gender, according to the United Nations Department of Economic and Social Affairs (UNDESA), 'refers to the social attributes and opportunities associated with being male and female and the relationships [between and among them]. (...) Gender determines what is expected, allowed and valued in a woman or a man in a given context' (UNDESA, n.d. cited in Eklund & Tellier 2012: 593).

For the purpose of this research gender relations are seen as social rather than natural, and it is understood that they are not the same in every society. According to Hoare et al. (2012: 207)

> economic, social and political conditions, and social norms about male and female identity and roles, vary in every culture. So, too, do the responses of individuals to their surroundings and to norms of behaviour. Gender norms and dominant local patterns differ in every area where relief operations take place.

3.8. Gendered disasters?

After the 2004 Asian tsunami it was found that girls and women in parts of India as well as many villages in Aceh, Indonesia, accounted for over 70 per cent of the dead (Oxfam International 2005). Additionally, a study of 141 countries over a 21-year period (1981 to 2002) by Neumayer & Plümper (2007) found that more women than men are killed during disasters. Yet, they concluded that biological and physiological differences between the sexes do not explain why disaster mortality rates are higher for females than for males. The study demonstrated that it is socially constructed gender-specific vulnerabilities, which appear in everyday life, that lead to the relatively higher disaster mortality rates for females as compared to their male counterparts.

Nature does not entirely determine the impact of natural disasters on humans; rather it is dependent on economic, cultural and political conditions and social norms. In principle, gender relations in disasters reflect gender relations in society. Because of differing life experiences, women and men, boys and girls vary in how they experience, respond to, and recover from disasters. When disaster strikes the abilities and techniques of responding of women and men differ, and, in the end, the impacts are varied (UNISDR 2009b: 4). Therefore it can be argued that natural disasters are not gender neutral and it is important to recognise the different needs, capacities, and contributions of women, girls, boys and men.

Enarson & Meyreles (2004: 49) comment on the paradoxical fact that although the 'disproportionate impacts on women and girls' in disasters are documented, the dominant theoretical perspectives and research strategies have been male-led. Almost ten years later a UNISDR – Regional Office for Asia and Pacific (UNISDR AP) background paper on the issues of vulnerability with specific reference to gender in the Asia Pacific region found that although there is evidence indicating that women play an active role in disaster recovery and reconstruction there is no clear understanding of the mechanisms in place for their implementation (2013: 3-4). This highlights the long-standing discourse regarding gender. It also demonstrates the importance of integrating gender considerations, which involves collecting sex- and age-disaggregated data, allowing for more accurate situation assessments that enable the needs and priorities of the population to be met in a more targeted manner (Eklund & Tellier 2012).

3.9. Seriously, not 'just' women

This research did not actively seek to include members of the lesbian, gay, bisexual, and transgender (LGBT) community. While the LGBT community are visible, if not recognised in Yogyakarta, for reasons of scope and resources, as well as the cultural taboo around the issue, the topic was not broached in the interviews. However, in a thesis looking at gender, it is important to acknowledge that people who identify as LGBT may not have access to family and community support. Additionally they may be at risk of violence and harassment. Fear of stigmatisation or difficulties in accessing support from relief workers may make it difficult for members of such groups to identify themselves, and relief efforts can end up further entrenching their marginalisation. A report released this year addressing this topic showed the importance of acknowledging the needs and capacities of LGBT communities in DRR policies and practice (Knight 14

August 2014). This was well demonstrated in an article by Balgos, Gaillard & Sanz, named 'Warias of Indonesia in disaster risk reduction: the case of the 2010 Mt Merapi eruption in Indonesia' (2012). They provide an interesting case study of how the *warias* (members of the LGBT community in Indonesia) contributed to DRR despite the marginalisation and discrimination they face because of prevailing religious and societal attitudes.

In their article examining English and Spanish literature on gender relations in disaster contexts Enarson & Meyreles (2004: 50) consistently found gender scholars focussed more on women than on men. Yet men's experience of disaster is also impacted by social norms about male identity and roles. For example, men too are harmed by gender-based social expectations in 'trying to live up to their reputation as stereotypical 'breadwinners' in the context of declining traditional livelihoods, they may engage in risky livelihood activities' (UNISDR AP 2013: 9). Gender-based social conditioning often excludes men from developing skills in domestic chores and care giving. The failure of gender-blind disaster recovery interventions to acknowledge this gap in men's knowledge has negatively affected their coping capacities and has, in some instances, resulted in their victimisation in the recovery process (UNISDR 2009b: 4). Additionally, post-traumatic stress and marginalisation of men with special needs may be a result of stereotyping men (UNISDR AP: 9).

As Clifton & Gell argue, not understanding or misrepresenting the reality of women and men's experiences 'negatively affects the culture and practice of emergency management' (2001: 8). This reinforces the need to conceptualise gender so that women and men benefit equally, and inequality is not perpetuated.

3.10. Limitations

While gender analysis alone is not enough to reveal and understand power relations and inequalities, this research adopts the position that it is one crucial lens through which one can ensure that humanitarian responses become more equitable and efficient. Age, ethnicity, race, religious belief, and socioeconomic status are important factors that determine vulnerabilities and capacities and need to be included in informing emergency responses (Enarson 1998, Eklund & Tellier 2012 and Clifton & Gell 2001).

A review of gender in humanitarian literature by Clifton & Gell (2001: 8) reveals that there is a lack of comprehensive gender analysis. Often the information is anecdotal rather than analytical, and it is difficult to identify specific impact in terms of gender relations in programs. Some people working in humanitarian response parallel this attitude. There is a trend for gender to be seen as something to be dealt with 'later' or 'by someone else'. Hoare et al. (2012: 214) argue that this comes from 'an assumption that basic humanitarian needs are the same for everyone, and that adopting an approach which is blind to gender and other aspects of difference (including age, disability, and class) is the most effective way of meeting those needs.'

Additionally the field has resisted the implementation of gender because of the 'tyranny of the urgent' (Fordham 2000: 1). However, as major disasters can undermine or fragment existing gender identities, the importance of being aware of social changes and their impacts on programing is key (Cupples 2007: 157).

The subordinate position of women, due to the fact they are less likely to control resources or be able to make independent decisions in a crisis, adds to their vulnerability during and after disasters. Humanitarian academics and practitioners have mistakenly interpreted this as an invitation to homogenise all women. There has been criticism of gendered analysis that ethnocentrically treats all women as victims of their culture and only connects their needs to reproduction (Cupples 2007: 157). Additionally there have been problems around the incorrect use of the term 'gender', as synonymous with 'women' (Hoare et al. 2012: 207).

3.11. Global agreements for addressing gendered disasters

While implementation of gender in policies, guidelines and academic work has proved difficult and remains incomplete, there are positive examples of the way the humanitarian system considers gender equality issues in its responses. The development of the Hyogo Framework for Action (2005) endorsed by the UN General Assembly following the 2005 World Conference on Disaster Reduction incorporates gender and social vulnerability concerns into proposed actions. It includes an agreement that 'a gender perspective should be integrated into all disaster risk management policies, plans and decision-making processes, including those related to risk assessment, early warning, information management, and education and training' (UNISDR, 2007: 4). As national governments are responsible for taking forward the commitments at country level, it means the gender component is often overlooked.

3.12. Summary of key concepts in this research

While the literature suggests that gender relationships between men and women change in disasters, generally by reinforcing gender norms and inequalities, this Working Paper cannot demonstrate a 'change' in gender relations in Kemiri due to the researcher's lack of prior knowledge about the day-to-day gender relations in society. However, this Working Paper can examine how men and women separately and men and women together live with the threat of volcanic eruption from Merapi. Investigating resilience in the community of Kemiri means exploring the vulnerabilities and capacities of different groups in society, in this case the men and women interviewed.

Similarly, as discussed above the research acknowledges the debate around the concept of vulnerability, resilience and community. However, in applying the terms the researcher will be led by the terminology set out in CDRC but also by how the participants in the study employ the concepts.

4. Research Framework

Twigg's (2007) Characteristics of a Disaster-Resilient Community (CDRC): A Guidance Note identifies many different components of resilience and makes some suggestions about how to progress towards resilience. The following chapter explores the limitations and criticism of CDRC, operationalises the Working Paper's adopted research framework, and elaborates on the questionnaire used in the study. The second section then contextualises the qualitative research, specifying the research location, cross-

language interpretation methods and the interview process. An assessment of the validity of the interviews and an analysis, including a discussion of the MaxQDA codes, of the collected data is then provided.

CDRC is not a manual but a resource to help support discussions between communities and the organisations working with them (Twigg 2007: 4). While Twigg states that the characteristics can be used at various stages of the project cycle and for different purposes (bearing in mind that the CDCR was developed with organisational use at its core), for the purpose of this Working Paper the CDRC was used as a baseline to study the level of resilience in the community of Kemiri.

4.1. Limitations and criticism

There are two principal reasons why the researcher chose CDRC as the framework. First, the CDRC is based on an internationally agreed framework for DRR to increase the resilience of nations and communities, the HFA, which has been well received and, for the most part, adopted (Twigg 2007: 4). Second, Djalante & Thomalla (2011) examined several frameworks for building resilience to disasters developed by various development and humanitarian organisations, and demonstrated that the CDRC is one of the most comprehensive frameworks for looking at resilience.

However, while CDRC might be comprehensive it does not provide an overarching quantitative framework. The focus is on individual project teams to decide what kinds of quantitative indicators are appropriate and base them on the characteristics set out in the tables; for example the number of volunteers trained in first aid etc. (Twigg 2007: 11). This was not such a dilemma for this Working Paper; while the data collected may not have been numerically measurable it still allowed for nuanced investigation.

There was at times however a degree of ambiguity about applying the characteristics and components set out in the thematic table. CDRC also raises this issue using the example of 'shared vision of a prepared and resilient community' which prompts the question of 'who is the shared vision supposed to include?' While CDRC reasons that each of the 'characteristics are intended to be applicable to communities and their members (remembering that communities are not homogeneous) but some could also apply to groups and organisations working among the community, such as local NGOs and perhaps even local government agencies or extension workers' (Twigg 2007: 10). While this Working Paper has gone into some depth about the concept of community, the main limitation faced by the researcher was ensuring the questions were appropriate to the context of Kemiri.

CDRC is one of the recent initiatives to improve the monitoring and evaluation of DRR that uses the HFA as a guiding framework; however, different initiatives inevitably depict a multiplicity of understandings. Some see this diversity as a problem, which has led for calls to harmonise framework indicators and evaluations. And while this seems like a sensible idea the reality is that DRR programs are context-specific, so any standardised assessment will need to be customised to fit the actual context to which it would be applied. Likewise, there is a real need to trial methods that create indicators and enabling environments that reflect local conditions yet reduce the burden associated

with reliance on data and information, and then debate the results. This must happen before general conclusions can be made with any confidence (Twigg 2007: 14).

Despite these limitations and criticisms CDRC reflects organisations' knowledge and experiences. Djalante & Thomalla (2011: 352) comment on the positive outcomes, such as the 'ability to promote learning and participation, as well as provide comprehensive overviews of resilience.'

Therefore the combination of CDRC being based on an internationally agreed framework for DRR and its comprehensive nature make it a suitable framework to analyse community resilience.

4.2. Operationalisation – applying CDRC

It is the intention of this Working Paper to analyse community resilience at the Kemiri village level by applying the CDRC (Twigg 2007), which in turn will answer the research question: how do gender relations impact the resilience towards the Mount Merapi volcano in Kemiri village? Furthermore, by exploring the vulnerabilities and capacities of different groups in society, namely the male and female study participants, it is anticipated comparisons will emerge from the answers that will shed light on community attitudes and differences in experiences.

The researcher chose to use all thematic areas, creating a survey based on each of the five themes of the 'Characteristics of a Resilient Community', as detailed in the tables Section C (Twigg 2007: 17-32).[5] This was done in consultation with the thesis supervisor and Universitas Gadjah Mada (UGM) academics. The following paragraphs will provide a detailed discussion of the semi-structured questionnaire used in the interviewing process; the actual list of questions can be found in Appendix A.

The first open-ended question, 'Can you tell me about your experience with Merapi? How does it affect you?' was designed to allow the interviewee to discuss what he or she wished. Additionally, it was anticipated that it would act to set the context of the interviewee and as an icebreaker, creating rapport between the researcher and the interviewee. After establishing the context of the participant, as well as the research, the interview followed the thematic areas outlined in the CDRC.

According to CDRC, the first of the thematic areas, 'Governance', is a crosscutting theme and should be an underlying concept in all the other thematic areas. This is due to the effect institutional systems (like planning and regulation), as well as partnerships and accountability, can have on DRR, development or relief initiatives. Hence, when envisaging resilience, it is relevant to ensure governance is contemplated (Twigg 2007: 8).

CDRC names seven components of resilience under thematic area 1: DRR policy, planning, priorities, and political commitment; legal and regulatory systems; integration with development policies and planning; integration with emergency response and

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[5]   The 'Characteristics of an Enabling Community Environment' column was then be used to make an assessment of the participant's answers in respect to the level of resilience in the village (Twigg 2007: 17).

recovery; institutional mechanisms, capacities and structures; allocation of responsibilities; partnerships, and accountability and community participation (Twigg 2007: 17). In line with this, the researcher asked about community engagement with authorities. Additionally the inclusion and/or representation of different groups in Kemiri was investigated by asking if the participants could name individuals who engaged with local authorities and how supported they felt by the process. To develop an understanding of the level of accountability and community participation the interviewees were also asked how information was communicated.

In line with the literature on risk and resilience CDRC identifies three components of resilience under thematic area 2 – Risk Assessment: hazards/risk data and assessment; vulnerability and impact data and assessment, and scientific and technical capacities and innovation (Twigg 2007: 21). Resource and time limitations mandated that the researcher only focussed on the first component, 'hazards/risk data and assessment'. Three questions were developed around the participatory process, how information from assessments was shared, discussed and understood, and how on-going monitoring and updating of volcanic risk was undertaken at the community level.

As discussed in the previous chapter, building resilience to disaster through interventions that emphasise building local knowledge and supplementing existing capacity are more likely to be successful (Manyena 2006: 446). This is reflected in thematic area 3 – Knowledge and Education of CDRC. Under this section there are five components of a disaster-resilient community: public awareness, knowledge and skills; information management and sharing; education and training; cultures, attitudes, motivation and learning and research (Twigg 2007, 24). To gain insight into the knowledge and education capacity in Kemiri the researcher chose to focus on three main characteristics: participation in awareness campaigns or training, previous experience used in capacity building, and the level of relevant local skills sets (volunteerism).

The concept of using people's experience of coping in previous events as an education and training tool for future crisis aligns within the literature on community resilience. As outlined in Chapter 2, communities are capable of using their own resources and competencies to manage the challenges and demands faced when responding to adversity (Paton & Johnston 2001: 273). In addition to adhering to the CDRC, the question also was a way the researcher could acknowledge and respect people's experiences and knowledge.

By asking a follow-up question about which community members had received volunteer training the participants were able to provide an insight into the relevant local skills sets available in the event of a volcanic eruption in Kemiri. This is based on the idea that engaging, empowering and involving community volunteers to be more proactive in all phases of DRR can have a major impact in the event of a disaster (Twigg 2007). Komino (2014: 326) argues that both formal and informal volunteers are crucial actors to maximise the overall resilience of communities in times of disaster. He contends that community groups and volunteer organisations can be a major support, providing critical resources and knowledge to help in times of disaster. For the purpose of this section 'volunteer is defined as a person who freely offers to take part in an

enterprise or undertake a task, regardless of whether or not they are compensated' (Komino 2014: 326).

Thematic area 4 identifies seven components of resilience: environmental and natural resource management; health and well being; sustainable livelihoods; social protection; financial instruments; physical protection; structural and technical measures, and planning regimes (Twigg 2007: 27). The researcher chose to focus on sustainability of livelihoods as the component of resilience for this interview question, concentrating on the characteristics, as outlined by CDRC, around local economic activity and employment, as well as livelihood diversification (Twigg 2007: 29).

The participants' answers provided an insight into Javanese culture. While noting the importance of culture in understanding livelihoods, there may have been cross-cultural communication issues in asking the question: 'What sort of work do you do?'. Retrospectively it may have been more appropriate to ask 'how do you spend your day?' and 'what is your source of income?'. These questions might have made it easier to understand the economic activity and employment structure in Kemiri and therefore draw conclusions about the impact of disaster on the villagers. Mitigating the researcher's lack of knowledge about workforce in Kemiri, the follow-on question 'if Merapi erupted and you were unable to undertake your current job, what would you do to support your family?' was designed to explore how flexible peoples' livelihoods were.

To establish the level of livelihood sustainability in Kemiri participants were also asked to comment on their hypothetical actions if a future eruption rendered Kemiri uninhabitable and prompted a government-imposed relocation.

The last thematic area, Disaster Preparedness and Response, has six components of resilience: Organisational capacities and co-ordination, Early warning systems, Preparedness and contingency planning, Emergency resources and infrastructure, Emergency response and recovery, and Participation, voluntarism, accountability (Twigg 2007: 36). The researcher chose to emphasise the second and sixth characteristics of a disaster-resilient community. Participants were questioned about the early warning system (EWS) in Kemiri to establish whether the local system was community-based and people-centred. A question was then posed to examine what mechanisms existed for disaster-affected people to express their opinions about previous experiences with or future concerns about Merapi.

In addition, the survey was designed with the intention that answers would allow for comparisons to be drawn. This was devised as a way to gain an insight into how gender relations intersect with resilience towards the active volcano of Mount Merapi.

4.3.   Methodology

The following section looks at the methodological approach taken in this research. It examines the interviewing approach, explores who was studied and why, as well as explaining how respondents were recruited. It explores the challenges and limitations, as well as the benefits in undertaking the research and discusses the approach used in data analysis.

Qualitative research emphasises understanding of the social world through an examination of the interpretation of that world by its participants (Bryman 2012: 380). In line with Bryman's concept of qualitative research the researcher deemed that conducting interviews would enable insight into the situation in Kemiri. While interviewing for research has its limitations and weaknesses, in this research it allowed the respondents to describe what was important for them. However, at times this felt intrusive and like all research that uses interviews, it was susceptible to interview bias (CDC 2009a: 2).

Kapborg & Berterö (2002: 55) observe that lack of familiarity with the language and culture can affect the validity of a study; this is in part due to the reduction of interpretation accuracy. One issue in this study was the language barrier. Additionally the researcher, despite gaining theoretical knowledge through study, was not grounded in Indonesian or Javanese culture, and may have misinterpreted some answers or made hasty conclusions.

4.4. Research on the flanks of Merapi

The researcher stayed with a group of students completing their *Kuliah Kerja Nyata* (KKN)(Student Community Service) (ACICIS 2014). The KKN students in Kemiri (sub-village), 8km from Merapi, were living in the house of the head of the village. The village of Kemiri was chosen by the researcher as the location for the interviews because of its proximity to the volcano, the lived experience of eruptions and because there was a pre-existing relationship with UGM.

This relationship was made accessible via an established relationship between the Network of Humanitarian Action (NOHA), the researcher's institution, and the Programme on Humanitarian Actions (PoHA), a specific study centre on humanitarian research, initiated through the Institute of International Studies (IIS) at UGM (PoHA n.d.).

Once in the sub-village of Kemiri, the procedure for selecting interviewees was closely linked to access. After interviewing both the head of the village and his wife, the village head provided a list of possible informants. This is a form of snowball sampling and is considered a type of purposive sampling by Natasha Mack et al. (2005: 5). In this method, participants with whom contact has already been made, in this case the head of the village, use their social networks to refer the researcher to other people. Despite communicating that participation in the interview was voluntary, it is difficult to ascertain the true extent of this 'voluntariness'. Interestingly, one man declined to be interviewed because he was worried he would not know the 'right' answers. One way of strengthening the external validity would be to increase the sample size, however, resource and time constraints prevented a larger sample.

4.5. Cross-language interpretation methods

Whilst asking questions may seem relatively easy, producing fruitful and rich answers is a much more difficult task. Despite carefully worded questions and vigilant attempts to report, interpret and code the answers, the spoken or written word continues to have a

residue of ambiguity (Kapborg & Berterö 2002: 56). This is further complicated when the researcher and the participants do not share the same language.

A number of authors have explored translation issues in cross-cultural qualitative research (Boyle & Jones 2011, Kapborg & Berterö 2002, Temple & Young 2004, Williamson et al. 2011, and Wong & Poon 2010). Among other things they have questioned the methodological implications of identifying the act of translation; whether it matters epistemologically who does the interpretations or translations; and the repercussions on the final product outcome depending on how far the researcher chooses to involve the interpreter in the research process. It is important to understand the impact of using an interpreter in interviews, primarily because of the researcher's lack of knowledge of local language.

The approach to cross-language interviews was based on the model outlined by Williamson et al. (2011), termed 'Interpreter-Facilitated Interviews'. The intention of Williamson's et al. (2011) approach is not to generate a verbatim translation; rather, the focus is on conveying the key ideas and the intended meaning. This approach, when compared to other translation-based options, is faster and more economical.

The terms 'translator' and 'interpreter' seem to be used interchangeably in the literature; however, they are characterised by different skills. Wong & Poon (2010: 152) define the term translator as 'an individual who transforms the research data (e.g., audiotaped interviews or documents) from one language into another.' Boyle & Jones (2011: 110) define an interpreter as someone who 'changes spoken languages into another language, orally'. In this research the term interpreter is used for the individual who helped conduct the interviews and translator will be used when referring to the individual who translated the recorded interviews. While both of these individuals were bilingual, it should be noted that neither were professionals.

All interviews for this Working Paper were conducted in English with an interpreter. The interpreter was Indonesian but had been taught English at school and had spent some time as a child in Australia. He was a KKN student in Kemiri and spoke the most fluent English. He had no prior experience conducting interviews, and as a result, the researcher discussed qualitative research methods, the purpose and background of the study, the conduct of interactive qualitative interviews, and ethical procedures, including informed consent and confidentiality. Wong & Poon (2010: 156) argue 'a lack of understanding of the epistemological framework of the research by any member of the research team, including the translator, will negatively affect the quality and outcome of the research'. In hindsight the researcher should have spent more time explaining the key terms and questions as well as the research procedures. This may have avoided some problems, discussed in more detail below, and increased the validity of the research.

In some interviews other students from the community service group contributed to the translations, which occurred mainly because the interviews were conducted in public settings. While ideally interviews would have been conducted in private spaces this was not practical for the context.

4.6. The interview process

None of the participants in this study had English as their native language. For each of the ten semi-structured interviews (see Appendix) the interpreter asked the interview questions in Indonesian, often probing for greater detail, and provided third person English summaries. It is worth noting that while the interviews were conducted in English and Indonesian, many of those interviewed spoke Javanese as their first language. Therefore the cultural and spiritual context was in Javanese. The advantage of interpreter-facilitated interviews is that the researcher is actively involved, with the interpreter as an intermediary between the research participant and the researcher. This was immensely valuable, since the researcher was able to clarify and follow-up unanticipated points. At the same time this process was time consuming and at times challenging. Additionally, it was impossible for the researcher to know at which point in the cross-language communication misunderstandings had occurred, or if it was simply that the question itself was unclear for the interviewee.

Whilst the researcher spent just under a week in the village of Kemiri, the ten interviews took place over a three-day period. They ranged from between 30 minutes and 75 minutes with four men, five women and a married couple who decided that they would both answer together. The participants were aged between 27 and 51 (Ave=39) and the majority had attended secondary school.

Following the fieldwork, the researcher transcribed the English sections of the interviews verbatim. In addition, the research field notes, which attempted to comment on the context of the visit, nonverbal behaviours of the participant and personal impressions of the interview, proved useful. Additionally, the researcher had the Indonesian segments of the recorded interviews translated by another bilingual translator.

4.7. Assessing the validity of the interviews

Kapborg & Berterö (2002: 55) argue that using the same interpreter in all interview situations has advantages and disadvantages. At the very least it must be acknowledged that using an interpreter is strenuous for all parties involved. In this regard, one of the difficulties was the interpreter's capacity to maintain a steady level of energy for cross-language communication. While using the same interpreter for all the interviews meant that the interpreter became familiar with the questions it also meant he started to anticipate responses and without consultation with the researcher decided whether the answers were sufficient or whether probes were needed.

On listening to the interviews again, the researcher wondered if respondents gave answers they believed would please the interpreter and/or the researcher (Kapborg & Berterö 2002: 55). This could also be because in summarising the responses the interpreter softened or censored responses, i.e. he left out information from participants because they did not fit with his sociocultural understanding or position (Williamson et al. 2011: 391).

In questioning the significance of who does the translations, Wong and Poon (2010: 156) discuss the dilemma of researchers who are conducting cross-cultural research and require translation assistance. While they see a positive movement to facilitate more

effective and equitable relationships between researchers and community partners they are frank about the negatives:

> In other cases, community volunteers with inadequate training are used as unpaid research assistants. The latter practice reinforces the myth that any bilingual individuals can perform research translation; it also perpetuates the concealment of power relations embedded in research, that is, when researchers of the dominant culture hold the sole authority and resources to research the 'Other' and produce knowledge about the 'Other' as the absolute truth (Wong & Poon 2010: 156).

While this Working Paper would be classified more as exploratory research and both interpreter and translator were remunerated at an agreed price, this argument by Wong & Poon acts as a warning about the researcher's privileged position in the field.

Wong & Poon (2010: 156) further observe that the exclusion of a word or a phrase in the translated texts or disparities in interpretation have the potential to impact the overall interpretation, meaning and construction, which alters the representation of the participants' reality. This was in some respect true of the initial interpreter's summaries, which provided a more simplified understanding of the interviewees' responses. For this reason the recorded interviews were translated again by a UGM student recommended by the PoHA office for his previous experience working on research projects.

Given that the expectation of the interpreter was to convey key opinions and not verbatim translations, the interpreter's English summaries of the interviewees' responses were not as rich as the second translations. Therefore the researcher decided not to use the first interpreted summaries as the sole source of data, but to undertake the coding on the second more detailed batch.

The author acknowledges that translation is not a neutral process in which the translators are mere 'technicians', they, like the researcher, are intricately bound to the socio-cultural position that might affect the text production beyond language equivalency (Temple & Young 2004: 168). With this in mind the analysis will look at themes rather than the multiple meanings of language used by research participants.

4.8. Analysis of the collected data

The nature of qualitative research makes it imperative to develop a systematic approach for analysis. The researcher adopted Ryan's & Bernard's (2003: 88) understanding that 'themes come both from the data (an inductive approach) and from the investigator's prior theoretical understanding of the phenomenon under study (an a priori approach).'

The analysis entailed four major steps. Before beginning any analysis, the researcher reviewed the data several times ensuring familiarity. In doing this, the researcher wrote 'first impression' notes (CDC 2009b). Because of the cross-cultural nature of the research, the researcher took Ryan & Bernard's (2003: 101) recommendation to use a cutting and sorting method, which was based around CDRC. This second step was done with the help of a computer software program, MAXQDA. Following the 'cutting and sorting' the researcher searched for repetitions, transitions, similarities and differences within the data. The last step of attaching meaning and significance to the interviews involved reviewing each theme that arose during the coding process and identifying similarities and differences in responses from participants with differing characteristics.

The relationships between themes were also considered to determine how they might be connected (CDC 2009b). Additionally the similarities and differences between male and female participants were examined.

Because of the language differences, coding techniques dependent on metaphors, linguistic connectors, and indigenous typologies, or techniques that required recognising subtle nuances such as missing data, were not appropriate (Ryan & Bernard 2003: 101). These factors influenced how codes were used in the coding processes, undertaken with the coding software program MAXQDA (see table 1).

Table 1: MAXQDA codes

Parent code	Code	Coded Segments
Context	Eruption Experience	22
Governance	Engagement with authorities	18
Governance	Who engages with authorities	7
Governance	Support from local authorities	18
Governance	Dissemination of information	12
Risk assessment	Identification of hazard or risk assessment	12
Risk assessment	Input into assessment	10
Risk assessment	Sharing of assessment findings	11
Knowledge and education	Participation in training	18
Knowledge and education	Reasons for participating or not participating in training	4
Knowledge and education	Discussion of previous experiences	11
Knowledge and education	Volunteerism	14
Knowledge and education	Community volunteers	18
Risk management and vulnerability reduction	Occupation	16
Risk management and vulnerability reduction	Impact of eruption on livelihoods	18
Risk management and vulnerability reduction	Relocation	13
Disaster preparedness and response	Early Warning Systems	23
Disaster preparedness and response	Mechanisms for expressing opinions	25
Repetition	Discussion of panic and/or trauma	13
Similarities and differences	Gender-based social expectation	10

Source: Own composition

Table 1 sets out the pattern of codes, identifying and sorting segments into similar categories. This allowed for thematically relevant categories to be guided by CDRC and for repetitions and similarities and differences to be identified. This processes facilitated the analysis of the interviews as depicted in Chapter 4.

For the purpose of the analysis section, the participants have been designated with pseudonyms as shown in table 2.

Table 2: List of Interviewees

Interview no.	Pseudonym	Sex	Date of interview
1	Interviewee 1	Male	18 August 2014
2	Interviewee 2	Female	18 August 2014
3	Interviewee 3	Female	18 August 2014
	Interviewee 4	Male	18 August 2014
4	Interviewee 5	Female	19 August 2014
5	Interviewee 6	Male	19 August 2014
6	Interviewee 7	Female	19 August 2014
7	Interviewee 8	Female	20 August 2014
8	Interviewee 9	Female	20 August 2014
9	Interviewee 10	Male	20 August 2014
10	Interviewee 11	Male	20 August 2014

Source: Own composition

Participants were given the title of their interview position (Interviewee 1 to Interviewee 11) to ensure their anonymity, however Interviewees 1 and 2 provided answers that were generally influenced by their positions (leader of the village and wife of leader of the village) within the community. It should be noted that Interviewee 3 and Interviewee 4 were interviewed together.

Additionally the reader should note that Interviewee quotes have been grammatically altered for ease of reading. However, some instances of speech, such as pauses or errors, have been kept to illustrate the subtleties of the response (Ryan & Bernard 2003: 101).

While qualitative data is useful for gaining insight into process and context, the findings are not necessarily generalisable outside the sampled participants' group. There is also a risk of reviewer interpretation introducing bias during the analysis stage. Furthermore, the findings are subjective and can be interpreted differently by different people (Mack et al. 2005). Despite this the researcher believes the findings from the interviews add depth to the understanding of resilience and gender in the village of Kemiri. The following chapter will present the findings of the field research.

5.   Research Findings

This chapter examines the interviews, presenting the findings of the field research by thematic area. The chapter is divided into eight analytical parts, which discuss the participants' answers in regard to the literature. The first section sets the context of the interviewee in regard to the hazard, while the following five sections are based on the

thematic areas outlined in the CDRC and a seventh section examines other themes that emerged from the interview process. The chapter concludes with a summary of the research findings.

5.1. Experiences with Merapi

As discussed in the background chapter, Merapi has a long history, however, the findings of this research emphasise the significance of the 2010 eruption. While three out of the 11 participants did not explicitly identify the 2010 eruption, it was obvious that it had an impact on each of the individuals. From September 2010 Merapi had shown dangerous levels of activity. This volcanic activity culminated in three major eruptions, recorded on October 25th 2010 (The Jakarta Post 25 October 2010). Two days after the initial eruption, Merapi released hot clouds of gas and ash into the air. However, the biggest eruption, on November 5th, shot out jets of boiling gas and rock, causing ash-covered residents to flee down the mountain (BBC 5 November 2010). The government downgraded the alert level on the 3rd of December 2010, more than a month after it began erupting (BBC 3 December 2010). It is not surprising that the majority of the respondents' spoke about feeling 'scared' or at least that the experience was 'disturbing' (Interview 6M, 19.08.2014: 3). The following section examines the differences and similarities in experiences.

The ferocity of the 2010 eruption and its impact on the village stood out as being different in comparison to previous eruptions: Interviewee 1 commented 'back then we only needed to take refuge near the 5km radius… 5-6km, but the last one we went to the 20km radius' (Interview 1M, 18.08.2014: 3). Interviewee 2 also spoke about the severity of the 2010 eruption: 'what's clear is that the Merapi eruption in 2010 was our first experience. So when we received information we weren't sure. As for worries, well, initially there's none but after the eruption I realised oh it's this big' (Interview 2F, 18.08.2014: 3). Her comments indicate an evolving experience with the volcanoand suggest the risk posed by Merapi in Kemiri prior to 2010 had been underestimated.

Four of the Interviewees spoke about previous eruptions, Interviewee 4 reflected that he had been young in 1994 but claimed that 2010 'was the scariest' (Interview 4M, 18.08.2014: 11). Interviewee 11 on the other hand noted the 2006 eruption, he provided an explanation of the effect on Turgo (4km away from Kemiri) but similarly reflected on the personal experience of 2010: 'I was part of the victims, even to the point (that) we took refuge' (Interview 11M, 20.08.2014: 5). This illustrates how knowing the information about risk is different to experiencing it first-hand.

In comparison Interviewee 9 said she had experienced three previous eruptions 'roughly, in 1994, 1998 and the one just now in 2010' and that she had been evacuated in the 1994 as well as 2010 (Interview 9F, 20.08.2014: 7). Yet, Interviewee 10, the oldest of the participants, had only evacuated with his family in 2010. He spoke about his experience with Merapi in 1969, 1970, 1994, 2006 and 2010 and commented that 'back then there was no evacuation'. His explanation for this was that in 2010 'there were so many observers and caring people and a lot of open information so, a lot of people were worried and everybody evacuated' (Interview 10M, 20.08.2014: 11). The responses from

Interviewee 9 and 10 illustrate the recurring nature of eruptions but also the divergent experiences of individuals.

In contrast to people who had experienced Merapi erupt before 2010, Interviewee 5 spoke of the trauma of experiencing a volcanic eruption for the first time. She attributed the personal distress caused by the experience to not being from Kemiri (she grew up in West Java) and the stress associated with caring for her family. She became visibly distressed whilst talking but assured the researcher and interpreter that she was ok: 'every time I tell the story I always cry' (Interview 5F, 19.08.2014: 3).

Interviewee 5 also described the anxiety caused by the evacuation process. She spoke about the things that 'made it hard in the evacuation centres', like feeding her children, 'because the food was packed rice' and her children 'don't like eating spicy food' which meant she 'had to buy rice three times per day' (Interview 5F, 19.08.2014: 8). This portrays an element of the financial concerns experienced by villages. Interviewee 5 also described 'the eruption that really finished the eastern side of the mountain.' She remembered that at 1am, everyone was tense and 'it was dark and the rain wasn't just ashes but it's also wet, it became mud, like warm mud. It isn't hot, it's just warm when it touches the ground' (Interview 5F, 19.08.2014: 8). Although she uses a shared narrative[6] about the process leading up to the final evacuation, she and her family chose not to evacuate to Maguwoharjo stadium with the majority of Kemiri residents. Her reasoning for this 'because if we did go to Maguwo, most likely the kids will be stressed out' (Interview 5F, 19.08.2014: 8).

This is in contrast to Interviewee 10 who stated that his 'family had decided to stay together in happiness and sorrow. If I wanted to live easy when the evacuation happened I could have stayed with my friends and family but I have integrity for my village' (Interview 10M, 20.08.2014: 17). While Interviewee 10 was able to find comfort staying with the village in the evacuation barracks, Interviewee 5 stayed the night with friends in Prambanan, which lies to the northeast of Yogyakarta, before going to stay with her family in East Java, and as she expressed it 'then we were safe' (Interview 5F, 19.08.2014: 8). Interviewee 5's decision not to go to the barracks with her family indicates that she advocated for the wellbeing of her children while Interviewee 10's response depicts his belief that strength comes from community togetherness.

Interviewee 11 also spoke about the confusion around the 2010 evacuation. According to him the people first gathered for three days at the Purwobinangun district office. He recalled, that he could not 'fully remember,' but when

> the condition was really really confusing, especially with the really really big eruption. It became chaotic in the evacuation camp, everyone dispersed and they ran away, like to anywhere. Even the volunteers, they ran for themselves to look for safety (Interview 11M, 20.08.2014: 5).

After taking evacuees to Maguwoharjo Stadium he stayed with a relative, however he 'frequently went to Maguwo' during the period people were unable to go back to the village (Interview 11M, 20.08.2014: 5). This underlines the confusion felt by the

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6   Whilst in the region, the researcher heard similar stories (representations of the situation and process) around the eruption, hence people reflect or conform to an overarching set of values about Merapi.

residents of Kemiri, especially those who hadn't experienced a volcanic eruption before. It also shows that Interviewee 11 stayed connected with the community even though he did not stay in the government-organised evacuation centre. Nonetheless, Interviewee 11's experience of the evacuation raises questions about the level of preparedness at the village level.

Interviewee 3 (who was born in Bantul, which is infamous in Indonesia for its earthquakes) also experienced Merapi for the first time in 2010. She commented, 'the disaster in Bantul was very different than the disaster in Merapi. Because in Bantul there was one earthquake and then it's done but in Merapi it continued until several months after' (Interview 3F, 18.08.2014: 23). Interviewee 3 explained that in Bantul people could 'still do activities such as rebuilding or collecting' belongings but with Merapi she 'didn't know when we can continue our daily activities and even the activities' (Interview 3F, 18.08.2014: 25).

Likewise Interviewee 8 also commented on the disruption of daily activities, like 'stopping of farming'. Additionally she spoke about the lack of disaster socialisation[7] and commented on how scared she was when she needed to pick her children up from school, located just below Turgo (4kms from Merapi) (Interview 8F, 20.08.2014: 4). Interviewee 7 also remarked that it 'was very scary, very tense, its just... the worst' and noted the economic and health impact (Interview 7F, 19.08.2014: 3). Interviewee 9 also spoke about the anxiety experienced in the village but attributed this in part to 'the health problems because of the ashes from the eruption – and the smell'. She also noted 'the main impact is that all the plants were destroyed. It took a long time to recover them' (Interview 9F, 20.08.2014: 3). The responses from these three women depict not only how terrifying the 2010 eruption was but how the experience affected their daily lives.

Similarly Interviewee 6 commented on the impact to 'society after or during the eruption' naming health and economic concerns. Additionally he acknowledged that while the BPBD (the local Disaster Management Agency) had installed warning devices, there 'are things not always detected by the devices because Merapi is sometimes unpredictable' (Interview 6M, 19.08.2014: 3). This shows that while warning systems are in place the reality of living on the flanks of an active volcano has risks that cannot be comprehensively deducted by technology.

This section has highlighted the varying nature of people's responses to the Merapi hazard. While some respondents gave personal extended answers to the first question, others were concerned with providing details about the 2010 eruption and response. Both female and male respondents spoke about the ferocity of the 2010 eruption, however, the women Interviewees were more likely to talk about the impact on their family or the village as a whole.

5.2. Thematic area 1 – Governance

Indonesian regional jurisdictions (provinces and local governments) are anchored in the Amended 1945 Constitution, however, the division of Indonesian territory dates back to

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[7] The word 'socialisation' was often used. In this context it means information dissemination with the intended outcome being imparting knowledge.

Dutch colonial era. The various types of government organisation throughout Indonesia have been shaped by the historic and dynamic relationship between the central government on Java (renowned throughout the archipelago for its established administrative structure and land area) and the other Islands that make up Indonesia[8] (MacAndrews 1986 cited in Fitrani et al. 2005: 59). Under the New Order regime (1966–98) provinces were known as level one (*Dati I*) and local governments as level two (*Dati II*), during the three decades the number of local governments remained practically the same. However, with the fall of authoritarian president Soeharto in May 1998 and the decentralisation process that followed in 2001, the political landscape changed (Fitrani et al. 2005: 58). In examining the governance structure in Kemiri and how it interacts with the overall structure in Indonesia it is important to acknowledge the changes taking place at the institutional level.

Proponents of decentralisation argue that the creation of new local governments (municipalities (*kota*) and districts (*kabupaten*)) is part of Indonesia's democratisation process, allowing politicians closer contact with their constituents. Conversely there are those who express concerns about diseconomies of scale and human resource capacity deficits (Fitrani et al. 2005: 58). A study looking at institutional governance in Indonesia Firman (2014: 219) argues the need to develop 'new forms of coordination, discussion and resolution of local and regional development policy issues at the macro and micro scales.' He argues that current local governments in Indonesia are not, and without help cannot, provide the forms of coordination required for good governance and service delivery. For the residents of Kemiri the coordination between local and regional disaster planning is imperative in the event of a future disaster. With this in mind, the following sections will examine what kinds of interaction happen with local authorities, as well as who participates in these interactions.

5.2.1. Engagement with local authorities

Of the 11 people interviewed, five participants were involved with local authorities, one person did not answer the question and the remaining participants (n=5) said they did not actively engage with local authorities regarding disaster risk reduction and Merapi.

Interviewee 1, who in his role as Kemiri village head had contact with BPBD, spoke about the two-way communication between the BPBD and the village apparatus. He described that when there is a development 'there's always information from there (BPBD), be it through mail or phone, if there's any development, for example it rains – every time after an eruption, there will definitely be rain' he reports it to the BPBD (Interview 1M, 18.08.2014: 9). Similarly Interviewee 4, who has been employed with the village office since 2006, spoke about coordination. He provided the following example: 'we know first even if it's only visually but they know it scientifically from afar. So what happens in the field and what they observe is synchronised and then they can conclude what to do' (Interview 4M, 18.08.2014: 33). These examples portray a hierarchal structure.

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[8]   The imposition of Javanese administrative patterns, often conflicting with traditional forms of local community organisation, has long been a source of discontent for non-Javanese Indonesians.

Interviewee 4 also said 'if not directly, there's always interaction' with local authorities. He attributed this to the volunteer organisations that are interrelated with BPBD. This type of interaction was the case for Interviewee 6, who had an active history of volunteering with Search and Rescue (SAR) and *LINMAS* (Community Protection organisation). He appeared to be very much aware of the interactions between local authorities and Merapi. In contrast, three of the other Interviewees who also volunteered, albeit in a lesser capacity during non-disaster times, said that they were 'not involved'. These three Interviewees were all women, which indicates a higher level of engagement between authorities and male villagers. However, Interviewee 2 commented on her increasing involvement after the 2010 eruption, including her and other women's involvement in drafting the village standard operation of procedures (SOP) (Interview 2F, 18.08.2014: 7).

Interviewee 10 thought that 'in terms of organisation' he didn't 'have direct contact' however due to his 13 years in the village government 'villagers also ask' for help. He reported that he was the 'voice of the evacuees' who had lobbied for the community during the 2010 evacuation.

> I said, that we hoped the future here will still exist, for children that go to school, the educational facilities need to be built, clean water facilities will have to be repaired and then we also asked for the area that's covered by the ash, the volcanic ash, they have to be mixed with organic compost so it will be fertile again. And it happens that all of that demand can be realised (Interview 10M, 20.08.2014: 10).

Interviewee 10 believed this role was asked of him and, appropriately so, due to his previous experiences with Merapi. According to the CDRC, participation in policy development and implementation (Twigg 2007: 21) is a characteristic of an enabling environment for resilience. Therefore Interviewee 10's lobbying of authorities not only shows his capacity to advocate for village needs but also illustrates active participation with governance structures.

If participants answered that they did not engage themselves with local authorities they where asked a follow-up question to determine if they could identify which community member engaged with local authorities regarding DRR. While all participants to varying degrees identified the village head: 'we are all represented by the village head' (Interview 5F, 19.08.2014: 19), other groups that were mentioned were *LINMAS*, the village office and non-governmental organisations (NGO). However the description of NGOs was often muddled: 'there are NGOs, some kind of NGO, but then after Merapi we lost contact. We never call them anymore' (Interview 5F, 19.08.2014: 23), which makes accurately analysing NGO involvement difficult. Nonetheless, these responses indicate a fluid concept of a local authority and shows that the nature of participation in Kemiri is flexible. This irregularity became more distinct when participants were asked about the level of support or how they received official information.

When asked if they felt supported by the local authorities[9], three participants simply said 'yes' without providing any further reasoning. Interviewees 7 and 9 spoke about advice provided from government bodies.

> The government, they often give advice and if there's anything then they'd inform us from the village head, who would passed it to *Rukun-Warga (RW)* (sub-village leader) then the *Rukun-Tetangga (RT)* (neighbourhood leader), then to the society (Interview 9F, 20.08.2014: 19).

Interviewee 9's response reveals the 'telephone tree' system of communication. Interviewee 7 similarly spoke about the information given, 'if there's any change in status of Merapi and if the condition of Merapi becomes more alarming, we would definitely be informed.' Interviewee 11 also mentioned that the government provides, however he specified 'support and aid, what we really need.' These reactions demonstrate that there are institutional mechanisms and structures that distribute information as well as allocate government funding and resources as outlined in CDRC (Twigg 2007: 19).

While Interviewee 6 had a more pragmatic stance regarding assistance from authorities, contending, 'there will always be flaws because BPBD takes care of the whole district' (Interview 6M, 19.08.2014: 46) Interviewees 1, 2 and 10 all provided constructive replies. Interviewee 10 commented that in 'providing safe places, and survival logistics that was from none other but the government' additionally he recognised the role played by NGOs. 'After we came back from the camps (the government) didn't give us food supplies for the next two to three days but the NGOs that live outside of Maguwo, when we went home they gave us rice and things for us to survive on for the next several days' (Interview 10M, 20.08.2014: 19). In contrast Interviewee 1 observed that the support thus far is 'already good, everything from the facilities' although he noted that 'the thing that's in the concern of BPBD is how to save the farm animals' (Interview 1M, 18.08.2014: 18). Interviewee 1's response emphasises the need for governments to think about the livelihood of civilians in disaster prone areas.

While Interviewee 1 believes 'it's more complex to think about farm animals than it is to think about humans,' his wife commented on the need to improve the 'way they (BPBD) handle the evacuees' in the barracks. The answers by both Interviewee 1 and 2 are suggestive of the division of labour – men are expected to take care of livestock, women are concerned with domestic duties. The division of labour and roles will be discussed in thematic area 4, however, Interviewee 1 and 2's response illustrate that their understanding of support from authorities is influenced by their perception of what was important. In considering the characteristics of a disaster-resilient community as outlined in the CDRC, Interviewee 2's answer in particular conveys a lack of inclusion/representation of vulnerable groups in community decision making and management of DRR (Twigg 2007: 20).

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[9] Defined as BPBD, sub-district or village but often miscommunicated because of language and cultural misunderstandings about NGO versus government.

5.2.2. '*Gethok Tular*' and other methods of information dissemination

The information flow in Kemiri is best described by the term '*Gethok Tular*,' a Javanese phrase referring to the method of communicating information person-to-person. Interviewee 9 explained, 'firstly from the district government, then to the village head, then it goes down to the RTs or for those that have the HT (handheld transceiver), they hear it directly from the HT, and they immediately inform the society' (Interview 9F, 20.08.2014: 21). Other participants mentioned the radio and TV as additional mediums for obtaining information.

In line with the hierarchal structure Interviewee 1 described his role as notifying 'public figures, there's *RTs, LINMAS*.' Because of the increased training and television reporting he thought it was also his responsibility to 'give a sense of peace to the community'. He spoke about the need to be 'calm' to ensure people 'can be prepared' (Interview 1M, 18.08.2014: 24). While this research does not want to undermine the importance of the village leader role in providing information at the community level, Interviewee 1's response prompts questions about the line between traditional information flow and the role of technology and news mediums.

While Interviewee 1 communicates information through the *RT* heads, Interviewee 2 took the information directly to the health services.[10] This is because 'in the village, there are community figures, there are also women figures, those people we inform them so they can help me communicate it to the families' (Interview 2F, 18.08.2014: 25). This response illustrates the *Gethok Tular* system as well as a division between women and men in information networks in Kemiri.

Overall the replies indicated that the community has access to information about local government plans and structures, which is stated as a characteristic of a disaster-resilient community in CDRC (Twigg 2007: 20). Additionally, the researcher came to the conclusion that there are local government DRR policies, strategies and implementation plans in place, as specified in the characteristics of an enabling environment (2007: 18).

5.2.3. Summary of governance

The literature about local government in Indonesia at the beginning of this section underlines the complexity of the system as well as emphasising an increasing aspiration for political engagement with local community. Both themes are represented in the responses given by the Interviewees. Additionally the responses highlight that a certain degree of interaction does take place with authorities and Kemiri villagers. However, the official interactions are predominantly male-led.

For a visual representation of the governance hierarchy, see figure 1, which was drafted after discussions with PoHA staff and KKN students.

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[10]   Kemiri women run the community health service, which is generally focussed around maternal health.

Figure 1: Governance Structure
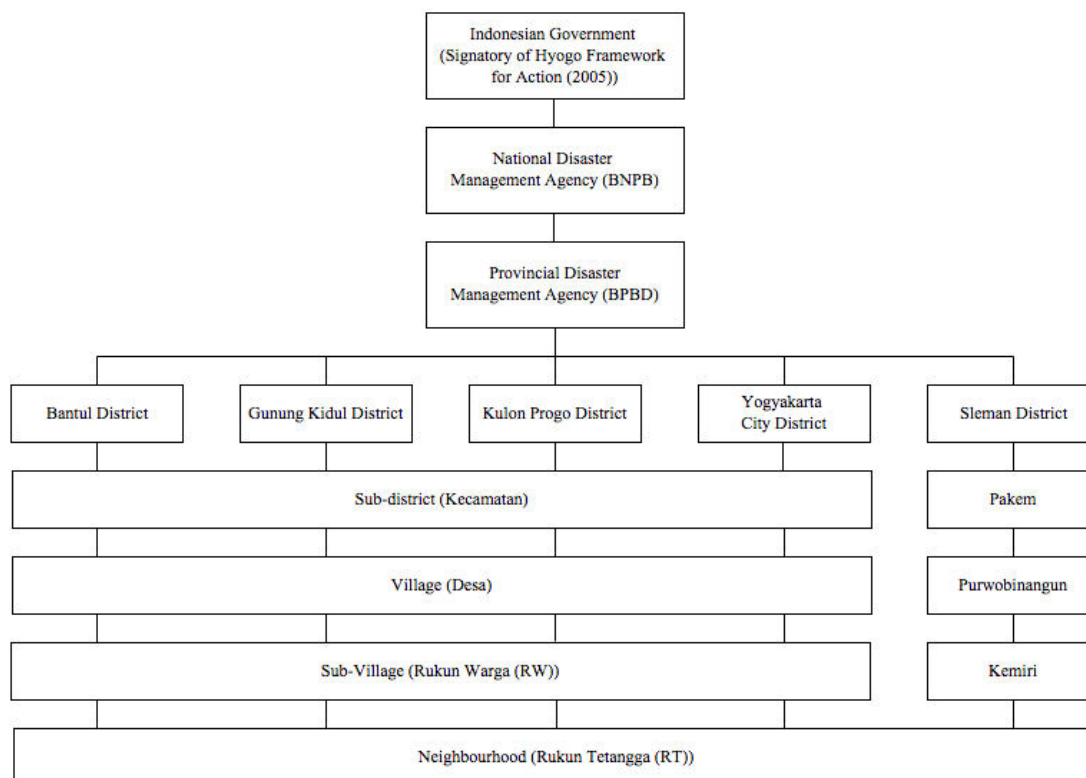
Source: Own composition

5.3.   Thematic area 2 – Risk Assessment

In 2010 the interpretation of geophysical and satellite observations led to timely warnings, allowing communities to be evacuated. However, 2010 also showed how inexperienced villages were more vulnerable with respect to hazards and evacuation procedures (Surono et al. 2012: 123). As Merapi continues to be active, posing a future threat to its inhabitants, it is crucial for longer-term hazard assessments to be undertaken to reduce the risk associated with volcanic activity (Gertisser et al. 2011: 62). The following passages examine the participatory nature of risk or hazard assessments at the Kemiri level as well as how information from assessments was shared and discussed.

5.3.1. Assessing risks and hazards

When asked if they knew if a hazard or risk assessment had been undertaken about Merapi, Interviewees 5, 8 and 9 answered that no assessments had been done. Whilst Interviewee 11 presumed 'for certain there is an institution that specifically studies Merapi... I don't know the organisation or what body' (Interview 11M, 20.08.2014: 23), Interviewee 6 supposed that 'maybe it's from BPBD.' Interviewee 6 reasoned that they 'always inform the society' but remarked that BPBD would only release important information because non-relevant or repetitive communication would make society 'worried... or maybe they will become lazy because there will be a disaster' (Interview 6M, 19.08.2014: 50). This illustrates the balance between communicating important information with the population of Kemiri versus providing voluminous information which puts stress on the villagers and desensitising them to the risk of eruptions.

Interviewee 2 on the other hand, named the *Pengamat Gunung Merapi* (Mount Merapi Observers) as the group that watches the mountain. She described how the 'post informs us through the communication radio, through HT' but then she stated 'well I know because my husband is a... hahaha... because my husband always tells me' (Interview 2F, 18.08.2014: 27). Interviewee 2's response suggests that she understands the structures in place around hazard assessments of Merapi. It also implies that she discusses it with her husband, Interviewee 1.

Similarly, Interviewee 7 provided a distinctive answer. She did not know of a risk assessment but informed the researcher that she had 'participated in training about how to save the wounded, and who has to be prioritised during the eruption' (Interview 7F, 19.08.2014: 25). This signifies that there has been some kind of assessment as to the risk of volcano eruption in Kemiri, and that the information has been applied and shared to some members of the community.

In a deviation from the other participants' responses, Interviewee 10 commented on misinformation. He observed that in the past there had been 'information that seems exaggerated, I don't know what's with that, like it's some kind of tendency' to misrepresent the disaster. Yet he was resolute that this was not a problem that affects the inhabitants of Kemiri because when 'the government, or bodies that do the research, express concerns about danger, then that's what the societies believe' (Interview 10M, 20.08.2014: 25). It seems improbable that the inaccurate information had no effect at the community level, but it is encouraging that Interviewee 10 continues to trust government-sanctioned information. He, like Interviewees 1 and 6, stressed the importance of giving villagers correct information.

The responses illustrate that there are a number of ways the risk posed by Merapi is understood and discussed within the community. However, the participants' answers suggest that information from government bodies is predominantly male controlled within Kemiri.

5.3.2. Participation in risks and hazards assessments

The participatory process in risk assessment, i.e. who was contributing and in what manner, correlated with the level of awareness of risk or hazard assessments among the participants. Interviewee 1, who because of his position of village head required him to be engaged with Merapi eruptions, exemplifies this.

He reported that BPBD receives 'reports from the researchers of Merapi on its condition' like from *Pengamat Gunung Merapi*, and then 'the information travels from BPBD to us' (Interview 1M, 18.08.2014: 29). While he explained that contingency plan discussions include other villages as well as Kemiri, it is ultimately BPBD who have the final say: 'they'll discuss what to do in the future, with this condition then what are the outline of things we need to plan.' He acknowledged that 'even if it isn't 100% correct' the predictions for the direction the eruption will go are usually 'pretty good' (Interview 1M, 18.08.2014: 29). His explanation illustrates that although there are consultations at the community level, the authority is with the information holder, i.e. not locally managed.

When asked about the nature of his meetings with the officials Interviewee 1 described a hierarchal system: 'they invite us, they invite important village figures, so I don't meet them, but I'm invited.' The meetings also include 'several other people that are invited' and Interviewee 1 noted more than once that he was not initiating the discussion but rather he was a passive participant (Interview 1M, 18.08.2014: 33). Again this illustrates the hierarchal system in place.

In Interviewee 4's opinion 'essentially, the result of research is for risk reduction of disasters, so in this case, *SIBAT* (community-based disaster mitigation group) is built specifically to deal with these issues.' So while he and his wife (Interviewee 3) did not know what the research entailed, they were adamant that 'the results were given out, as the basis of risk reducing activities' (Interview 4M, 18.08.2014: 91). These activities included 'simulation and socialisation' and Interviewee 4 reported that they had been 'involved in the creation of the evacuation map' (Interview 4M, 18.08.2014: 91). While one might have expected that Interviewee 4, who works in the village office, to have contributed to risk assessment processes in a greater capacity, the same can be concluded from Interviewee 2's response. Although she had previous experience, which one imagines would prove useful in a risk assessment, she reported that she 'just channels' the information she receives (Interview 2F, 18.08.2014: 29). The responses from Interviewees 2 and 4 suggest while assessment findings are shared among the residents and the results are applied, it is a top-down process.

Interviewee 6 noted that if 'there's an escalation on Merapi's status, then every sub-village that's at risk, would certainly be visited or they would be socialised regarding disaster' (Interview 6M, 19.08.2014: 52). This implies that he was not consulted in the assessment phase but understands the concept of risk assessment to be applied to the actual disaster scenario. He further commented: 'So if anything happens, then the residents won't be too panicked.' He described the four escalation phases:

> [I]f it's *Siaga* (standby: level III), then we would have to be extra alert and the residents are always warned when they travel up north, if there's an escalation of status then they will always hold a training on disaster management (Interview 6M, 19.08.2014: 52).

This response shows that Interviewee 6 believes information is shared and discussed by residents living in affected areas, and that authorities target information about the disaster risk into the areas that will be affected.

On the other hand Interviewee 10 commented 'they come to this village but there's a little difference in understanding between researchers that come far from Merapi with the villagers that live near it.' He noted that the village of Kemiri feared the 2010 eruption 'because there was those who got hit by the *Wedhus Gembel'* (pyroclastic flows). However, he notes that in 1994 the *Wedhus Gembel* also hit Turgo but it 'wasn't really exaggerated'. Interviewee 10 remarked the 'information from the media was really big' and noted that the 'fear and the psychological impact in the villagers really showed up.' He continued his point by talking about the ferocity of the 1969 eruption, which filled the Boyong River 'from west till east' and 1994, but noted the absence of media reporting in these events. This change in information availability has meant that the 'villagers, we have to follow the government, in the times of danger we have to evacuate' (Interview 10M, 20.08.2014: 27). In a way, his point that increasing information

increases peoples stress levels highlights the distinctive nature of engaging with people around risk.

None of the female participants reported participating in hazard or risk assessment processes, which indicates that their access to BPBD meetings is limited. Yet they all were confident that in the case of emergency they would be informed.

5.3.3. Sharing and discussing assessments

When asked how findings from assessments are shared and discussed with the community Interviewee 1 pragmatically answered: 'if the information is ordinary, then we'll inform it through meetings, from *RT* meetings but if the information it has to be, for example it needs direct action then I invite people' to assemble and collectively take action. He also identified that urgent information can be communicated 'through the mosques'[11] (Interview 1M, 18.08.2014: 39).

This method of communication is what Interviewee 5 described: 'in the case of Merapi's 2010 eruption we were informed through the mosque, using the speaker. Then after that we went to head of the village's house because that was the gathering point.' Interviewee 9 stated 'the one that informs is usually the village head' (Interview 9F, 20.08.2014: 29). Interviewee 5 and 9's description of how information is distributed at the village level reinforces that there is a system of communicating and sharing findings of assessments.

Interviewee 2 provided further insight into intricacies of the information distribution system defined by Interviewees 1, 5 and 9:

> [W]hen I get information, it depends on the information, what the method of communicating it to the society will be. Well you need to be smart, with the local language. What's clear is the information will get to the society, and the society will also discuss it (Interview 2F, 18.08.2014: 32).

This illustrates not only her 'smart' communication tactic but that information is discussed amongst the community. Her understanding of the situation was: 'Kemiri villagers are already aware of the disaster, that we live in a disaster prone area, so if there's information then they'd directly come to me' (Interview 2F, 18.08.2014: 32). This confirms that there is open discussion at the community level.

Additionally, Interviewee 2 explained the situation in 2014 when 'the status of Merapi was escalated to *Waspada* (alert: level II)' and how the community responded to the information. When asked to elaborate on the 2014 event she clarified 'we decided on the evacuation point, here[12], the women were informed and had to prepare for those who have families that are sick or disabled' (Interview 2F, 18.08.2014: 32). This suggests that Interviewee 2 predominantly communicates information to the female residents of Kemiri and women assume the role of carer in crisis situations. Moreover she described that they had decided not to 'bring the sick directly to the evacuation point' but they would be evacuated first. This would be done by car and although 'most of us already have phones, those who don't can ask the village head to call someone who has a car'

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[11] The Kemiri village mosque, like all communities across Java, has loud speakers for the 'call to prayer'.

[12] Interviewee 1 and 2's house is the first evacuation meeting point in Kemiri. This is a central location and is known by everyone in the community.

(Interview 2F, 18.08.2014: 32). The level of discussion demonstrates that assessment findings are shared, discussed and understood among the residents (albeit separately amongst the sexes) and fed into the community disaster planning.

This type of dialogue in Kemiri was further elucidated by the response from Interviewee 7: 'I socialise the information around my *RT* during the *arisan* (women's gathering) or during the teachers conference' (Interview 7F, 19.08.2014: 27). Interviewee 7's answer further demonstrates that the inhabitants of Kemiri monitor risk, strengthening their capacity to respond if the risk arises. However, it also reveals a division in male and female information dissemination practices.

Interviewee 9 had a contradictory experience of sharing and discussion of risk. She maintained that in *arisan* the 'disaster issue is rarely talked about' and while it had been discussed 'once or twice, it was during the disaster' (Interview 9F, 20.08.2014: 31). This confirms that the distribution of risk assessment processes do not include representatives of all sections of community.

5.3.4. Summary of risk assessment

The answers provided by the participants indicate that identifying a participatory process, which includes representatives of all sections of community and sources of expertise (as stipulated under characteristics in the CDRC), is not an easy task. However, this is not to say that it does not exist; the researcher might not have asked the 'right' question or perhaps, because of the technical aspect of volcanic risks, it is a process driven from government bodies and scientists. Despite the inability of the study to provide a unified understanding of risk assessment in Kemiri, the participants' responses highlight that the community does share, discuss and understand the risks, and findings of risk assessments (however they might come into existence) are implemented into community disaster planning. The degree of top-down processes does however indicate that it does not include, or reach, all sections of community.

This is particularly evident in the responses provided by the female participants. The section reveals limited male participation in risk or hazard assessments, and no female participation at the Kemiri level. Yet the male Interviewees spoke about official bodies, while the female respondents indicated they channelled information or were passive recipients of it. The means by which information from assessments was shared and discussed suggested two parallel information systems, divided between the sexes.

5.4. Thematic area 3 – Knowledge and Education

The idea that resilience to disaster is built through interventions that have their emphasis on increasing local knowledge and increasing existing capacity was discussed in the theoretical chapter in detail. The following section focuses on training and participation, as well as how past experiences have been used to increase resilience in the future. Additionally it examines the level of volunteerism in Kemiri.

5.4.1. Training and participation

Interviewee 1 could not remember how many times he had been involved in training. Furthermore he stated that he was 'not really interested in participating.' He explained 'we inform each other, so there's information from there and then we reciprocate.' This depicts a level of informal training, focussed on sharing information. Speaking about the training from the government he reported that only a few people receive training: 'usually the ones that are invited are just the public figures, by figures I mean the head of the sub-villages.' He then commented that providing training to everyone was: 'well it's impossible' (Interview 1M, 18.08.2014: 49). This again underlines the hierarchal nature of participation in DRR processes in Kemiri. When asked about training provided by NGOs he struggled to remember the names or what training had taken place: 'back then there was training from *Pasak Merapi*[13] ...from... I forgot...' (Interview 1M, 18.08.2014: 45). Limitations on time and language stopped the researcher from probing further on this subject, however, it was interesting that as leader of the village he could not provide a more detailed account of NGO or government led projects in Kemiri.

Interviewee 2 also had trouble remembering the training she had received: 'back then yes... I've had training from... what's the name of the NGO, I forgot it was about disaster response... it was called disaster mitigation training'(Interview 2F, 18.08.2014: 36). Interviewees 3, 4, 6, 7 and 10, on the other hand were quicker to identify the trainings they had participated in.

While Interviewee 6 described the importance for BPBD and SAR members, such as himself, of participating in training so they 'can increase their skill and ability' (Interview 6M, 19.08.2014: 57), Interviewee 7 shared her experience of the NGO training about 'how to rescue the disabled during Merapi' (Interview 7F, 19.08.2014: 29). While the training reflects the interest of the participants it also highlights the role division in DRR between the sexes – men active and strong in the face of crisis and women as carers.

Membership in an organisation *SIBAT* dictated Interviewee 4's answer:

> [T]he knowledge that we get is about that disaster risk-reduction. So like what we should do before the disaster, during the disaster, and after the disaster. Including first aid training, soup kitchen and the evacuation process, like the evacuation point, what places need to be avoided, etc. (Interview 4M, 18.08.2014: 99).

Interestingly Interviewee 3 prompted him on the evacuation process, even though she had not participated in the training. Interviewee 4 explained 'sometimes there's a special training from the village government, and the BPBD but then I participate, not as *SIBAT*, but as a civilian.' He maintained that this was because it was for 'common knowledge' (Interview 4M, 18.08.2014: 100), however, his wife had not participated in any training in Kemiri. Interviewee 3 had received training from the Indonesian Red Cross in Bantul but when asked why she had not participated in training in Kemiri her husband answered: 'She had personal training from me... haha' (Interview 4M, 18.08.2014: 112). The response from Interviewee 4 demonstrates that DRR training does

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[13] *Pasak Merapi* is a local organisation that is involved in developing community-based contingency plans.

occur in Kemiri yet it is, as Interviewee 1 stated, only for a targeted audience. The interaction between husband and wife, Interviewee 3 and 4 illustrates that knowledge is transferred from the trainings via a follow-on effect method.

Interviewee 10 spoke about his participation in disaster preparation, 'including the drafting of the disaster SOP document' (Interview 10M, 20.08.2014: 29). He spoke about 'preventive measures' but expressed his opinion that 'the villagers have integrity and care for one another.' His concern was around 'the capacity' and 'authority' to give 'funding if we were to take refuge' but he seemed resolute that at the village level their responsibility was to 'only cater to evacuation' (Interview 10M, 20.08.2014: 29). This demonstrates Interviewee 10's belief in the community's capacity to care for each other, regardless of trainings, and his concerns about the issues that need to be lobbied for, such as the conditions in the evacuation barracks.

In contrast, Interviewees 5 and 8 distinguished between simulation exercises and training provided about DRR. Interviewee 5 stated: 'I was never invited' and when prompted to think about activities in the community she answered, 'it wasn't really training, it was just a simulation' (Interview 5F, 19.08.2014: 42). Similarly, Interviewee 8's response was: 'for trainings, no but like socialisations, yes.' Further discussion about the simulation with Interviewee 8 revealed that she found the evacuation simulation, which included an explanation of the signage, helpful: 'now I know more and we can be better prepared' (Interview 8F, 20.08.2014: 38). The two women's responses convey that active participation in awareness campaigns or training was absent from their experience. They also highlight the difference between formal and informal trainings.

While Interviewees 5 and 8 had some experience with passive engagement in awareness campaigns, Interviewees 9 and 11 had participated in neither simulation exercises nor training. When asked why, Interviewee 9 said that maybe she 'wasn't aware' or that 'others are informed' (Interview 9F, 20.08.2014: 35) but she did not receive the information. In contrast, Interviewee 11 reported that in his work as a social science teacher he keeps up-to-date with information about 'mountains and disasters' because they 'are taught to the children, and then the children make project reports, on how to handle or avoid' hazards (Interview 11M, 20.08.2014:27). These responses emphasise the difference in knowledge and access.

From answers provided by the participants, training or simulation exercises are targeted at the public figures in Kemiri, who appear to be predominantly men. Of the Interviewees who had received training the male participants spoke about it in greater detail. Furthermore the responses highlight the different levels of knowledge and access to awareness campaigns and/or trainings. And while the CDRC states that trainings should be 'geared to community needs and capacities,' (Twigg 2007: 25) the researcher found little evidence to suggest that all Interviewees' needs had been met, particularly those of the women.

5.4.2. Previous experiences informing DRR

Except for Interviewee 8 who reported that she just listened (Interview 8F, 20.08.2014: 41) all the respondents answered that they had actively discussed their experiences. Even Interviewee 11 confided that he shared his experiences with his students.

Both Interviewees 1 and 6 were definite in the use of previous experiences. Interviewee 1's response was, 'of course we were asked about our experiences in the past, we talk about what's lacking in the past, never what's good haha... we discuss so in the future there's better procedures' (Interview 1M, 18.08.2014: 47). Expressing similar impressions, Interviewee 6 responded: 'oh yes, yes, yes, of course, that's in the training for the disaster, if something ineffective is done then that means there needs to be an improvement for next time' (Interview 6M, 19.08.2014: 59). The attitudes of the two men depict a pragmatic approach to learning from previous experiences.

Interviewee 10 was less affirmative in his comments, contending that 'the representatives of each village experience the same thing... from this area, that area... we all experienced Merapi's eruption'. He described the technical discussions around preparing 'for human and animal evacuation' that take place in forums but ultimately, as he believe all the experiences to be the same, 'it's just that we need the policy to face if one day it happens again' (Interview 10M, 20.08.2014: 31). Interviewee 10's assessment concludes pragmatically, i.e. 'needing to find a solution', however, in a way he dismisses the loss and disruption felt by affected communities. His view that it's all the 'same' experience does not leave room to acknowledge that one community, or area, may include diverse groups, with varying levels of vulnerability and disparities in recovery (Cutter et al. 2008: 599).

In contrast Interviewee 2 talked about differing experiences. In describing how in 'the post-disaster training we're asked to tell our experiences and from that we're given solutions' she commented that the trainings' participants were not 'just from Kemiri, so there are a few areas, so the experiences are different and we can learn' (Interview 2F, 18.08.2014: 42). Similarly Interviewee 5 described the 2006 event, which saw people from 'the north of the road to Boyong River' evacuated to Kemiri. From this interaction she 'never imagined that the 2010 eruption would be so destructive,' however, she was appreciative of the people who shared their experience, 'or those that had training' to share. Her overall feeling was that 'hopefully nothing will happen, but if anything does then we all already know how to save, at least, ourselves' (Interview 5F, 19.08.2014: 68). These two women convey a desire to learn from other people's experiences. They seem to acknowledge that understanding how other people coped in previous crises is beneficial for them.

According to Interviewee 4 'studying from past experience' allowed *SIBAT*, who were created before the eruption in 2010, to perform effectively when they need to. He claimed that 'the community will easier accept information if it comes from their friends,' which ensures villagers are more receptive 'to being organised' (Interview 4M, 18.08.2014: 115). This example also highlights that people learn from other people's experience.

The most practical response came from Interviewee 7 who reported that 'after the training we directly practiced in the houses of the disabled' (Interview 7F, 19.08.2014: 31). Again this response conveys a willingness to learn from others and share experiences and knowledge.

While the participants' responses indicated receptiveness to both formal and informal training and information sharing, the traditional method of engaging and involving

community members to be more proactive trained volunteers in all phases of DRR was less evident.

5.4.3. Volunteerism

Although Interviewees 9 and 11 said they were not community volunteers, they, like all the other participants, could identify the organisations that in the event of an eruption could provide support. Between them, the participants identified a number of different organisations that had volunteer components, however, their volunteer interaction varied.

Interview 1 commented, 'in Kemiri, the existing volunteers are from *LINMAS*, the Red Cross, *SIBAT* and SAR. These people usually are members from these organisations... maybe their knowledge is more than mine' (Interview 1M, 18.08.2014: 54). While he spoke about how different organisations focus on their own mandates and provided training to their own members, Interviewee 1's description did not reveal a profound interaction between him as leader of the village and volunteer structures.

Divergent responses from participants revealed a notable distinction between formal and informal volunteerism in Kemiri. Interviewee 10's comments best exemplify this:

> [D]uring the eruption, they weren't called volunteers but simply 'villagers that care'. That's different because volunteers are more structured. The people that are physically well, brave and can ride motorbikes, they'll evacuate their families, their neighbours, or elders or disabled, they'd prioritise them. For example when we've gathered in the village head's house, and the disabled are not yet there, then we have to evacuate them immediately, then the elders, that's how we work. As for numbers, well we're not limited, whoever they are, if we ask for help, they'd go and pick them up. That's what happens. But in this village, there's always a figure that we can see, of course it is the village head... (Interview 10M, 20.08.2014: 33).

While this description highlights a top-down process, where the leader of the village leads the process for evacuation, it also reveals an unofficial structure in Kemiri. Although it shows that there is a willingness within the community to help, it relies on expectation of 'community spirit' rather than a formal structure where community members and organisations trained in relevant skills are set in motion to undertake a disaster response.

When asked if the 2010 experience had led to a more structured system for engaging volunteers, Interviewee 10 responded that 'a couple of youths follow some volunteer organisation, like *Tetulung* (accommodating) Volunteers... there's also some volunteers from political parties' (Interview 10M, 20.08.2014: 37). However, Interviewee 10 was not a convincing advocate for formalised volunteers: he worried that 'even if there's volunteers' who will have the 'overall picture of the village?' He continued 'even the kids from here, they can't remember all the people... the volunteers, they would have to list people first but we remember' (Interview 10M, 20.08.2014: 37). This depicts the interaction between two systems: the local and the external. While each system has a coherent and rational outlook, which makes sense to those involved, it illustrates there are two systems within Kemiri village. The crucial point is that they are initially different and can lead to inconsistencies of understanding in pressured situations.

Interviewees 2, 5 and 8 aligned themselves with informal volunteerism. When asked if she was a volunteer in the event of an eruption Interviewee 2 specified, 'that's what I do because as the wife of the village head I have to prepare all the needs of the community' (Interview 2F, 18.08.2014: 45). When probed further she said that she looked after logistics and coordination but had not received any formal training. Similarly Interviewees 5 and 8 did not mention any training but reported having provided logistic assistance whilst in the evacuation centres, although Interviewee 5 remarked that she 'didn't think that was volunteer work' (Interview 5F, 19.08.2014: 75). This demonstrates a degree of unrecognised work undertaken by the female participants.

Interviewee 5's description of the logistic assistance indicates that she freely took part in assisting evacuees: 'when we took refuge we, especially the women, needed underwear and female hygiene products and mattresses for those who had small children' (Interview 5F, 19.08.2014: 78). She went on to explain that, despite having small children she could not leave, she helped rectify the problem by asking her husband to contact an NGO 'that could find us mattresses and that could prepare underwear, things like that. The person was told to contact me, and then I asked for a certain amount and in less than a day it came' (Interview 5F, 19.08.2014: 78). This gives the impression that the domestic needs of the evacuees were not included in evacuation planning. As women in Kemiri are generally responsible for caring for the domestic needs of their families, this suggests that they were not present in the disaster preparedness discussions. The issue of lacking resources and inappropriate sanitation and hygiene facilities at the evacuation centres was referred to by a number of the female participants.

On the other hand, Interviewees 3, 4, 6 and 7 all were actively involved in volunteering through established organisations. Interviewee 4 was a member of *Siaga Bencana berbasis Masyarakat* (SIBAT) (Community-based disaster mitigation) with 'the task to reduce the risk of disasters' (Interview 4M, 18.08.2014: 42). Furthermore he outlined the network of volunteers in the area, observing that 'some of the community became volunteers but they don't volunteer here they volunteered elsewhere' (Interview 4M, 18.08.2014: 118). This network was described in greater detail by Interviewee 6 who explained: 'In Sleman district there was a lot of volunteers, from multiple communities. I can't pinpoint the number per se because there were groups from the whole district, they want to help during the disasters' (Interview 6M, 19.08.2014: 61). This suggests that there are high levels of community volunteerism, not just in Kemiri but also in the surrounding district.

Interviewee 6 also provided an example of compensated volunteering. He was clear that he had no 'intention to receive money but the government gave us rupiah, 75.000 or 70.000 per month, to compensate for fuel' (Interview 6M, 19.08.2014: 39). This shows that the Indonesian government reimburses some of its volunteers. He also commented that women 'handle the logistics, food logistics… um… like handling children food' (Interview 6M, 19.08.2014: 63). His response indicates his assessment that women's role in disaster response is predominantly as carers.

Yet Interviewee 3 identified herself as 'an active member of Bantul Red Cross' (Interview 3F, 18.08.2014: 45) and Interviewee 7 indicated she was one of nine health volunteers in

Kemiri. When asked, she confirmed that the 'health volunteers are all women' in Kemiri (Interview 7F, 19.08.2014: 39). The responses from Interviewees 3, 6 and 7 highlight the division of roles taken by men and women in formal volunteer roles in Kemiri. The descriptions of volunteering by participants illustrates that women are predominantly carers, while men take traditional roles of security and search and rescue.

Nevertheless, the responses show a high level of community volunteerism (both formal and informal) in all aspects of preparedness, response and recovery. Despite the gendered separation of tasks, the participants' answers show that volunteerism is representative of different sections of the community.

5.4.4. Summary knowledge and education

The responses illustrate that the inhabitants of Kemiri have taken part in, or at least been exposed to, awareness campaigns and DRR trainings. The fact that community experience of coping in previous eruptions, or knowledge of how this was done, was used in simulations and trainings was a positive. However, as not all respondents had participated in training, it cannot be determined if there is widespread education geared to all community members' needs and capacities. The disparity between who had and had not received trainings was tipped in favour of the male participants; this inequality was also evident in the number of community members who had received formal training in relevant skills for DRR. Overall the women participants in this study appeared to have less access than their male counterparts.

5.5. Thematic area 4 – Risk Management and Vulnerability Reduction

Part of the objective of disaster risk reduction is to minimise the loss of livelihoods within an affected community. Therefore it is imperative that activities like community capacity building, mitigation and emergency preparedness planning do not neglect livelihoods. This chapter focusses on sustainability of livelihoods, concentrating on local economic activity and employment, as well as livelihood diversification.

5.5.1. Livelihoods

Enquiries about livelihoods in Kemiri revealed the importance of *Salak* (Snakeskin fruit). This oval shaped fruit, covered in scales giving it the appearance of reptile skin, is grown across Indonesia. It is a cash crop for many Indonesians, as it takes four years to grow but can then bear fruit for the next 20 years (Oxfam 7 November 2010). Seven out of the 11 Interviewees directly talked about *salak*, and while Interviewees 1 and 2 did not mention it they had a plantation at the back of their house. Additionally Interviewee 1 referred to himself as a 'farmer' (Interview 1M, 18.08.2014: 67).

Interviewees 4, 9, and 11 also indicated some level of farming, however, they also had other jobs. Answers provided by the male participants show a high involvement in farming activities.

When asked about their occupation four out of the six female respondents answered: 'housewife.' While Interviewee 5 and 9 then offered the information that they had a *salak* distribution (Interview 5F, 19.08.2014: 86) and *salak* plantation (Interview 9F,

20.08.2014: 47), Interviewee 3 had to be prompted in order for her to disclose her role as a preschool teacher and that she assisted with the farm. Similarly, Interviewee 8 had to be asked a follow-up question to establish that she had a *salak* plantation and livestock. Interviewee 2's role as wife of the head of the village appeared to dictate her position, and in turn her work. These replies reveal that the female participants undertake unpaid work. Additionally the interaction between the position in family and identity becomes evident.

The significance of family, which is prominent in Javanese society, was also evident in Interviewee 10's reply about his occupation: 'as a head of family and I have goats' (Interview 10M, 20.08.2014: 39). Many of the participants' answers provided an insight into Javanese culture, like the central values of family and community, however, the occupation question highlighted the gendered nature of working identity. In her article 'Gendered Anxieties: Islam, Women's Rights, and Moral Hierarchy in Java,' Adamson (2007: 8) explores how gender issues and notions of family are implicated in political consciousness about nationhood, religious identity, boundaries, and governance. She argues that Java is a hierarchical society where language and culture reinforces status and positions. It is worth reflecting that the 'familial relationship in Java is one of moral obligation. Four cultural concepts are central to the governance and maintenance of the Javanese family: *ruku* (harmony), *hormat* (respect), *musyawarah* (mutual deliberation) and *gotong-royong* (cooperation)' (Adamson 2007: 17). While the questionnaire devised for this project was not detailed enough to develop an analysis of familiar interactions the responses do demonstrate the patriarchal nature of the society.

5.5.2. Livelihood diversification

When asked what participants would do in the event of another eruption almost all Interviewees used their experience in 2010 to answer. While this may have been the result of a cross-language communication mishap around past and future tense, it is not unimaginable that the question itself may have simply prompted people to think about their 2010 experience.

Both Interviewees 1 and 2 answers illustrated their roles within the community. While Interviewee 2 explained how she focussed on the community, 'cooking and looking after people' (Interview 2F, 18.08.2014: 74), Interviewee 1 spoke about the need to be prepared: 'the obvious thing is when you live on the side of Merapi you need to be ready at all times' (Interview 1M, 18.08.2014: 69). This preparedness was in the form of a 'deposit,' even if it is only 'something like rice or anything... because Merapi's disaster isn't really long, maybe for one or two months, then it's over.' While his evaluation of the situation was that the deposit had to cover the village in the event of an evacuation, he also noted 'in these conditions the government also knows'. This implies a level of access to government schemes. Furthermore he distinguished between the evacuation stage and when the villagers can return; commenting on damage he stated 'well hopefully it's never as big as Cangkringan'[14] (Interview 1M, 18.08.2014: 69). This

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[14] An area, heavily damaged by the 2010 eruption, where the government ordered the villagers to relocate from.

demonstrates the previous events have shaped his understanding of what is possible in the future.

Past proceedings had also shaped Interviewee 4's understanding; he explained that an eruption would not affect his role at the village office because while 'services to the community' and routine administration work would be disrupted, 'when there's an eruption (the village office) focusses on managing the evacuees.' He commented that 'we still serve the society but in a different way' (Interview 4M, 18.08.2014: 129). On the other hand he was less positive about his other income source: 'as for the farming, that's definitely disrupted' (Interview 4M, 18.08.2014: 129).

Interviewee 3 also chose to compare normal and disaster periods; she described the difference between methods employed at the preschool in Kemiri and in the evacuation camps. While 'we usually do it with glee, there we need to situate the children that have varying experiences' (Interview 3F, 18.08.2014: 131). She discussed working 'together with other NGOs, that comes to the camp to help' and that they work in collaboration with 'the other communities there'. Interviewee 3 explained how the children at the evacuation centres were divided into 'preschool, primary school and so on, so we can continue learning or play games, this included trauma healing activities' (Interview 3F, 18.08.2014: 131). This not only implies that Interviewee 3 adapts her skills in the crisis situation, but also that there is reasonable coordination between different stakeholders to ensure the children receive the care they need.

When asked if she would continue to sell *salak* in the event of a future eruption Interviewee 5 responded it was possible, however, she spoke about the burden of family responsibility: 'I had to focus on my son because I'm afraid if it's raining ashes and my son goes out he'll get a respiratory disease.' Additionally the change in circumstances also meant she had 'to drive him to his school' (Interview 5F, 19.08.2014: 102). This highlights the trickle down effects of the eruption, such as increasing domestic work responsibilities.

Interviewee 6 commented: 'what I've experienced, I focus on family and also managing the livestock.' Although at the time of the interview he was not an active member of SAR he expressed that he would 'also make time for' volunteering (Interview 6M, 19.08.2014: 69).

Interviewee 7 understood this question as reference to when she was 'back then in the evacuee camp' in 2010. She said, 'I just sat around and did nothing. And there were no activities so automatically there was no income and our needs, there was plenty of needs but there was no income' (Interview 7F, 19.08.2014: 57). This highlights the financial stress associated with evacuating. As well as depicting the financial stress placed on evacuees, Interviewee 7's response demonstrates the loss of control people felt; although they were given food there was nothing for them to do other than worry. When asked about her family's farm she disclosed: 'the government forbids it but people still come back to take care of the animals and to take the *salak*' (Interview 7F, 19.08.2014: 59).

Similarly Interviewee 8 divulged that she and her husband secretly returned via 'small paths' to avoid the 'big roads that are blocked by patrols' to check on their property (Interview 8F, 19.08.2014: 64). While Interviewee 8 returned with her husband to check

on their property Interviewee 9 said she remained in the evacuation centre, however Interviewees 7, 8 and 9 all commented on feelings of restlessness whilst in the evacuation centres.

Interviewee 10 also discussed the impact on farming:

> [W]e all stopped taking care of our *salak* plantation, our animals. We just gave them the bare minimum attention to survive, when they are usually given greens, 50kg. Then we would give them just three to four branches, so they can live but for the farming, we all stopped in the camp, no one. That's what makes the villagers here shocked psychologically, they lost hope staring in the future (Interview 10M, 20.08.2014: 43).

This underlines the toll, both financial and emotional, on evacuees. Furthermore these examples of participants leaving evacuation camps to return to their homes to feed their cows and goats, and to check on their houses (the use of a guard dog depicts fear about assets being stolen) indicates that there was no plan to evacuate animals and no income diversity plan in the event of an eruption.

When asked about the activities in the barracks, Interviewee 10 described, 'especially those who are scared, then they'd just stay there and eat, sleep, wait for food rations' he then mentioned that 'those that don't have vehicles, they can't go back to the village.' While he was able go back 'every morning, check the house, if there's goats then we give them branches, if there's a dog, it's the one that guards the area, then we give it food,' he commented on how hard it was for people 'that don't have access, access through friends, then they were the ones in shock because money was not given' (Interview 10M, 20.08.2014: 45). This again highlights the importance of agriculture as a source of income for the village. It also demonstrates that mobility of people in the evacuation centres impacted on their experience.

Interviewee 11 was given a leave of absence during evacuation period; he commented:

> [T]he headmaster gave me leave, he said what's most important is that you are safe, you don't need to think about school work... so then, thankfully, I didn't have to go teach. Maybe because they know my condition, that I have trauma (Interview 11M, 20.08.2014: 45).

Out of all the respondents, Interviewee 11 spoke most openly about the trauma he experienced in 2010. His comment illustrates that the eruption did not have the same financial impact on him because as a public servant he was able to access state insurance.

The participants' answers can also be categorised under two other components of resilience: 'social protection' and 'financial instruments,' as identified in the CDRC. The replies show that there is 'collective knowledge and experience of management of previous events' (Twigg 2007: 29) and, particularly outlined by Interviewee 1, 4 and 10's responses, there is some kind of 'community disaster fund to implement DRR, response and recovery activities,' (Twigg 2007: 30). Further probing would have been needed to establish the effectiveness of the community disaster fund.

From the answers we see that both male and female participants were placed under financial stress, however, it was perhaps men who were disproportionately

disadvantaged in trying to maintain their reputation as the 'breadwinner' in the context of dangerous working conditions (i.e. agriculture land in no-go zones).

5.5.3. Relocation

The following paragraphs explore the varying levels of apprehension towards obeying government relocation orders.

The acknowledgment that the villagers live in proximity to danger was imbued in the answer provided by Interviewee 8, who reasoned 'if everything is already gone, then it's okay if I go. Well we just need to obey the government' (Interview 8F, 20.08.2014: 66). Interviewee 9's response also embodies this acceptance; she explained that 'for my family's own safety, for me, I'd follow the recommendations from the government' (Interview 9F, 20.08.2014: 59).

Interviewee 7 on the other hand acknowledged that 'maybe, when the time comes and we're not allowed to live here again, maybe if we live here it's too dangerous but then well, maybe if the government still allows us to rebuild, then, then we'd stay here' (Interview 7F, 19.08.2014: 63). This noncommittal answer suggests that her willingness to leave Kemiri, despite government instruction, is questionable.

On one hand Interviewee 5 expressed similar stoicism: 'if Kemiri is not inhabitable then what else can we do? We need to follow [the government's order]', yet she also stated 'that's better than... I mean, if the government recommends that and facilities are provided then why not just take the positive things' (Interview 5F, 19.08.2014: 108). This shows the caveats within the acceptance. Interviewee 5 clearly believes that if the government wants to relocate the villagers then there needs to be an appropriate resettlement program. However, she is also clear about the risk. Reflecting on Mbah Maridjan she said, 'he didn't want to relocate and then what's the result? In the end, he got hit by *Wedhus Gembel* and I don't want that' (Interview 5F, 19.08.2014: 106). Her reflection on 2010 shows pragmatism in evaluating the situation in terms of its past context.

Interviewee 10 stated, 'when it comes to disaster, God only knows, us humans we can simply see the facts, analyse, and give diagnosis' (Interview 10M, 20.08.2014: 48). While he reconciled that 'when God decides for it to happen and it happens that we had to relocate,' he hoped the government's relocation program was 'not like the previous ones.' He also advocated that the government provide resettlement villages that deliver facilities, to allow people to 'continue life normally, so not just the relocation like before, that's just a relocation of place but their livelihoods are only touched a little' (Interview 10M, 20.08.2014: 48). His contextualised response of the hypothetical relocation within the context of what was experienced by some villages in 2010 shows a level of consideration towards the risk of relocation.

The relocation of nearby villages also emerged in Interviewee 2's contemplation of the subject:

> I get confused thinking about it. But then ah in Kaliadem... If the condition is like Kaliadem then I'd rather be relocated, if it's like Kaliadem but if it's like Turgo in 1994... then... ah... if it's like Kaliadem, they were relocated but the status of landownership is not

revoked, so if in the next ten years there's a plant that grows here, then that's still owned (Interview 2F, 18.08.2014: 82).

This demonstrates the complexity of the issue. Zaman's (2002) article on resettlement and development in Indonesia outlined a number of issues with current resettlement projects, which he argues 'are unsatisfactory by any standards' (260). Overall he sees compensation rates and resettlement assistance as the biggest barriers to success and reasons the problem stems from an absence of detailed national policy or guidelines to carry out resettlement projects, as well as inadequately trained staff who lack resettlement management experience (Zaman 2002: 260). Zaman goes on to argue that the current mechanism for relocation only deals with land acquisition, which means resettlement is narrowly defined 'as moving people to another location without further provision or means to restore their lost incomes or livelihoods' (2002: 264).

This is reflected in Interviewee 2's perception of the problem, that 'from past experiences they only relocate our house, so our jobs are gone' (Interview 2F, 18.08.2014: 76). Interviewee 10's answer quoted above also highlighted the perceived threat of relocation and loss of livelihoods. Similar expressions of concern about livelihood can be found in the responses given by Interviewees 1, 4 and 6.

Interviewee 4 answered for himself and his wife (Interviewee 3) when he stated: 'of course we'd support the government.' However, he maintained that because 'some people's jobs are here it makes the decision to relocate heavy-hearted' (Interview 4M, 18.08.2014: 136). While he thought it would be ok if the relocation place had 'the same job fields or at least, there's some sort of job that we can use as income' Interviewee 1's answer was not as definite. Interviewee 1 also spoke about the source of livelihood as a deterrent for people to relocate: 'if the condition is really bad, then maybe yes, but mostly the villagers would say no. Because their source of livelihood is here' (Interview 1M, 18.08.2014: 73). He also commented 'they've been here for such a long time, I think it's hard for people to relocate'. The connection to the land is also visible in Interviewee 6's answer: 'the land for farming is also here and if we were to move then we wouldn't know where to find land. What would our jobs be?' (Interview 6M, 19.08.2014: 88). The condition of the village was a significant factor for Interviewees 1, 2 and 6. This highlights the connection between relocation and livelihoods, which is predominantly farming on the flanks of the volcano's mountain in Kemiri.

In contrast to the other responses, when Interviewee 11 was asked if he would be willing to relocate he answered that it would be 'better to find a location' for himself 'that's close to work' (Interview 11M, 20.08.2014: 55). While different from the other participants' responses, it also indicates that he is aware of previous issues associated with government relocation. It also demonstrates the importance of livelihood.

Overall there was recognition in the responses that demonstrated pre-existing thinking on the subject. The answers provided by the female respondents around obeying government relocation instructions illustrated an acceptance of something undesirable but inevitable. Male respondents were more likely to talk about the connection with relocation and livelihood.

5.5.4. Summary risk management and vulnerability reduction

This section has depicted a local economy reliant on agriculture. Additionally it showed the link between Javanese culture (particularly the central values of family and community) and prescribed roles – often along gendered lines. The section has highlighted the financial stress placed on both men and women in situations of evacuation. It also shows that men are disproportionately affected by social and cultural norms, in that they engage in risk-taking activates to return to their farmland despite government warnings. However, the research findings also show that the female participants were restless in the evacuation centres, indicating a divergence from predetermined roles.

Some of the answers alluded to the existence of community savings and credit schemes, however further probing would be required before any conclusions can be drawn. Similarly, while the researcher observed various DRR projects in the community, the questions failed to prompt respondents to talk about community disaster funds for implementing DRR, activities targeted at livelihood diversification.

5.6. Thematic area 5 – Disaster Preparedness and Response

The following section examines whether the early warning system (EWS) in Kemiri is community-based and people-centred. It then explores the mechanism for inhabitants to express their views regarding Merapi. While all participants were aware that there was an EWS there were a range of responses about how it operated.

5.6.1. Early warning systems

When asked to describe how the EWS worked Interviewees 7, 8 and 9 explained why the siren sounds and the course of action required. While Interviewee 8 commented, 'those things are automatic right? Like when something is wrong in the mountains then they'd definitely sound the alarm' (Interview 8F, 20.08.2014: 68), Interviewee 9 noted that 'when the danger status of Merapi is increasing, then that's when the siren is turned on' (Interview 9F, 20.08.2014: 61). A similar difference is evident between Interviewee 7's explanation of what the EWS' intended consequence is: 'When it sounds then we run' (Interview 7F, 19.08.2014: 71) and Interviewee 8's assessment that the siren is an instruction to meet at the 'gathering point' (Interview 8F, 20.08.2014: 72). Although the women provided slightly different explanations, it shows they understand the EWS siren is linked to hazards and requires them to evacuate.

On the other hand Interviewee 2 identified the 'function of EWS is for early warning of the *Lahar Dingin* (cold lava)' (Interview 2F, 18.08.2014: 84). Comparably, Interviewees 3 and 4 indicated that the EWS is 'for *Lahar Dingin*' (Interview 4M, 18.08.2014: 138). Interviewee 4 explained, 'the BPBD, they've planted some form of EWS in the form of the siren that's placed in the riverbanks.' He added, 'there are two systems, automatic and manual, for the manual one, if visually we know that it's dangerous there, then people can sound the alarm' (Interview 4M, 18.08.2014: 140). Yet he contended that although the siren would sound, the *Lahar Dingin* would 'not directly impact [them] so actually the EWS there it's not directly important' (Interview 4M, 18.08.2014: 145). While

the answers provided by Interviewees 2 and 4 illustrate a good understanding of the EWS, Interviewee 4's comments also depict that local conditions have been taken into account.

Interviewee 1's response however adds to the complexity of the EWS in Kemiri: 'apparently, the lava that was spewed in 2010 was called *Lahar Hujan* because it's not always cold. Even if it was already a year old the lava was still hot' (Interview 1M, 18.08.2014: 81). This would indicate that Interviewees 2 and 4 had not received updated information, or, that the latest EWS message was not appropriately presented and/or understood by all sectors of society. Adding to the complexity, Interviewee 1 also commented that the EWS siren was dependant 'on the information given beforehand' (Interview 1M, 18.08.2014: 85). He explained the difference between when Merapi's 'condition is *Siaga*' which indicates people 'need to beware' and 'if it's just *Lahar Hujan* (rain).' He added that although in 'theory' the siren for *Lahar Hujan* indicated that people should stay away from the river: 'the reality is if it's flooding people would go out and see hahaha' (Interview 1M, 18.08.2014: 85). This illustrates not only the complexity of the EWS for Merapi but also the level of risk to which people are accustomed.

Additionally Interviewee 1 clarified that the EWS for *Lahar Hujan* is controlled by the BPBD and that he was 'told that because Kemiri is disaster-prone area 2 we were given an EWS from New Zealand' (Interview 1M, 18.08.2014: 81). His response indicates a top-down approach to the EWS; however, when Interviewee 6 was asked if he had been consulted in the design process[15] he said 'I was involved because BPBD researched which place needs to be given an EWS' (Interview 6M, 19.08.2014: 81). He also commented 'maintenance had to be done by the community because yesterday, on Independence Day, every 17th of August, was a time where we checked the devices' to check it's operational (Interview 6M, 19.08.2014: 95). Interviewee 6's response indicates a level of resources in place in Kemiri to monitor and maintain the EWS. Nevertheless the responses provided by the other participants suggest that the technical[16] resources come from outside the community.

Few respondents revealed how they had been informed about the EWS. While Interviewee 2 and 4 mentioned that there had been simulation training, described in detail by Interviewee 4: 'the whole village participated in a simulation, including what it's function is, or if it alarms then what should they do' (Interview 4M, 18.08.2014: 147), Interviewee 5 asserted that 'no one told me'; she just knew about the EWS. Although she could explain that the EWS meant, 'we're prohibited to go near the river,' she also said 'it's broken I think' (Interview 5F, 19.08.2014: 123).

Interviewees 10 and 11 also reported that they thought it was broken. Interviewee 10 explained that the automated EWS to alert the villagers to evacuate 'isn't optimal. The sound isn't really heard, especially those that live in the valleys, especially if there's other noises'. He added that it was 'unlike what the developer hoped it to be' (Interview 10M, 20.08.2014: 50). When asked if they had expressed concerns about this Interviewee 10

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[15] All the participants were asked if they had been consulted in the design process but Interviewee 6 was the only one who said he had.

[16] It was unclear if this was in the form of trained personnel for maintenance and operation or technical monitoring and communications equipment.

said he had in 'SOP training' and Interviewee 11 said 'I've never discussed this to a forum, it just goes by the way it always had... and everybody else don't seem to care as much' (Interview 11M, 20.08.2014: 59). How people were able to express their opinions about previous experiences with or future concerns about Merapi will be discussed in the section below, nevertheless the accounts from Interviewees 5, 10 and 11 imply that members of the community are not actively participating in all aspects of the development, operation, training and testing of the EWS.

5.6.2. Mechanisms to express opinions

Overall the responses reflected the governance structure within the community; the majority of participants mentioned village forums or identified the leader of the village or his wife as someone to speak to about issues they were experiencing. At the same time a number of people conveyed the informal nature of this aspect of community life.

Interviewee 1 acknowledged that people usually made their complaints or suggestions 'directly' to him, especially if there was already an existing relationship. Additionally he mentioned that these comments have usually been 'organised through *RT*, so the data is there' (Interview 1M, 18.08.2014: 91). When asked if the ideas put forward in these situations were implemented he responded: 'if there's a complaint or idea, if it's logical, then we'd do it' (Interview 1M, 18.08.2014: 95). This indicates that the village has the power to lead projects for pre- and post-disaster situations and that they are able to obtain aid and other support for the community around reducing the risk of Merapi.

On the other hand Interviewee 2 made the comparison between 'normal every-day life': 'women here can't express directly. So if "A" has a problem, they usually tell their relatives or friends first, but then there's always someone that comes to me. If it needs the action of the village then I tell my husband,' and what happens in the evacuation centres: 'if it's a big problem, like for evacuee camps, there's someone that takes care of that. So I just inform them, 'sir that my villagers have this problem hopefully you implement it' (Interview 2F, 18.08.2014: 88). This demonstrates that the network of communication within Kemiri is drawn along gendered lines; not only is it separated by sex but there is also a power dynamic in the information flow.

Interviewees 6 and 10 described the approach of channelling information up. Interviewee 6 suggested that people could 'express their concerns or demands' at 'a meeting in the *Balai Desa* (Village Hall)'; he also supposed 'they could go through the village head so he can tell those responsible for the issue, or the BPBD' (Interview 6M, 19.08.2014: 99). Interviewee 10 also believed that people could express their ideas 'in a forum, sometimes we just say it' (Interview 10M, 20.08.2014: 56).

Interviewees 5, 7, 8 and 9 provided similar accounts of how they would raise issues. Interviewee 9 said that when she or her 'neighbours and friends want to express our complaint' it could be done 'during *RT* and *RW* meetings' (Interview 9F, 20.08.2014: 45). Interviewee 8 also spoke about using the governance structure when providing an example of when she had raised an issue by telling 'the head of *RT*' (Interview 8F, 20.08.2014: 82). Likewise Interviewee 5 said 'usually we give it to the head of the village or his wife' (Interview 5F, 19.08.2014: 127). These responses demonstrate that there is a

current community mechanism within the existing structures that allows people to contribute their opinions, however its effectiveness is less measurable.

When asked if their ideas had been implemented the answers were mixed. Interviewee 10 commented that if it cannot be solved by the village head or the local village office 'then they'll give it to the Coordination Meeting above them, so that's how villagers can express ideas. But then, whether the issue is communicated or not because the idea is not implemented well we never know' (Interview 10M, 20.08.2014: 56). He additionally commented on the difference between 'during the emergency they'll say yes because from a lot of institutions they have interest but once it's over then there's nothing' (Interview 10M, 20.08.2014: 56). Interviewee 10 provided the example of 'in the SOP we listed down what facilities we need, like HT, which as of now hasn't been realised' (Interview 10M, 20.08.2014: 56). Interviewee 10's point about receiving help during the emergency illustrates that there is 'community knowledge of how to obtain aid and other support for relief and recovery' as outlined in the CDRC (Twigg 2007: 35).

This is also evident in Interviewee 3's response. She portrayed a relatively easy relationship between the village preschool and obtaining assistance when needed. She explained that on request 'usually an NGO, maybe the Red Cross, or other NGOs that concerns on the issue of disaster' would assist with the preschoolers (Interview 3F, 18.08.2014: 160).

The response from Interviewees 7 and 8 are less encouraging. These women also spoke about the problems with the evacuation centre. Interviewee 7 divided her concerns into village level and government level. She thought, 'one problem that should be dealt with is when we were in the evacuation camp, the activities' (Interview 7F, 19.08.2014: 77). This refers to the restlessness experienced by evacuees. She additionally spoke about her experience in 2010 where people 'did not expect that we needed to directly go to evacuation camps' and there was nothing to 'eat or drink' (Interview 7F, 19.08.2014: 78). When asked if she had spoken about her concerns she responded: 'As for the food supply yes, during meetings it has only been taken as suggestion but it hasn't been delivered to the higher-ups'. She further clarified that she had been told the reason for this was 'that there was no fund from the village government' and she thought that her concerns were 'probably going to be told to the district head' (Interview 7F, 19.08.2014: 80). In comparison to Interviewee 3 and 5, her response highlights the challenges in implementing change.

Interviewee 8 also commented on the distribution of relief: 'the aid does not directly come to us, it has to be collected first but it did not reached us, everything went missing... supposedly' (Interview 8F, 20.08.2014: 4). This indicates mistrust in the system. She further explained, 'if the aid was directly distributed, it was stored for such a long time, most of it expired.' She also spoke about the lack of soap (Interview 8F, 20.08.2014: 82). While she said she had reported her concerns she did not 'know whether it was passed on to the higher-ups, it's still lacking... logistics here is still unorganised' (Interview 8F, 20.08.2014: 84). Interviewee 8's unfavourable portrayal raises questions about the actual ability of the community to obtain aid and other support for relief.

In contrast to the uncertainty that concerns were dealt with and resulting actions implemented expressed by Interviewees 7, 8 and 10, Interviewees 4 and 11 took a more informal perspective on the manner in which people discuss their ideas and concerns regarding Merapi. Interviewee 4 observed 'the point is we shared our experiences, it's just that we don't make a special forum just for that, so we do it spontaneously' (Interview 4M, 18.08.2014: 158). Yet he also commented on 'the experience that they share roots from the same problem' (Interview 4M, 18.08.2014: 156). This comment together with the hierarchical nature of Javanese society suggests that not everyone shares with the same consequence. Comparably, Interviewee 11's response outlines 'informal discussion and talks after village meetings' as a forum where implementable solutions to problems are discussed (Interview 11M, 20.08.2014: 65). These responses signify a lack of whole community participation in discussion about Merapi-associated concerns.

5.6.3. Summary disaster preparedness and response

From the responses the research cannot conclude that there is an 'application of social audits, report cards and other mechanisms enabling those affected by disasters to evaluate emergency response' as outlined in CDRC as an enabling characteristic of a resilient community (Twigg 2007: 36). Additionally any form of 'effective and transparent mechanisms for monitoring and evaluating DP and response' (Twigg 2007: 36) is informal. Answers provided by female and male participants depict a difference in experience. The female Interviewees were more likely to provide an example where something went wrong and describe how this was dealt with while the male Interviewees generally spoke about problems in a conceptual manner. The views expressed by Interviewees 6, 7 and 8 in particular, demonstrate that the division of labour, in this case responsibility for domestic needs, influenced the perception.

The responses about EWS are inconclusive regarding the existence of a functioning technical early warning device. However, there is evidence of community early warning mechanisms, especially when reflecting on previous discussion around *Gethok Tular*. While it would appear that the community has understood messaging about the EWS, the differences in responses highlight a need for more education about the hazards and risks as well as the warning signals and their meanings. Informal 'trainings' about the EWS were particularly evident in replies from the female respondents. While there appeared to be an overarching system in place the level of involvement and local participation could be increased to implement a more community-based and people-centred EWS at the local level. Despite these shortcomings the researcher felt that the participants had trust, if not entirely in the EWS device itself, in the organisations (local government and BPBD) providing information about warnings.

5.7.   Other Themes

The following section will explore two other themes that emerged from the interviews. As discussed in the methodology, repetitions, transitions, similarities and differences within the data are the most appropriate method for analysing results (Ryan & Bernard 2003: 101).

5.7.1. Repetitions – Panic

In all but two Interviewees the topic of 'panic' surfaced. For Interviewee 1 the issue of panic was raised in regards to the dissemination of information, 'but to lower the chance of panic we were careful, so people can still be calm yet aware' (Interview 1M, 18.08.2014: 20). This idea that distressing information may lead people to panic was also reflected in Interviewee 2's description of the escalation of Merapi's status to *Waspada* in 2014, 'we have to be able to control the society so they don't panic but at the same time they are prepared' (Interviewee 2F, 18.08.2014: 32). However, when probed on the actual instances of panic within the community Interviewee 1 clarified that 'because there's always training and information and there's a lot of information from the television' he can just inform people and 'if there's a little panic, we have to calm them down. That's what we're tasked to do' (Interview 1M, 18.08.2014: 20). This highlights Interviewee 1's position within the community as well as the impact of engaging and informing people on risk.

Interviewee 6's response paralleled that of Interviewees 1 and 2. He reasoned, 'information has to be accurate' and should be distributed carefully (Interview 6M, 19.08.2014: 48). He also maintained that people 'would be socialised regarding disaster. So if anything happens, then the residents won't be too panicked' (Interview 6M, 19.08.2014: 52). This is in contrast to Interviewee 8's experience. She described her experience in 2010 as: 'well panic... when Merapi erupted we all panicked.' She identified 'a lack of socialisation' which meant 'when we wanted to pick the children up, we were all scared because the school is four kilometres away from Merapi, that's why we panicked' (Interview 8F, 20.08.2014: 52). By ascertaining that her lack of socialisation about the evacuation process for her and her children created panic Interviewee 8 illustrates the importance of disaster preparedness training.

Interviewee 9 also described the anxiety of the 2010 eruption: 'all my family, even the whole village, panicked and became very tense in facing the disaster' (Interview 9F, 20.08.2014: 3). This is in line with Interviewee 4's description of the eruption: 'the community here saw directly the smoke, named *Wedhus Gembel*, and all the people here panicked' (Interview 4M, 18.08.2014: 13). Interviewee 4 maintained that information had to be sanitised for public consumption. He thought, 'if the information isn't necessary, like if there's an escalation of status but it isn't dangerous, that isn't given out so it won't cause panic' (Interview 4M, 18.08.2014: 56). This indicates a belief that the community should only be provided with accurate and significant information.

Interviewee 10's perspective on the other hand was: 'if it's dangerous we can run, but we can't be too panicked' (Interview 10M, 20.08.2014: 3). Interviewee 5 also echoed this idea of acknowledging the risk of the hazard but responding calmly (Interview 5F, 19.08.2014: 19). While responses from both Interviewees 5 and 10 display signs of an educational campaign about responding calmly to crisis, Interviewee 3 provided an example of how the trauma experienced in 2010 continues to affect the villagers.

She described the response of villagers when the status of Merapi escalated: 'There was a bulk of smoke rising, it wasn't really thick, and it was actually nothing important but it was accompanied by a loud rumbling sound' which made 'all the people, especially those

living in the crossroad a little up north, panic. They all came out bringing things, like they were about to evacuate' (Interview 3F, 18.08.2014: 63). That the villagers responded to the visible signs of Merapi, despite an official warning not being issued, highlights that they are not totally reliant on an EWS. Although, as pointed out by Interviewee 3 the 'trauma from 2010' still impacts the inhabitants in Kemiri. She explained how people 'went to the roads. Then for a couple of days some of them went on a night watch, even mothers slept near the road and stayed up late so if there's any information, they would quickly receive it' (Interview 3F, 18.08.2014: 65). This not only highlights the residual distress felt by the residents of Kemiri but also the importance of acknowledging the propensity of locals to make decisions about Merapi.

Scanlon (1997: 3) writes that there has been a tendency amongst disaster research scholars to perpetrate the view that 'warnings, even accurate ones, may lead people to panic;' that victims of disasters will be 'confused and in shock, unable to care for themselves.' A recent publication by Rebecca Solnit (2009), exploring the social consequences of five major disasters,[17] provides a rich description of how surviving populations coped and flourished in the post-disaster period. So while Scanlon and Solnit attempt to debunk the myths about panic-stricken disaster affected populations, the responses from this research indicate that they are present in the disaster mitigation thinking in Kemiri village. However, the variation in answers would suggest that there is also acknowledgment of the capacity of the local community in responding to the threat of volcanic eruption.

Additionally the narrative of 'do not panic, stay calm and be prepared' comes across in the respondents' dialogue. While none of the male Interviewees spoke of their own panic (although Interviewee 11 did talk about the trauma he experienced as a result of the 2010 eruption) two of the female participants included descriptions of panic in their 2010 experience. The majority of Interviewees expressed knowledge about the need to remain calm and not cause panic, illustrating a gender-neutral understanding of preparedness leading the composed reactions.

5.7.2. Similarities and differences – Gender-based social expectation

While the researcher concluded from spending time in Kemiri that families tended to work together to minimise risks associated with Merapi hazards, there was a division of labour along gendered lines. For example, men were generally expected to look after property (like farm animals), while women were expected to prepare the home and attend to children and sick family members. While this helps explain why people within the community of Kemiri may be differently vulnerable to the disaster, it also elucidates the gender-based social expectations. One that emerged from the interviews were the expectations placced onmen.

In describing the process of evacuation Interviewee 1 explained that first women, children and elderly are evacuated first 'but the healthy men, before the status becomes

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17   Solnit examines the 1906 San Francisco earthquake; the 1917 explosion in Halifax, Nova Scotia; the 1985 Mexico City quake; the 9/11 terrorist attacks, and Hurricane Katrina's destruction of New Orleans 2005, and argues for the acknowledgment of the capacity of the real first responders.

Awas (beware: level IV) then they'd still stay' (Interview 1M, 18.08.2014: 77). When asked if the men who stayed on the mountain discussed their feelings, or admitted if they were scared Interviewee 1 said 'yes, so ah... well... with communication, they can reduce their fear.' While Interviewee 1's answer was not overly descriptive it illustrates that the men who stay acknowledge the risk they take.

This differed from Interviewee 6's perspective. He had a history of volunteering with SAR and provided a fascinating snapshot into his experiences of searching for victims of eruptions and missing hikers. When asked how he coped with the stress he claimed, 'because I'm already trained, it's impossible for a SAR member to be scared when looking for bodies hahaha...' (Interview 6M, 19.08.2014: 71). This response implies that Interviewee 6 was not free from social and cultural norms that expect men to be strong and face crises in a masculine manner.

Another instance of men acting in accordance with gender-based social expectations is in the example provided by Interviewee 9. She stated that 'only my husband' returned to Kemiri, despite government warnings not to, 'because at home we have livestock and they need to be fed' (Interview 9F, 20.08.2014: 54). This highlights the vulnerability men face in living up to their reputation as stereotypical 'breadwinners' in the context of engaging in risky livelihood activities (UNISDR 2013: 9). It should be noted that Interviewee 8 joined her husband when they came back to check on their property, however this subject was not probed further.

Whereas these two women had different experiences of access to Kemiri they both shared similar experiences whilst in the evacuation centre. When asked about the evacuation centre Interviewee 9 explained, 'there were no activities at all. I was just sitting around' (Interview 9F, 20.08.2014: 56), and Interviewee 8 objected, 'so far, we're not given any activities. We actually want to have activities so we don't get bored, but so far there's nothing' (Interview 8F, 20.08.2014: 52). This demonstrates the aptitude of people and the significance of keeping active, in particular refraining from victimising the members of disaster-affected communities.

Interviewee 7 went as far as to recommend activities: 'so I don't get bored, I'd like if there was any activities, like making handicrafts and when we get home we can sell it... it can be for our source of income, aside from being a housewife' (Interview 7F, 19.08.2014: 61). This illustrates the importance of considering all sectors of the community in programs for livelihood-focussed recovery, as well as context-specific tailoring of programs.

Therefore, while the men of Kemiri village are expected to fulfil social and cultural norms by being strong and facing crises in a masculine fashion whilst continuing to be the stereotypical 'breadwinners', women are confined by their position as housewife and carer. As none of the men raised concerns with the evacuation centre facilities or services, one assumption is that women are confined by their subordinate position within society, categorised with the elderly and children, and therefore excluded from decision making processes.

5.8.   Discussion of research findings

Twigg's 'Characteristics of a Disaster-Resilient Community (CDRC): A Guidance Note' proved invaluable in identifying characteristics of resilience within the community of Kemiri. There are many issues that emerge from the interviews that are pertinent to building resilience, however this discussion section will concentrate on characteristics that illustrate gender distinctions. As illustrated in the sections above gender was relevant across all five CDRC thematic areas, however, gender distinctions can best be defined according to the following categories: inclusion and representation in official structures; information dissemination; gendered identity and division of roles, and society-based expectations. The following paragraphs will explore these four themes in greater detail.

From the interviews it can be concluded that interactions with official bodies, like the BPBD, are predominantly male led, reflecting a lack of female inclusion or representation in community decision-making and management in regards to disaster risk reduction. This limited access was demonstrated in the lack of female participation in risk or hazard assessments. Additionally, discussions about mechanisms to express opinions about previous experiences with or future concerns about Merapi revealed differing experiences for female and male interviewees. Female participants provided concrete examples that required action and were linked to family or community issues. Generally they reported speaking to some one they knew, like the leader of the village, in comparison to male interviewees who linked problems back to the overall governance structure. This was particularly pertinent in the example about the lack of logistics and appropriate relief in the evacuation centre. Kemiri women were evidently not consulted in the processes around evacuation planning. In contrast male respondents spoke about problems in general terms, which implies men have a greater level of interaction with, or confidence in, governance bodies when dealing with issues pertaining to Merapi.

Similarly the manner in which information was disseminated throughout the community highlighted difference between the sexes. From the research findings it can be concluded that a community system was in place, *Gethok Tular* (surmising that information was shared and discussed by inhabitants). The responses by participants suggested a parallel system, divided between male and female residents. While this was evident in both the governance and risk assessment thematic areas, the discussion about mechanisms to express opinions within the community also demonstrated that the information networks within Kemiri were drawn along gender lines. Furthermore, responses also showed that this was not only separated by sex but also position within the community, for example Interviewee 2 had more access to information because of her position as wife of leader of the village. This further highlights the importance of understanding the gender constructs of communities.

While information flows appeared to be separated, so too was the division of work. The discussion about occupation highlighted the gendered nature of working identity, as well as the unpaid work undertaken by the female Interviewees. This was also evident in the discussion about volunteerism. Participants' comments confirmed that, in both pre- and post-disaster situations, women were predominantly responsible for domestic tasks and

caring for children and elderly or disabled members of the community, while men took traditional roles of tending to property.

Nevertheless as seen from the discussion under thematic area 4, male participants were disproportionately affected by social and cultural norms. They engaged in risk-taking activities: despite government warnings they returned to their properties, living up to their reputation as 'breadwinner'. However, the research findings also reveal that the female participants were restless in the evacuation centres. Female participants expressed a desire to learn new skills, indicating a desire to increase their own capacities and to diversify income sources.

The impact of gender based social expectations was also evident when Interviewees spoke about a hypothetical relocation. While female respondents were more likely to frame it as an undesirable but inevitable event, male participants negatively associated it with access to their livelihoods.

The consequences of gendered work identity have interesting implications for disaster risk reduction programming. In Kemiri, males are expected to risk their lives to ensure the viability of their livelihoods, while females were bored in the evacuation centres. This signifies that strategies need to take account of these radically different experiences and identify interventions that protect men and engage women.

6. Outlook and Recommendations

While Merapi's volcanic activity continues to threaten the villages encircling the mountain, the question remains: how will this threat be dealt with in the future? This Working Paper has demonstrated the importance of incorporating a gendered dimension in community-based disaster risk reduction (DRR). Before providing a conclusion the following section provides recommendations to reduce the risk of disaster and further areas for research.

6.1. Recommendations

The consequences of the gendered distinctions within a resilient community, as highlighted in this Working Paper, have crucial implications for DRR programming. While ensuring better outcomes for disaster-affected populations requires a multidimensional approach that includes governments, humanitarian organisations, academics and local community participation, the following paragraphs provide examples of how this might be achieved in Kemiri.

To effectively reduce disaster risk in Kemiri, programs and projects must identify and acknowledge the distinct capacities and skills that both women and men contribute to risk reduction. This could be achieved by:

- Acknowledging that leadership by both men and women in the community is essential for effective resilience. A gender perspective is particularly necessary in contingency planning and response. For example, the inclusion of women in the evacuation planning phase would facilitate the appropriate distribution of domestic goods and appropriate sanitation facilities.

- Increasing coordination and information exchange (both vertical and horizontal) within the community. Despite the established social information and communication channels (*Gethok Tular*), acknowledging the gendered nature of the content and methods of communicating could enhance community developed and understood information on risk, vulnerability, and disaster management practices within Kemiri.

- Creating DRR initiatives that build the capacities of both men and women equitably, by training both in the use of new technologies, such as the early warning systems (EWS).

- Acknowledging traditional practices around livelihoods. The gendered work identities within Kemiri led men to engage in risk taking activities to tend to their property. This requires a strategy, which could be in the form of an animal evacuation plan. Additionally, engaging women 'stuck' in the evacuation centres would lead to income diversification and capacity building.

The interviews showed that families in Kemiri tended to work together to minimise risks associated with hazards, which highlighted that different people within a community had different vulnerabilities and capacities in the event of an eruption. While the research findings will not necessarily be applicable outside the sampled participants, the overall consideration of resilience and gender in the village of Kemiri adds to the literature seeking to enhance focus and agency on gender and community resilience. The following section will explore other ways in which DRR can be understood.

6.2. Further research ideas

While acknowledging that assessment schemes will always need to be customised to fit the context to which they are applied (i.e. context-specific initiatives), considering how DRR programs intersect with inequalities of race, ethnicity, class, age or physical ability will better target the needs of disaster-affected populations. Criticism of DRR often centres on anecdotal rather than analytical evidence; this illustrates the importance of continued research at the community level. From the analysis and discussion in this Working Paper the following areas of research would add to the existing literature on disaster:

- How to strengthen and protect livelihoods in Kemiri. This is in line with the current academic and practitioner discourse on not just 'saving human lives' but also 'protecting and strengthening livelihoods' (LEGS 2009: 8). While it is Merapi that makes the soil fertile (explaining the high levels of agriculture), Merapi's eruptions hinder farming and animals die from respiratory problems. This indicates the need for strategies around evacuating livestock and increased disaster mitigation plans around agriculture.

- Vulnerable groups. Elderly men and women may have limited mobility and require the support of family member or others in the community. People living with disabilities may also need additional time and support to be able to respond to hazards. Exploring how to recognise and address these differing needs could effectively contribute to reducing vulnerability to hazards.

- Exploring the needs and capacities of the lesbian, gay, bisexual, and transgender (LGBT) community in DRR policies and practice. Further research is needed about the difficulties faced by LGBT members of society in accessing and receiving support from relief workers and the relationship between relief efforts and further marginalisation and discrimination.

- Further research on indigenous knowledge and practice. A closer examination of Javanese culture (including spiritual beliefs and their impact on behaviour) and strategies traditionally employed by locals, like the practice of mixing organic matter with the volcanic ash to increase the fertility of the soil. Understanding the similarities and differences between tradition and technology in DRR would also aid in program planning and implementation.

- Investigation of the impact of not being able to return to tend to property (inability to live up to the gendered expectation of being the 'breadwinner'). Additionally, further analysis of post-traumatic stress and/or marginalisation would be beneficial when considering disaster responses.

Both academics and practitioners can work together with local populations to develop evidence based programing, ensuring better outcomes for disaster-affected people.

6.3. Conclusion

Twigg's (2007) 'Characteristics of a Disaster-Resilient Community (CDRC): A Guidance Note' proved a reliable framework to study the central research question enabling this Working Paper to demonstrate the significant role gender distinctions play in the resilience of a community in dealing with disasters.

While the data collected clearly illustrated that gender was applicable across all five CDRC thematic areas, some identified gender distinctions more acutely than others. The research results show that women were less likely to be included or represented in official structures, which, in the instance of contingency planning had led to inappropriate facilities in the evacuation centres and untimely distribution of relief. This discrepancy also highlighted society-based expectations along gendered identity.

While not underestimating the role and importance of family in Kemiri (families seemed to work together to minimise risks associated with Merapi) the results show that gendered role divisions generated divergent experiences. This substantiates the proposition that gender relations within Kemiri impact the resilience of community members in the event of an eruption. Furthermore, it highlights the importance of taking into account the experiences of people and looking for approaches that protect against vulnerabilities as well as engage capacities.

The results of this Working Paper feed into the wider discourse on disaster. It is hoped that the results will prove useful for humanitarian organisations, academics and disaster-affected populations alike, enhancing capacities and reducing disaster risks.

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Appendix

Semi-structured Interview

My name is Lily Gardener and I am doing a research stay at Universitas Gadjah Mada (UGM). I am thankful that you found the time to speak to me today. I am from Australia but I am studying a master program on humanitarian action in Germany. I am here in Kemiri to conduct research on how gender relations impact the resilience towards Mt Merapi volcano in regard to Disaster Risk Reduction (DRR).

The research results will lead to my thesis, which will be published in English and provided to my university, the POHA office at UGM and to you if you would like it.

We will be asking questions and you are free to provide answers that are as short or as long as you would like. Any additional information you would like to give, including information that is not specifically asked for, is appreciated and welcome.

Your participation is completely voluntary. You can stop participating at any time without providing a reason. You can also skip questions you do not feel like answering by just saying 'next question.'

To remember your quotes correctly I would like to tape this interview. I will use the information anonymously (no names mentioned).

If you are happy to do this, we would now like to ask you some questions and have an open discussion about them. I am also happy to answer your questions.

Questionnaire

Can you tell me about your experience with Merapi? How does it affect you?

Governance:

1. Do you engage with local authorities (BPBD, sub-district or village) regarding Merapi DRR?
   Follow up questions:
   – Are you employed by the village government?
   – Have you participated in the Forum Pengurangan Resiko Rencana?
     ⇒ If no: Who from the community engages with local authorities re DRR?
     ⇒ If yes: How do you feel about the support from local authorities regarding DRR in your community?

2. How is the information communicated to the rest of the community?

Risk assessment:

3. Do you know if a hazard or risk assessment has been undertaken about Merapi?

4. Did anybody ask you to input into the assessment? Do you know who (who else) they asked?

5. How have the findings been shared and discussed with the rest of the community?

Knowledge and education:

6. Have you participated in any training for Merapi DRR? (Training from NGOs?) Why? / Why not?

7. If yes: Was community experience in previous eruptions discussed in the training?

8. In the event of an eruption are you a village volunteer? Which community members have received volunteer training (e.g. hazard-risk-vulnerability assessment, search and rescue, first aid, management of emergency shelters, needs assessment, relief distribution, fire-fighting)?

Risk management and vulnerability reduction (livelihood):

9. What sort of work do you do?

10. If Merapi erupted and you were unable to undertake your current job, what would you do to support your family?

11. What if the village was so badly damaged that the government wanted to relocate you, what would you do? Would you choose to relocate or would you continue to do your current work?

Disaster preparedness and response:

12. Is there an early warning system? Can you tell me how it works? Were you consulted in the design process?

13. How do people express their opinions about previous experiences with Merapi? Are these views used? And how are they used?

Demographics:

Age:

Highest level of education:

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