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Shaping collective action for community-based disaster management in Merapi, Central Java, Indonesia

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ABSTRACT

Situated in Yogyakarta's northern region, Merapi is one of Indonesia's most active volcanoes. Surrounded by densely populated farming communities, Merapi has had 68 eruptions since 1548. Merapi's 2010 eruption was marked by bursts of ash clouds, subsidence of its top-most layer, inundation of rivers and soils by lava currents, and the alteration of its surrounding natural landscapes. Local communities depend on the natural resources on Merapi's slope for farming, livelihood, and subsistence. The eruption had sizable impacts on community lives in terms of living conditions, livelihood, and social and political structures. The dynamics of community life in response to Merapi's volcanic activities are highlighted. Using a particular focus on farming communities as the case study, the article discusses community user groups' adaptive management capacity to dynamic natural landscape frequently marked by volcanic eruptions. The discussions support local government in fostering community resilience and social cohesion in response to Merapi's activities. Empirical findings suggest that social institutions and local rules come into play and the people practice collective disaster management on behalf of the community. These social institutions take the form of neighborly ties, reciprocity, collective identity, and social and ecological responsibilities. Merapi's pasture is not free access, but dynamically governed by local and informal rules to maintain its benefits for the safety of the community.

Key words: rational choice approach, collective action, devolution, power, private property, citizenship, identity, social capital, engagement, patron-client, community of communities

BACKGROUND OF THE STUDY

Merapi volcano, situated in the northern most region of Yogyakarta Province, is known for its frequent and intense eruptions. Records suggest Merapi has erupted 68 times, with a short interval of 2-5 years and a long interval of 5-7 years. Volcanic activity is present all year round, with minor eruptions occurring every 2-5 years. In its 2010 eruption, Merapi spewed out over 50,000,000 m^3 of hot lava with a temperature of 600 °C and a thermal energy of 6 megaton TNT or 300 times that of the atomic bomb in Hiroshima. Merapi's 2010 eruption has a Volcanic Explosivity Index of 3.5, leading to the utter destruction of its top-most layer and the vast alteration of its surrounding ecological landscape due to magma deposits and the inundation of rivers and landscapes by lava currents.

Surrounded by densely populated farming communities, the 2010 eruption caused substantial infrastructure damage and had sizable impacts on community lives in terms of living conditions, livelihood, and social structure. Merapi's eruption affected more than 4,826,380 lives in four regencies with a total of 334,442 km^2. The regencies affected by Merapi's eruption in Central Java Province include *Sleman* Regency, *Magelang* Regency, *Boyolali* Regency, and *Klaten* Regency. *Klaten* and *Sleman* Regency suffered greatly from the eruption. The number of casualties reached 346 people, with five people lost and 121 heavily injured. Another impact of the November 5, 2010 eruption was a wave of refugees within 20 km of the eruption. According to a report by the National Disaster Mitigation Coordinating Board (ie, *Badan Koordinasi Bencana Nasional* or *BAKORNAS*) more than 6,300 people were displaced. The total estimated

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damage and loss due to Merapi's eruption was worth up to Rp 5,405 trillion in housing, infrastructure, livestock, land, entrepreneurial activities, and livelihood. In the housing sector, the loss and damage to homes were the second largest out of the total amount, with half of the loss due to treading and destruction by cold lava currents and hot funnel clouds. The damage to facilities and infrastructure was quite extensive. There was a large number of damage and loss of forests and pastures, while the biggest loss was in crop, horticulture, livestock, and farmland. Dairy farmers lost their grazing grounds for their cows and sheep.

THE OVERARCHING RESEARCH METHOD

Through a case study of 12 districts (*kecamatan*) in four regencies (*kabupaten*) affected by Merapi's 2010 eruption, the article analyzes government effort in promoting participation and inclusion in community-based disaster management. The adoption of ethnography and the case study approach stems from the need to observe social capacity in its dynamic contexts and contextualize the inquiry within its context. Participant observation, open-ended interviews, and biographical inquiries are used to obtain primary data. Primary data are analyzed through coding, categorization, comparison, thematization, and a comprehensive analysis of the themes which emerged. Secondary data are derived from government reports and are utilized to gain a better understanding of the informants' perspectives. The selection of informants is based on the extent of the informants' involvements in mitigation, recovery, and reconstruction, the implications which government and donor agency-induced programs and projects have on research informants and on the need to triangulate so as to ensure adequate representation of community user groups. The regencies in the Province of *Central Java* that are chosen as the case study sites include the regency of *Magelang, Sleman, Klaten*, and *Boyolali*. Site selection is based on the extent which the impacts have on the landscape and the people. Data collection was conducted from September 2011 until August 2012. The total number of informants amount to 297 people.

Using ethnography and qualitative inquiry, the research is a social inquiry of community-based disaster management in Central Java, Indonesia. The pertinence of the ethnographic method lies in its ability to disclose the social and political constructions underlying community-based disaster management in the case study sites. The research examines the "rules" for constructing social reality and common sense within the field settings, including how these rules are applied, maintained, and transformed in the face of power relations. The case study approach is incorporated to acquire in-depth, detailed, and complex understanding of people in their natural setting (Table 1).

In Merapi, the various government programs and projects incorporated for disaster management

Table 1. Research informants in Merapi

Research informants	Number of people	Research informants	Number of people
Farmers and livestock breeders	25	Village heads	25
Landless farmers	25	NGO personnel	15
Dairy farmers	25	Task force members	20
Displaced persons	25	Task force leaders	7
Ecotourism guides	5	Donor organizations	5
Farm and construction laborers	15	*REKOMPAK* personnel	5
Motel owners and merchants/ traders	15	Disaster mitigation extension agents	10
Community elders	25	National government officials	2
Religious leaders	10	Provincial government officials	3
Community leaders	25	Regency government officials	10

are under the jurisdiction of the provincial and regency governments and are centrally administered by a coordinating agency through the adoption of an umbrella program financed by the government and various donor agencies. Programs and projects directly related to disaster mitigation and reconstruction include the formation of task force teams for routine disaster mitigation practice, relocation, reconstruction of housing and communal barns, reconstruction of electricity and road facilities, institutional strengthening of local cooperatives, funding for replacing dead livestock (ie, mainly cows, goats, and sheep), and replanting affected areas for sustainable practices. A program which was still in effect during our investigation was the community-based reconstruction program funded by the World Bank carried out by the government and a local organization called *REKOMPAK* in *Cangkringan District*. Those involved in *REKOMPAK* were local government officials, villagers, and academicians from *Gadjah Mada* University in Central Java.

GOVERNMENT INITIATIVES FOR DISASTER MANAGEMENT IN MERAPI AND ITS ISSUES

Indonesia is prone to natural disasters due to the country's geomorphological make-up. A systematic and coherent natural disaster mitigation plan is perceived necessary by government officials and donor agencies. The Government of Indonesia (GOI) incorporated mitigation plans based on human rights principles and the need to protect the natural environment as stated in the country's constitution. Natural Disaster Counter Measures No. 24/2007 stipulates the steps in natural disaster management before, during, and after the occurrence of disasters. The above mechanism comprises a chain of cycle, starting from the policy for land use, the adoption of disaster mitigation measures, the initiatives for emergency response and evacuation, and the process for rehabilitation and reconstruction. Enforcement of natural disaster counter measures is the responsibility of the central and local government and is to be planned, integrated, and coordinated thoroughly. In the event of an emergency, enforcement is done by the Disaster Mitigation Coordinating Board in collaboration with business and international organizations. The provincial and regency government is responsible for combining ways to minimize the impacts of natural disasters with ongoing development.

The Indonesian government's initiatives for natural disaster management are based on Law No. 24/2007 on natural disaster impact mitigation and Government Regulation No. 21/2008 on natural disaster impact mitigation relief efforts. Disaster management is categorized into three different stages, that is, before, during, and after the occurrence of natural disasters. Prior and subsequent to the occurrence of natural disasters, the Provincial and Regency Natural Disaster Impact Mitigation Board (*Badan Penanggulangan Bencana Daerah—BPBD*) play the roles of planner, coordinator, and executor of disaster impact mitigation schemes. During natural disasters they are responsible for coordination, command, and control, and the execution of actions. Law No. 24/2007 stipulates that disaster management is a cycle comprising the formulation and implementation of sustainable development policy sensitive to the risks and threats of natural disasters followed by disaster mitigation, emergency response, and reconstruction and rehabilitation. Figure 1 outlines the cycle of Indonesia's disaster management system.

The provincial government of Central Java adopted the Hygo-Framework-for-Action (HFA) model in community-based disaster management which encompassed three main objectives, namely integrating relief efforts with sustainable development policies to reduce risks, securing institutional strengthening capacities among the different groups, and instilling systematic approaches to reduce risks during emergency and recovery. The HFA model has five main priorities illustrated below in Table 2. The article discusses issues emanating from the above model and highlights possible trajectories for alleviating such issues.

Government Regulation No. 26/2007 on spatial planning aims to harmonize the natural and man-made environment, providing protection to both man and nature while mitigating the adverse impacts of natural disasters. The local government incorporated zoning policies for sustainable development and disaster management purposes (see Figure 2).

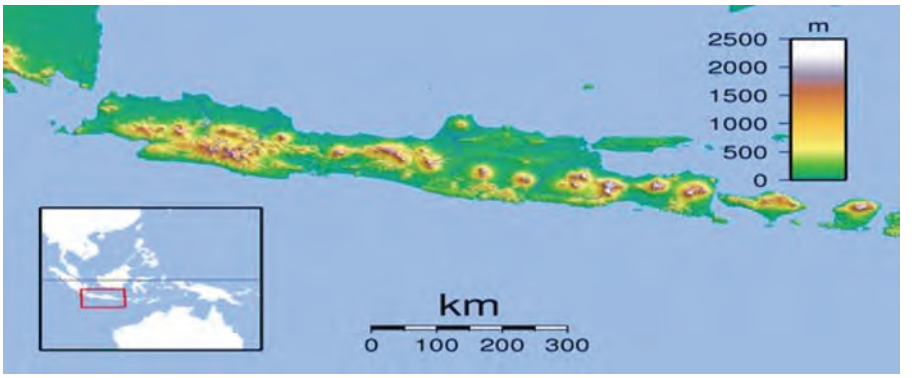

Figure 1. Location of Merapi Volcano in Central Java, Indonesia.

Table 2. Five main priorities in the hydro-framework-for-action model	
1	Ensuring that risk reduction becomes a priority in the local and national government by institution-based implementation.
2	Identifying, calculating, and monitoring risks and increasing the early warning system.
3	Using knowledge, innovation, and education to develop a disaster mitigation culture.
4	Reducing existing risk factors.
5	Strengthening society's readiness in handling disasters through effective response rate in every societal level.

Consistency of law enforcement effort is required to stimulate more organized development plans sensitive to land use and spatial considerations. As outlined in Figure 3, Zone One is 0-5 km from the epicenter and no residential, horticultural or commercial activity is allowed. Zone Two is 6-10 km from the epicenter and is a buffer zone with protected forests and parks where no residential, horticultural, or commercial activity is allowed. Nonetheless, contrary to current land use policies, in Zone Two there are sedentary farm lands, livestock grazing grounds, and numerous semi-permanent residential housings and motels for tourists. Zone Three is 11-15 km from the epicenter and is marked by somewhat sparse, semi-permanent farming communities, grazing grounds, and residential housing. Zone Three is where victims are taken for safety. Zone Four is 16-20 km from the

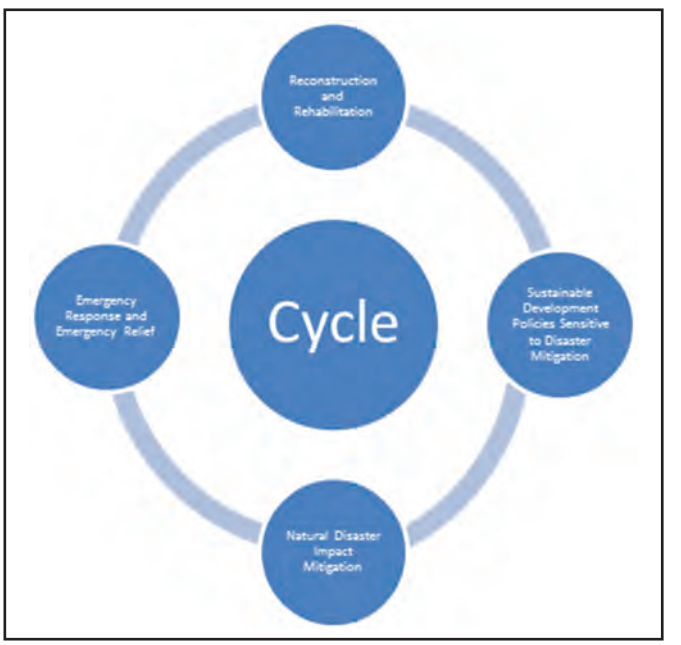

Figure 2. Indonesia's natural disaster impact mitigation cycle.

epicenter and serves as a catchment area with denser farming communities and residential housings.

The provincial and regency governments established task force teams in the four regencies affected by Merapi's eruption. The job of the task force is to ensure disaster awareness, to train community groups in mitigating and managing disasters, and to provide emergency response and relief in times of distress. Training is conducted to minimize the risk of disasters, especially in villages traversed and affected by lava currents. Subsequent to Merapi's 2010 eruption, regular trainings on disaster mitigations are

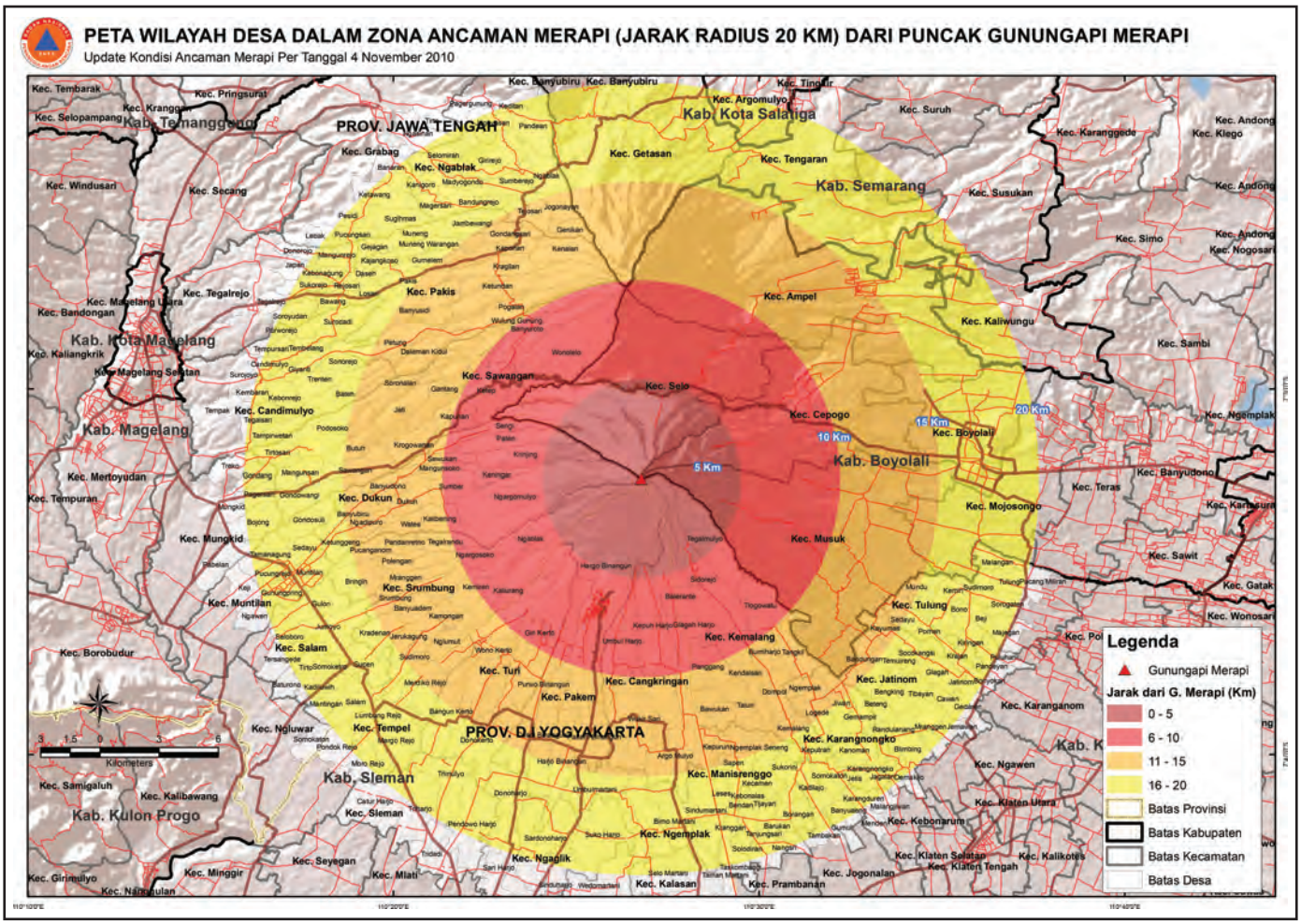

Figure 3. Zones in Merapi Volcano.

conducted in Taman Agung's village hall in Muntilan within Magelang Regency. The budget is derived from the local government. Participants coming from 13 villages are trained by *REKOMPAK* personnel, all of whom are affected by Merapi's eruption. Community members are combined into two to three groups in accordance to their vicinity. After training, community members are requested to devise regular procedures (*Protap*) for disaster mitigation, including initiatives which have been practiced beforehand and their experience in handling natural disasters. The draft is then synchronized with contingency documents in the local government. In 3 days' time, community members receive modules from trainers. The modules include simulations for disaster management and mitigation during normal, alert, and precautionary state.

Collective action for community-based disaster management is conceived by government officials and donor agencies as the aggregation and integration of individual interests articulated through common values.[1] The development of social capital is perceived as the key to facilitating common values and collective action.[1] Social capital is the "network of strong and cross-cutting personal relationships developed over time that provides the basis for trust, cooperation, and collaboration in communities."[2] The perception that social capital facilitates common values and collective action warrants further inquiry. As the actualization of interests requires venturing into power relations, the emergence of social capital could not have taken place in the absence of contentions and struggles. Moreover, there is the need to venture into "the good,

the bad, and the ugly in social capital"[2] to understand the complexity associated with motivation, participation, and collective action. To promote participation and collective action before, during and after disasters, a mechanism for integrating diverse perspectives and interests can be used, such as through coordinated meetings for consensus making and strategic planning. Moreover, integration can be facilitated through mutual engagement, reciprocity, and elevating interests and decisions into political agendas. Consequently, the gap between what was acceptable and unacceptable gradually diminished, facilitating the cohesive integration of diverse community members. Nevertheless, differences are present, and these could not be aggregated through principles of monodimensionality, commonality, and linearity alone.

Lesser[2] noted that some decisions result in the fragmentation of the broader whole due to excessive identification with certain focal groups and collusion against broader aggregate interests. Nonetheless, in the presence of social institutions community groups in Merapi are rewarded with identity recognition and symbolic resources. It is these rewards which motivate groups to act for the common good and align with local exigencies. Groups and individuals will act for the best if they see and acknowledge the importance of their actions. A person's tie and commitment to his or her surroundings cannot be dictated solely by institutions, policies, and monetary incentives; it is very personal and is precipitated by one's sense making, identity, and imagination. Moreover, utilitarianism, quantification, and the institutionalization of property rights embedded within the government's model may lead to the dis-embedding of local communities from their sense-making and knowledge commons in community-based disaster management. The gaps and issues found within the Hydro-Framework-for-Action or HFA model which the researchers encountered within the case study sites (Table 3), along with their possible resolutions, are elaborated and discussed above.

FOSTERING CONNECTION AND BUILDING THE COLLABORATIVE CULTURE

Promoting civic participation and collective action for community-based disaster management requires organization and institutionalization. The need to organize and institutionalize suggests the need for politics; but politics can never be expected to conform to the mandates set out within acts of governance and institutionalization[3]:

> The political is in the social as an ordering and organizing principle, which means that the social as the underlying framework of consensus cannot be prior to the political, or beneath it, enveloping it, restricting it, or conditioning it.

Hence, the social and political will always exceed given regime structures since it cannot be reduced to the interests of the formal and legal institutions where they arise.[3] In Merapi, the community members' perception and connection to the landscape and natural disasters are markedly different at different times. Community groups often subvert and undermine the social constructions underlying disaster management advocated by existing government and donor agencies. Some community user groups perceive the disaster management initiatives advocated by government and donor agencies illegitimate, invasive, and alienating. As well, power struggle does not allow for collective action to be "conceptualized in terms of the consensual decision making approach."[3]

Community members in Merapi contest the social construction underlying the government's disaster management scheme while power inequality shapes what is actually achievable in mitigation, reconstruction, and rehabilitation. As well, social and political processes "cannot be defended on procedural grounds alone since these grounds are themselves in need of being grounded in political values."[3] In Merapi, the tacit "rules" for disaster mitigation, reconstruction, and rehabilitation are grounded not only within local politics at the village level but also within the political relations between donor agencies and government institutions at the provincial and regency levels. Concurrent with Ostrom's[4] remark in *Commons in the New Millenium*, there is the need for government and donors to develop an understanding of the kinds of social and structural relationships that need to be

Table 3. Gaps and issues in the HFA model encountered within the field sites	
Five main priorities in the hydro-framework-for-action (HFA) model	**Issues found in the HFA model within the sites**
Ensuring that risk reduction becomes a priority in the local and national government by institution-based implementation.	1. Partiality, fragmentation, and conflict of interests among the various entities. 2. Nested power relations. 3. Lack of effective and efficient coordination mechanisms. 4. Weak umbrella agency. 5. Weak coordinating agency. 6. Weak legislative and judicial underpinnings. 7. Lack of mechanisms for funding management and funding disbursement leading to fraud and inconsistencies.
Identifying, calculating, and monitoring risks and increasing the early warning system.	1. Operational disconnect: a difference between the actions of one party and the actions expected by another party, or a mismatch in the plans each party has about the physical operations of the response. 2. Partiality, fragmentation, and dispersion of community user groups. 3. Abrupt geo-physical changes and dynamic community user groups.
Using knowledge, innovation, and education to develop a disaster mitigation culture.	1. Gaps in sense making within the various knowledge commons. 2. Informational disconnect: a difference in the information that two or more people possess. 3. Barrier to entry for acquiring information, knowledge, education, and innovation.
Reducing existing risk factors.	1. Partiality, fragmentation, and dispersion of community user groups. 2. Active and passive resistance from community user groups. 3. Community user groups may be too impoverished and disempowered to perform self-help measures. 4. Community-based disaster impact management is divorced from efforts for sustainable development, livelihood security, and socially sensitive land governance.
Strengthening society's readiness in handling disasters through effective response rate in every societal level.	1. Too focused on policies, regulations, bureaucracy, and command control mechanisms. 2. Lack of integration into the political and social institutions found within local sites. 3. Lack of integration with identity, imagination, and sense of citizenship of community user groups. 4. Government and donor agencies act as policy maker and dispense instructions as opposed to acting as broker, negotiator, and arbitrator.

promoted for participative engagement in community-based disaster management to be surmounted. Aldrich[5] noted that "higher levels of bonding social capital can translate into greater levels of trust and more widely shared norms among residents." There is the need to incorporate "the whole community approach."[6] "The Whole Community is a philosophical approach in how to conduct the business of emergency management . . . whose benefits include . . . a stronger social infrastructure and the establishment of relationships that facilitate more effective prevention, protection, mitigation, response, and recovery activities."[6]

According to Adorno,[7] the transition to a liberal market society encourages the self-destructive character of reason, that is of a rationality that turns back upon itself and creates a new realm of universal domination through the destruction of personality and creative social experiences. Fieldwork results suggested that in order to promote the socially responsible culture for collective disaster management, a heightened learning capacity from empowered user communities is essential. Empowerment entails awareness and mobilization for enhancing the basis of social, political, and economic power.[8] According to Friedmann,[8] coupled with these power bases and a heightened

learning capacity for protecting them, an individual's potential for promoting the socially responsible culture cannot be undermined. In Merapi, village and district protocols function as the glue binding the mosaic of community life fragmented under various laws and policies, acknowledging that sustainable governance and collective disaster management is a result of a holistic way of life.

The state-centric analysis of governance usually assumes a civil society willing to collaborate if given the opportunity, and rarely assumes a situation whereby civil society perceives itself as relatively autonomous, leading the construction of citizenship rather than reacting to government policies. The framework of citizenship, when conjoined with governance, offers a vehicle for integrating numerous evolving changes at the nexus of civil society and the state. Pressures for innovations mean that government and organizations cannot afford to stand still, continuing to do what they do best. While there is a desire for innovation, the government's tolerance for risk and change is generally low. In the case of Merapi's disaster management initiatives, the control and security aspects of governing remain dominant, whereas a different scenario persists—that of regulatory citizenship. Government still maintains considerable command and control type regulation of society, but have also become more extensively involved in meta governance, in steering society by setting the rules of the game, distributing resources, requiring others to take responsibility and self-regulate, and by establishing the narratives that shape the nature of problems to be solved and the policy instruments appropriate for resolving them. Nonetheless, the government still needs to figure out how to adapt to, (meta) regulate, and work with entities which do not fit the service versus advocacy category.

Site-specific knowledge commons in community-based disaster management

According to the rational choice approach, shared values and collective action are guided by purposive rationality within a strategic conceptualization of action.[9] Purposive rationality refers to a point of view from which actions can be more or less rationally planned and carried out, or can be judged by a third person to be more or less rational.[10] Instrumental and strategic actions constitute purposive rationality. "Instrumental action refers to non-social actions that achieve set goals through the effective and efficient organization of certain means or standard techniques."[11(p212)] "Calculation of the most successful decision is guided by goal maximization and by the anticipation of decisions made by other goal directed actors."[11(p213)] According to Steins,[11(p214)] "the purposive rationality model was extended into the socio-cultural sphere from the realm of economics to anticipate the behavior of individuals in the face of collective dilemmas and opportunity costs."

The rational choice approach fails to explain a person's acts of altruism in the absence of mandated obligations and sanctions to preserve the common good. Nor can it explain the reasons community groups were able to avow individual rights without undermining collective interests. In the case of Merapi, the capacity to *know and reflect* arises from grounding policy and practice within the specific context of human behavior and the embedded nature of localized meaning and purpose. It is this grounding which holds the greatest promise for providing community members with a voice and incorporating resource users in community-based disaster management. A community leader from *Cangkringan* noted the following with regard to the concept of knowing-in-action and reflection-in-action which assist in preserving the knowledge commons to engender the collectively responsible culture for community-based disaster management:

> The extension agents from REKOMPAK and the community members learn, do things and evolve together throughout the year after being here in Merapi together for so long and experiencing things together. We learn from the government on how to make strategic plans for mitigation and emergency relief, including how to perform first aid, how to treat burned victims and how to make temporary shelters from makeshift materials. On the other hand, the extension agents and government

> learn from us how to track and predict Merapi's activities and cycles, how to read changes in the cloud formation and the weather pattern, how to observe and differentiate various forms of tremors, how to understand changes in livestock and wildlife behavior, how to cultivate plants and many more. They also learn from us how we help each other and what we do to help each other in times of peace and in times of distress. We complement each other and it is the volcano and the land here which teach us many things.

The conceptualization of knowledge-informed-policies and policy-making tools as an objective, transferable commodity has dislocated and divorced knowledge and policy making from human action and the intricacies of everyday practice. Moreover, the translation, transformation, and reconfiguration of knowledge overtime along the knowledge chain are often unaccounted for by government and extension agents in policy making and implementation. In community-based disaster impact mitigation and reconstruction, the translation, transformation, and reconfiguration of knowledge is extremely rapid during emergency and distress and requires the roles of NGOs, government extension agents, and the media to internalize their diversity under the flagship of an umbrella agency governing the mobilization of civil society through public-private partnerships.

Interviews with government officials and extension agents in Merapi suggest that the "design" process in policy formulation and implementation is as much a reflection-in-action as it is a trial-and-error whereby exploratory "experiments" dominated attempts in disaster management due to the volatility in the chain of events. Exploratory "experiment" is the probing and "playfully" engaging activity by which government and extension agents get a feel for things. It succeeds when it leads to the discovery of new initiatives and positive breakthroughs in social engineering. The government's experience in Merapi suggests that policy makers and extension agents can get very good results without intending them and very bad outcomes may accompany the achievement of intended results. The former include the formation and endurance of social capital at the community level for ensuring sustainable development and collective safety long after the occurrence of natural disasters. The latter include resistance from some community groups to relocate and seek refuge in times of disaster despite the government's success in mobilizing the majority to relocate in government funded shelters and protection grounds.

Devolution of authority to foster connection and social inclusion

Complexity, partiality, and fragmentation make it difficult to participate in policy decision making. Devolution of authority in community-based disaster management requires reasoned deliberation, the empowered involvement of community user groups, and a roughly equal valance of power among groups and individuals. An NGO official and community leader in *Klaten* Regency noted that "there has to be a real motivation from government to devolve decision making power to the people and a sustained empowerment and mentoring program for community-based disaster impact mitigation to the people, while the community's voice as one of their form of power also has to be harnessed and incorporated through the People's Representative Council and the Task Force Teams." The head of *Sleman* Regency's Natural Disaster Mitigation Board (BNPB) stated three mandatory aspects required within BNPB's institutional design for devolution before, during, and after disasters, namely the devolution of decision making and the power of implementation to local action oriented units, the connection of community units and organizations to one another and to relevant government departmental units for supervision and resource allocation at the appropriate level, and the rapid adaptation and linkage of the administrative agencies responsible for providing information, funding, technical know-how, and human and material resources.

Devolution of responsibility relates to the capacity of community user groups to give back to the social and ecological landscape for its protection and longevity as opposed to their detriment. In Merapi, to

capture and mobilize the community's potential there is the need to redefine and fine-tune the concept of disaster management to suit local perceptions and facilitate the emergence of local social institutions. These social institutions took many forms, including that of mutual engagement and social reciprocity, neighborly ties and mutual validation, and collective achievement and group identification. It is precisely these institutions within the community which can facilitate initiatives and enduring actions for sustainable development and disaster management in the face of government limitations in funding, infrastructure, logistics, manpower, organizations, and bureaucracy. Deep seated within local power structures in Merapi are patron-client relations acting as an intricate web of social security provider for the marginalized and socially impoverished that are often left untouched by government programs and policies. These intricate webs of social security provider are locally engineered, socially adaptive, politically enduring and especially vital during and after natural disasters. Among Merapi's notable patron-client relations are those between landowners and landless farm laborers, merchants-middle man and farmers, cattle breeders and livestock laborers, dairy farmers and milk men, owners of small and medium dairy industries and dairy farmers, motel owners and tour guides, food stall owners and "chefs," truck owners and sand miners, and heads of households and maids/butlers. An impoverished and asset-less villager who lives deep in the mountain noted the following with regard to the pertinence of local social institutions for disaster management:

> Honestly, sometimes we feel disturbed by the presence of those people from the government who cannot and will not understand us and our circumstances as poor people. They tell us to relocate and bring us in trucks and put us in their tents and give us food and clothing and blankets for a while. But after the charity is gone, what should we do, where do we go and how do we get back to the place where we were and what we did when we do not have any money? How do we get back on our feet again when we have nothing? We are deprived and lost once again. I live far away in the mountain and a lot of times we do not even know in time that there are people from outside the village who will provide us with assistance during disasters. We are just sitting here and we have to help ourselves with the neighbors without anyone from outside the village to come and help us. Actually it is our families and patrons who helped us relocate, who provide shelter and food and who give us money to rebuild our lives afterwards. I am thankful that I have them. We need their help because they are closest and we need to help each other because if we do not help them then next time they won't help us. And people here always remember how much other people helped and gave to each other in the past and, if they have money, they must return the favor in a similar manner. That is who we are and that is what we treasure here. The rich people and the people who have money have to help the poor and the poor people also has to give something to them in the form of energy, labor, assistance or with whatever they have although not in the form of money. That happens all the time but more so during disasters. A lot of us here don't go to government shelters but go to the homes of our relatives, friends and patrons outside the village and district where it is safe. It is far from our home but we go there.

The testimony suggests that as opposed to being disempowering, power is perceived as empowering and is anticipated. The fieldwork results show that localism and egalitarianism neither guarantee the lateral relationship one imagines nor do they warrant the emergence of social reciprocity and social validation that are required for incorporating cultural sensitivity and social solidarity into people's thoughts and

imaginations. Promoting social responsiveness and solidarity requires venturing into complex landscapes and the space which asymmetrical power relations impart for mobilization and change. This space, when instilled with social reciprocity and social validation which motivate the incorporation of cultural sensitivity and solidarity into people's awareness and imagination, leads to the emergence of collective action and solidarity in times of disasters.

Experience from Merapi shows that facilitating devolution, inclusion, and cohesion in community-based disaster management requires a holistic approach incorporating the practice of ecologically sensible and socially sensitive land governance. Empirical findings suggested that the community, through the elders, was determining access and making decisions about land management on behalf of them all which allowed adaptation, livelihood security, resilience, and cohesive natural disaster management. Merapi's commons is governed by local and often informal rules which induced behavior that are in line with a collaborative mentality to maintain its benefits for ecological sustainability and collective safety. Informal rules concerning land use and the extraction, allocation, and distribution of natural resources were found in each of the districts within the four regencies examined. Despite the coexistence of public, private, and collective ownership of land based on indigenous laws, the land and natural resources were governed and utilized based on community "consensus" across landscapes and purported through social reciprocity and identity validation and differentiation. Parcels of land within each district in the four regencies examined were divided into zones and equally reserved for permanent agriculture, sedentary agriculture (ie, dry mountain rice cultivation), industrial plantation cultivation (ie, cultivation of *Sengon* trees or *Albizia Chinensis* for wood production), cattle breeding grounds, sand mining, residential sites, conservation and catchment areas, tourism, evacuation routes, and evacuation sites. The purpose of zoning is to ensure comprehensive land care management whereby the land, the people and the ecological system are given equal rights to co-exist and simultaneously nurture and protect each other. Access to these sites and the extraction of the local natural resources found within the sites were highly prioritized for local community members and required the "consent" of local elders, community leaders, organizational leaders, and informal "guards" who assist elders and leaders in "policing" and "enforcing" local and informal rules. Rewards and "punishments" accrue for compliance and infringements. Rewards for compliance take the form of identity differentiation, recognition and validation as "Merapi's protector," "community caregiver," "disaster first-aid worker," and "local heroes following Mr Marijan's footsteps"; access to the elders and community leaders for information, decision making power, and networks; protection and aid in times of natural disasters from the community and their leaders; and capital for rebuilding lives and businesses subsequent to natural disasters. Sanctions include isolation, warnings in the event of infringements, confiscation of tools and equipment, the responsibility to restore degraded ecological landscapes, providing compensations to victims and the withdrawal of rights and permissions to act as farmers, miners, middle-men, first-aid workers, caregivers and community, village and religious leaders. These unwritten rules include the flora and fauna which can be extracted from conserved sites along with their quantities, the quantity, and place where sand can be mined, the quantity of *Sengon* trees which can be planted, the vegetation which are to be planted and cultivated within the agricultural and sedentary farming zones, the activities not allowed within the evacuation sites, the types and number of animals allowed within the grazing grounds, and the prices which middle men set for commodities bought from farmers. Opening and closing seasons were put in effect in conservation zones, sedentary farming zones, agricultural zones, mining zones, industrial plantation zones, grazing grounds, and in the tourism and evacuation sites. Elders and leaders were expected to be just, wise, and benevolent while prioritizing collective needs and interests and playing arbitrary roles when conflicts and contentions occur. Hence, experience from Merapi affirms that facilitating devolution, inclusion and cohesion in community-based disaster management requires

incorporating the practice of ecologically sensible and socially sensitive land governance.

The normalization of discourse and the regulation of identity for building solidarity, collective action, and social cohesion in community-based disaster management are reinforced through participation in local organizations such as in the Koran and Bible study groups, youth organizations, women's cooperatives for local economic development, dairy farmers' associations, farmers' associations, merchants' associations, disaster impact mitigation task forces, village and community leaders' monthly gatherings, Friday prayers' community, various *arisans* or community gatherings for support and social welfare, PAUD or Parent Teachers' Organizations and many more. Over time, this led to the diversity of power bases in Merapi's land governance and disaster management and, through mutual engagement, discourse alignments, and identity convergence, led to the formation of power structures which were more democratic and socially responsive. These power structures thus understand the institutionalization of voice as a supplement to the system of government, seek to correct the biases in society and acknowledge the existence of corrective and transformative social power in its participatory (eg, conformity, solidarity, willed collective action) and non-participatory form (eg, passive resistance, undermining, subversion, destructive behavior). In the case of Merapi, the above is pertinent for inducing community members to act in a way that benefited the overall good in conjunction to their simultaneous attempt to avow individual rights.

Citizenship and cohesive power structure

Results suggested that despite competing timelines, community members give back to the social and ecological landscape by actively participating in (re) structuring the power structure and social constructions underlying landscape governance and efforts at collective disaster management. The need to intertwine sustainable land governance, collective livelihood security, and joint disaster mitigation resonate loudly across many community groups who refuted the government's partial and fragmented policies to disaster management. The good name associated with the volcano makes even those that thought to benefit as individuals behave collectively in protecting the social and ecological landscape and in securing efforts for collective disaster management. Evidence suggests that community user groups will opt for more sustainable methods of land governance and for more socially cohesive methods of disaster management when their safety and livelihood depend on them. This is exemplified from the following excerpt from a community leader:

> Everything I find in this land called Merapi reminds me of my life's journey. You see there where my goats graze, that is where I courted my girlfriend now wife when I was sixteen, I try to make sure that the goats are happy but also try to remind people to not overgraze over there. You see there where the conserved land is, that used to be barren and dry but we plant trees there and create mounds from rubbles, soil and stones there in order to honor the great Merapi and to return the course of the river to normal so that it will not flood us. That is where I used to play when I was a child with my friends. These land, they are endless, unbounded, boundary-less, uncharted, and they connect one another and connect us to each other. I have land which privately belong to me but I also let others use it because my late mother said to me to take care of the land and the people as her legacy, as our legacy as a reminder of who I am and where I come from and what I am made of. I will never let outsiders buy my land here or use my land here. It is not for sale, never. Not only does my life and safety depend on it, but where else would I go to give me a place to be myself, to enjoy myself, to remind me of my late mother, etc? Nowhere else but in Merapi do I feel like this.

These benign initiatives across landscapes emerged from group attachment to localized settings and governance mechanisms that are adapted to complex and

dynamic settings. Agrawal[12] noted the emergence of environmental subjects, that is, "people who have come to think and act in new ways in relation to the environment." According to Agrawal,[12] "the environment constitutes for them a conceptual category organizing some of their thinking; it is also a domain in conscious relation to which they perform some of their actions." This is exemplified by the following statement from a community member in the task force team:

> When I become a task force agent, I cannot motivate people to care for the environment and to care for themselves and for each other in times of disasters through technicalities only, what I mean by technicalities is through policies, directions, organizational strategies and material and monetary incentives. I have to understand what their imagination is like through how they see their history, place and purpose in Merapi, through what is important to them and through what they find endearing and close to their hearts and minds. They are people, not animals. They cherish many things so much in Merapi on a very personal basis which I have to comprehend as well. We cannot take them out of this location, which is their loving home, their past, their memories, their treasures, out of pure force, we have to have a dialogue with them and convince them that they will not be lost, abandoned, alone and confused. Our disaster management is comprehensive and holistic, and we try to instill comfort in people despite their utter distress during disasters. Nonetheless, there also has to be some force involved. We ensure them that the government, the NGOs, the military, the police, the security guards, the task force agents, etc need to be here and to be followed precisely to institute safety and order and we make them understand that our job as officers is to make them safe and so they must follow our direction to save themselves and to collaborate and work together to save as much lives as possible.

The significance of Agrawal's[12] concept lies in its ability to explain the shift from negligence to active membership, state to community and bureaucracy to democracy. In the case of Merapi, community resilience and the "endurance" of local knowledge for community-based disaster management lies in the power structure, in the patterns of convergence and divergence among community user groups and in the social constructions underlying the land, the people, and the collective efforts at disaster management. It is through a personalized form of affiliation with the landscape that community members retain a commonality on the subject of collective interest and are motivated to protect the discourse underlying sustainability and collective disaster management even when certain actors are perceived to undermine them. Hence, localism on its own does not necessarily promote social and ecological sensibilities. The case suggests "the need to closely examine the premises of one's views, and the ways they could potentially unfold."[13]

In the case of Merapi, the multiple sources of power are harnessed, negotiated, and finessed to surmount the emergence of local power structures which collectively promote sustainable governance, livelihood security, joint disaster management, and social justice. Power is defined as "the capacity to introduce and/or inhibit change in the face of resistance."[14] Utilitarian power includes economic possessions, technical-administrative capabilities, and manpower.[14] Coercive power is the weapons, installations, and manpower which the government uses.[14] Persuasive power is exercised "through the manipulation of symbols, such as appeals to the values and sentiments of the citizens … in order to mobilize support and penalize those who deviate by excommunicating them."[14] Persuasive power rests in the interpersonal ties which bind members of a unit to each other.[14] The various sources of power in Merapi led to the creation of barriers and enablers for the emergence of fair play, equal opportunity, and a sense of community to protect collective needs and public interests in the form

of the social and ecological landscape. Such barriers and enablers are always susceptible to negotiations and change, leading to the potential for further reflection and social sensibilities to emerge.

Co-management of land- and community-based disaster management

Community-based disaster management is closely related to the co-management of land and its resources. The need for co-management of land and resources is based on the assumption that private interests are contradictory to collective needs.[15] As well, Ostrom's Common Pool Resources (CPR) theory suggests that co-management of land and resources can be facilitated through common ownership, consensus, and joint decision making.[15] CPR is an abbreviation for Common Pool Resources, namely natural resources that are non-excludable for use by their surrounding communities but can be governed through formal and informal regulations with regard to its extraction, allocation, and distribution. Examples of common pool resources include land, soil, water, air, and the flora and fauna found within certain localities. The narratives from Merapi suggest that private ownership of Merapi's slope is not contradictory with the need for protecting the social and ecological landscape and for ensuring that local community members can obtain user rights, livelihood, and protection from land owners through unwritten rules and agreements in times of distress. Private ownership of Merapi's land is more associated with public obligations as opposed to private rights. A landowner and farmer noted the following:

> My family's land stretches from the hills over there where the trees are until the valleys down there where the river runs. It was handed down for generations and we live here savoring all that the land has to offer: the mountain, the trees, the rivers, the valleys, the soil, the farmland, the volcano, the animals and many more. They belong to this Merapi volcano. We are only here to cherish and use them temporarily. The land which my family owns is utilized by many villagers who are not our family members. We welcome them as long as they do not destroy the land and help us maintain the different functions which they land intended to do. Some of my land is conserved as forest and protection grounds, some is used as evacuation sites down there, some is used for agriculture by our family and neighbors, some is used for grazing grounds for the villagers while others are just left fallow and empty and that is where the lava and volcanic rocks flow when Merapi erupts. My family members and I think of ourselves as the lucky ones to have the land, the farms, the cows, the goats, the chickens, the trees, but we share these things and the land with others so we can all live together to help each other not only during disasters but in our everyday lives so we can coexist and live together.

The narratives from Merapi suggest that land ownership by local user groups leads to the protection of the social and ecological landscapes. The perceived need to protect the land, the people, and their social constructions is so great that community members refused bad judgments which can undermine their collective effort to safeguard the social and ecological landscape.

In *The Tragedy of the Commons*, Hardin solely assumed two choices to land management for protecting collective needs and interests, either through privatization or state intervention in which public ownership prevails. The failure to promote socially viable and ecologically sustainable decision making leads to the argument for public ownership by the state. Nonetheless, the privatization of Merapi's land can co-exist with social capability and public obligation for their protection and conservation. Noting Hardin's narrow categorization of natural resource management, Ostrom remarked that multiple management regimes are present and that Hardin undermined the presence of social institutions created through mutual engagements.[16] Nonetheless, what Ostrom fails to recognize is that the anticipation of personal rewards emanating from the privatization of land resources

can increase the resource users' motivation for the protection of the land and its people. In Merapi, community members are highly motivated to protect and conserve the social and ecological landscape due to the symbolic rewards (eg, status, identity, political space) they receive from the private ownership and the collective management of the plots and parcels of land. Their private ownership and collective management lead to their association with non-market resources such as that of family time, social life, and eco-systems as opposed to their association with market commodities.

CONCLUSIONS AND RECOMMENDATIONS

Responsiveness for protecting the landscape requires a new space which gives a sense of importance and identity to community user groups. At the heart of this is the need to engage resource users through identity, imagination, and reciprocity. Active engagement of this nature can lead to the creation of space for reflection and change, therefore, stimulating groups and individuals to be more responsive in assuming responsibility for protecting collective needs. Planned changes within policy measures are most likely to result in highly restrictive environments, whereas social, psychological, and political engagements are most likely to result in new space for empowerment and incorporation. In Merapi, proposal for action to secure active participation and group inclusion centers on the extent to which social and political changes are actively secured. Partiality in participation leads to gaps in policy planning and implementation. Nevertheless, resource users across landscapes are also interconnected through mutual engagement, identity convergence, and symbolic reciprocity. An individual's commitment to nature and his social surrounding is very personal and precipitated by identity, imagination, and social constraints. Etzioni[17] noted that the above form of interconnections facilitate the rise of community of communities. Promoting sustained participation in disaster management requires venturing into new political spaces. These spaces are often "absent," nevertheless, when created and purported by social institutions, they can alter the incentive-disincentive scheme and incorporate social and ecological agendas into everyday community life. The case study suggests that the precondition for creating new political spaces include forming new alliances, establishing organizations and stimulating incentives and rewards which appeal to the imagination and identity. To promote good governance and accountability, there is the need to institute sound intervention approach on behalf of donor and relief agencies. The researchers would argue that it requires securing flexibility and adaptive management capacity through negotiations and brokering. Negotiations and brokering are important for responding to dynamic and complex issues in sustainable governance and disaster management. Through them, communication and alignment of the various user groups are fostered, leading to a power structure akin to Etzioni's vision of community of communities which can encourage loyalty to higher levels of governance without undermining devolution within decentralized collectivities.

The researcher argues for three important features in natural disaster funding management. First is the availability of funds from the central government needed by local government and trusted organizations in coping with disasters during the emergency and the rehabilitation and reconstruction phase. The design of annual rehabilitation and reconstruction programs are required since the government needs to raise funds from various parties, either from domestic or foreign donors. This forecasts the government's competence in financing whole projects related to disaster settlements. Second, accessibility of funding is necessary for government and trusted organizations to mobilize efficiently. This is made possible through clear procedures and mechanisms for funding remittance. Third, the distribution of funding and its accountability are included in policies to avoid funding distortion during project implementation. Lastly, the government requires a clear final report concerning its distribution, utilization, and monitoring. Below in Table 4 is a summary of the possible trajectories and resolutions for resolving issues and challenges within the HFA model used by the GOI and donor agencies in facilitating community-based disaster management in Merapi, Central Java.

Table 4. Trajectories and resolutions for resolving issues within the HFA model

Five main priorities in the hydro-framework-for-action (HFA) model	Issues found in the HFA model within the sites	Trajectories and resolutions for resolving issues within the HFA model
Ensuring that risk reduction becomes a priority in the local and national government by institution-based implementation.	1. Partiality, fragmentation, and conflict of interests among the various entities. 2. Nested power relations. 3. Lack of effective and efficient coordination mechanisms. 4. Weak umbrella agency. 5. Weak coordinating agency. 6. Weak legislative and judicial underpinnings. 7. Lack of mechanisms for funding management and funding disbursement leading to fraud and inconsistencies.	1. Increase government's tolerance for risk and change. 2. The control and security aspects of governing should still remain dominant, combined with the concept of regulatory citizenship. 3. Government still maintains considerable command and control type regulation of society, but have to become more extensively involved in meta governance. 4. Government is involved in meta governance while steering society by setting the rules of the game, distributing resources, requiring others to take responsibility and self-regulate, and by establishing the narratives that shape the nature of problems to be solved and the policy instruments appropriate for resolving them. 5. Strengthen legislative and judicial underpinnings. 6. Strengthen umbrella and coordinating agencies. 7. Institute sound mechanisms for funding management and funding disbursement. 8. Asserting the authority of the provincial, regency, and village governments and the Task Force Teams.
Identifying, calculating, and monitoring risks and increasing the early warning system.	1. Operational disconnect: a difference between the actions of one party and the actions expected by another party, or a mismatch in the plans each party has about the physical operations of the response. 2. Partiality, fragmentation, and dispersion of community user groups. 3. Abrupt geo-physical changes and dynamic community user groups.	1. Involvement of higher level authority to create a more egalitarian and equitable local power structure for inclusion, deliberative participation and active citizenship to emerge. 2. Empowering mentoring staffs within Task Force Teams at the regency and village levels. 3. Asserting the authority of the provincial, regency and village governments, and the Task Force Teams. 4. Strengthen umbrella and coordinating agencies. 5. Strengthen coordination mechanisms between entities across the horizontal and vertical lines.
Using knowledge, innovation, and education to develop a disaster mitigation culture.	1. Gaps in sense making within the various knowledge commons. 2. Informational disconnect: a difference in the information that two or more people possess. 3. Barrier to entry for acquiring information, knowledge, education, and innovation.	1. Understanding, appreciating, and incorporating the various sense making and knowledge commons present within the localities in local policies and extension practices. 2. Involvement of higher level authority to create a more egalitarian and equitable local power structure for inclusion, deliberative participation, and active citizenship to emerge. 3. Integrate disaster management modules into the local education curriculum.

Table 4. Trajectories and resolutions for resolving issues within the HFA model (continued)

Five main priorities in the hydro-framework-for-action (HFA) model	Issues found in the HFA model within the sites	Trajectories and resolutions for resolving issues within the HFA model
Reducing existing risk factors.	1. Partiality, fragmentation, and dispersion of community user groups. 2. Active and passive resistance from community user groups. 3. Community user groups may be too impoverished and disempowered to perform self-help measures. 4. Community-based disaster impact management is divorced from efforts for sustainable development, livelihood security, and socially sensitive land governance.	1. Integrate community-based disaster impact management with policies, plans, and extension practice for sustainable development, livelihood security, and equitable land governance. 2. Empower and link the various social institutions at the village level to create self-help community of communities across landscapes that are culturally acceptable and socially sensitive through mentoring staffs and Task Force officials. 3. Provide additional resources in the form of equipment, vehicles, people, and logistical necessities.
Strengthening society's readiness in handling disasters through effective response rate in every societal level.	1. Too focused on policies, regulations, bureaucracy, and command control mechanisms. 2. Lack of integration into the political and social institutions found within local sites. 3. Lack of integration with identity, imagination, and sense of citizenship of community user groups. 4. Government and donor agencies act as policy maker and dispense instructions as opposed to acting as broker, negotiator, and arbitrator.	1. Reflection-in-action and learning-in-action for government, non-government agents, and extension workers. 2. Government and donor agencies act as brokers, negotiator, and arbitrator. 3. Appeal to the identity, imagination, and sense of citizenship of community user groups. 4. Empower and link the various cultural, political, and religious institutions at the village level to create self-help community of communities across landscapes that are culturally acceptable and socially sensitive through mentoring staffs and Task Force officials.

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