A multidisciplinary perspective on supporting community disaster resilience in Nepal

Hossein Baharmand
University of Agder
hossein.baharmand@uia.no

Kees Boersma
VU Amsterdam
f.k.boersma@vu.nl

Kenny Meesters
Tilburg University
k.meesters@tilburguniversity.edu

Femke Mulder
VU Amsterdam
f.mulder@vu.nl

Jeroen Wolbers
VU Amsterdam
j.j.wolbers@vu.nl

ABSTRACT

Fostering community resilience in the aftermath of a disaster constitutes a significant challenge and requires an adequate understanding of the community's specific capabilities and vulnerabilities. We carried out a field study in Nepal as a multi-disciplinary research team that explored how the humanitarian response enabled community resilience after the devastating earthquakes. We explored three elements of resilience: *persistence*, *adaptability* and *transformability* by zooming in and out between the local community and humanitarian organizations operating at the national level. Our combined insights from three disciplines, *social sciences*, *information management* and *logistics*, show that humanitarian organizations operating in Nepal still primarily aimed to (re)build community resilience 'from above' instead of enabling communities to strengthen their own resilience in a bottom up way. In this paper we contend that fostering an inclusive and networked response has the potential to strengthen the adaptive capacity of humanitarian organizations and community groups and boost local resilience.

Keywords

Community Resilience, Multi-disciplinary Research, Coordination, Humanitarian Logistics, Information Management

INTRODUCTION

On Saturday the 25th of April 2015, the Nepal Lamjung region was hit by an earthquake that measured 7.8 on the Richter scale. This was followed by more than 300 aftershocks. As a result, close to 9000 people died and a large number of public and private properties were severely damaged, rendering over half a million people homeless. A few weeks later, on Tuesday the 12th of May, another major earthquake struck Nepal. This time, its epicenter lay near Mount Everest. Measuring 7.3 on the scale, this quake completely destroyed many of the buildings that had been damaged in April.

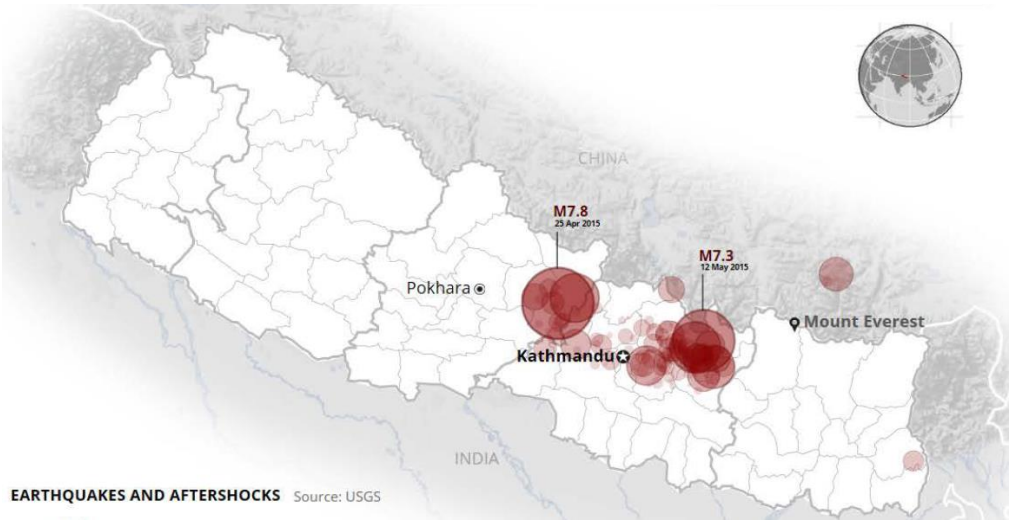

Figure 1. Earthquakes and aftershocks in Nepal, source: USGS

In the aftermath of the disaster, 34 countries came to assist the government of Nepal with search and rescue operations. A total of 60 countries offered Nepal relief aid and humanitarian assistance. The main challenge during this relief operation was to transport relief items to some of the worst hit villages in Nepal due to their remoteness, poor weather conditions, rugged terrain, and threat of landslides. As in previous large-scale disasters, the effectiveness of the response was affected by coordination challenges, logistical difficulties and lack of adequate ICT infrastructure. In order to gain more insight into the complex on-site challenges faced by the various humanitarian actors responding to the crisis in Nepal, we travelled to Nepal to conduct exploratory multidisciplinary research into these challenges. Our research team consisted of scientists from the fields of organizational science, information science, and logistics. This paper presents the findings that this multidisciplinary research effort into disaster management yielded. In doing so, our team draws attention to a methodological challenge that lies at the heart of the ISCRAM community: joining research efforts between computer scientists and social scientists.

Our fieldwork took place six weeks after the second earthquake hit Nepal. There were still some remote areas that had been severely affected, but not received much outside assistance. Nevertheless, at this time the government of Nepal decided to officially shift the phase of the humanitarian response from relief to early recovery. During our fieldwork we learned that this decision - which ended the tax free period for importing humanitarian goods – had been made in part to avoid people becoming dependent on foreign aid. The government contended that Nepali communities were resilient and that this self-reliance should be encouraged. In this paper we explore and problematize how the concept of resilience manifested itself in the aftermath of the earthquake in Nepal. We approached the following research question from three different disciplinary perspectives: *in what ways did disaster relief agencies foster the resilience of affected communities in their relief operations in the aftermath of the Nepal earthquakes?*

THEORY: EXPLORING COMMUNITY DISASTER RESILIENCE

The term resilience has a wide range of meanings and connotations in each of our different academic disciplines. Resilience can be seen as a characteristic of various entities (infrastructures, supply chains, livelihoods, ecosystems, organizations) and be defined in relation to various stresses and shocks (Levine and Mosel, 2014). A common starting point for defining resilience is to consider it as the ability of an actor or system to absorb shocks and to bounce back to its original state. In this sense resilience is seen as: *"the capacity to cope with unanticipated dangers after they have become manifest, learning to bounce back"* (Wildavsky, 1991, p.77). While there is no convergence into one definition of resilience, one concept in all discussions is similar (Mitchell and Harris, 2012): the ability to absorb or resist a stress or shock, and to recover from it.

In different academic fields three levels can be discerned at which resilience operates: individual, community, and ecosystem (Comfort, Boin and Demchak, 2010). Especially the community level became important for disaster research after the analysis of the response to Katrina (Colten, Kates and Laska, 2008) and the 9/11

attacks (Kendra and Wachtendorf, 2003). Analysis revealed that the effects of these disasters were mainly mitigated at the level of the community (Solnit 2010) and that much of the remarkable capacity to overcome these crises was located at this level and not at the overburdened formal response agencies.

Disaster scholars seem to agree with the idea that disaster resilience is about the capacity of communities to cope with external hazards and threats: *"local resiliency with regard to disasters means that a locale is able to withstand an extreme natural event without suffering devastating losses, damage, diminished productivity, or quality of life without a large amount of assistance from outside the community"* (Miletti, 1999, p.33). In response, research on disaster resilience has begun to shift its focus to study how communities are able to respond to and overcome the hazards posed to them by a disaster. Here we recognize two strategies: forecasting strategies which are developed to reduce vulnerabilities; and resilience strategies that are prepared to deal with uncertainties (Normandin, Therrien and Tanguay, 2009). In this context, vulnerability is the characteristics of a person or group in terms of their capacity to anticipate, cope with, resist and recover from the impact of a hazard (Oliver-Smith and Hoffman, 1999). It includes the ability of social entities to absorb the impacts of external and internal system shocks without losing the ability to function, or failing that, adapt, and recover from those shocks (Tierney, 2014). Especially in situations where remote communities are affected, local communities need to draw on their own resources and be self-reliant until relief operations become operational (Paton 2006). Yet, adequate insight into how response organizations try to foster and approach community level resilience in the aftermath of a disaster is still largely absent from the academic debate.

If we look more closely at the different types and levels of resilience, we can distill from these studies three aspects that are helpful for further developing our understanding of this phenomenon: persistence, adaptability, and transformability (Folke et al. 2010). First, persistence is about the capacity to cope with shocks or absorb disturbances. If a community faces a hazard and is able to cope with its effects, its resilience outmatches its vulnerabilities. The community persists and returns to its old status quo. Second, adaptability is about the capacity of actors in a system to influence resilience. It is not so much about whether a community survives an external shock, but whether that community is able to deal with the shock by actively altering its behavior. In other words, can they adapt to deal with the shock created by the hazard? Third, transformability is about the capacity to create a fundamentally new system when ecological, economic, or social structures make the existing system untenable (Folke et al. 2010). Transformability refers to a community's ability to morph into a new social structure and transform its social relations so as to deal with the current hazards it faces as well as any similar hazards it might face in the future. In the words of Weick, Sutcliffe and Obstfeld (2002), transformability enables an actor to come away from a crisis with a greater capacity to prevent and contain future errors.

Current professional and academic knowledge about community resilience at times of disaster clearly shows that communities have an extraordinary ability to overcome the effects of a disaster. The nature and extent of a community's potential for resilience ultimately depends on the coping, adaptive and transformative capacities of the individuals and households that make up those communities. Resilience at the level of the individual and household is determined by the assets people have. Such assets include human capital (skills, knowledge, health), physical capital (infrastructure, tools) natural capital (land, water, air) and financial capital (savings, regular income, access to financial services). The ability to connect, share information and cooperate with other people is key to resilience. This ability is enabled by social capital (Putnam, Feldstein and Cohen, 2004) which, hence, greatly influences people's coping, adaptive and transformative capacities at times of crisis (Aldrich and Meyer, 2015).

Social capital refers to horizontal (with peers) and vertical (with superiors and subordinates) relationships of trust, reciprocity and exchange. Bonding social capital, enables people to work together effectively on the basis of cohesion. Bridging social capital enables people to coordinate and collaborate on the basis of networks that cross social stratifications and identities (Aldrich, 2012). The coping, adaptive and transformative capacities of individuals and households, then, are determined by the type and extent of assets individuals and households have (Vatsa, 2004). This is in turn shaped by the system in which they live. As such, the level and nature of resilience that marks an entire community (i.e. whether and to what extent it can be classified as 'persistent'; 'adaptive'; and or 'transformative') is the outcome of the interplay between the assets individual community members have and the emergent properties of the community as a whole that are the result of these assets.

On the basis of our three disciplinary perspectives, we will explore the three aspects of resilience discussed above: persistence, adaptability, and transformability. We will do so in the context of a case study about a community living in the mountains of Nepal.

METHODS

In this study we combined open and semi-structured interviews with field observations. We worked in teams of researchers with different kinds of expertise. This made it possible to explore the same settings through different disciplinary lenses. Together we looked at coordination, information management and logistics during the first six weeks of the humanitarian response to the earthquakes in Nepal. Our focus was on the interactions between formal responding organizations and between these organizations and local communities. We looked at a range of different formal organizations, including national NGOs, local government bodies, international organizations, international NGOs, and UN agencies.

We arranged our initial interviews prior to our departure through our pre-existing contacts at INGOs and at the UN. We also used online community platforms, especially LinkedIn, to search for potential interviewees and set up interviews. Once we had commenced fieldwork in Kathmandu, we used snowballing to identify new research participants. Furthermore, through our contacts at Kathmandu based INGOs, we were able to arrange visits to their field offices in Rasuwa and Nuwakot district. We carried out most of our interviews in Kathmandu. In total we interviewed 38 humanitarians active in relief operations and spent four days observing interactions between humanitarians and local communities in Rasuwa and Nuwakot. Observing work practices is an important step in understanding what people do, since most actions are so contextualized that people often cannot articulate how they do what they do in a detailed manner, unless they are in the process of doing it (Barley and Kunda, 2001). In order to be able to integrate our different research perspectives during analysis we created a shared topic guide. This guide listed our shared topics of interests, which included decision making, coordination, communication, reaching affected populations, humanitarian priorities (e.g. food, shelter, health, sanitation, etc.) and information tools. By moving through these topics in a semi-structured manner we were able to cover the interests of our three disciplines (logistics, coordination, and information management) and leave enough space to explore how these topics were made meaningful in the work of the respondents.

In this project we took a grounded theory approach (Corbin and Strauss 2008). We recorded our interviews and took copious interview notes and photographs. We wrote extensive field notes recording our observations, impressions and emerging insights. After we returned from our research visit to Nepal we transcribed our interviews, highlighting core issues and ideas and developing these into short summaries. On the basis of our transcripts and field notes we selected events, issues and categories of interaction, around which we grouped our data and structured our analyses. We used these themes to maintain a clear view on the link between the data we collected and the insights we developed (Gioia, 2013). Building on that, we used vignette writing both as part of our analysis and in order to present our findings. Writing "restructures thought" (Menary, 2007) and, as such, developing vignettes can serve as a method of analysis. Writing accounts of this nature involves reconstructing the interactions that took place during the response and relating them to the perspectives of the humanitarians we interviewed. We used this approach to make sense of – and integrate – our observations. The resulting outputs were conceptually-based, vivid accounts of professional practice (Miles, 1990). In our analysis we specifically focused on respondents' interpretations of their own actions and those of others. Our method was characterized by a process of zooming in on the accomplishments of humanitarians and local communities and zooming out to their relationships in space and time (Nicolini, 2009). In order to triangulate our findings we conducted follow-up interviews via Skype and in-person with experts in the Netherlands.

In this paper we present one of the vignettes we developed during our analysis. It is based on a field visit to Rasuwa District. Three members of our research team (one from each of discipline) joined an INGO field worker on her trip to the affected area. On location we shadowed her and other humanitarian actors for two days in order to observe how they worked in the community, with community leaders and with local partner NGOs (Yanow, 2009). We will now explore this single vignette about community resilience - from three different disciplinary perspectives - in order to demonstrate how these outlooks complement each other and show how our combined insights resulted in a holistic picture of this important phenomenon.

THREE PERSPECTIVES ON LOCAL COMMUNITY RESILIENCE

Vignette: the case of Rasuwa

At around 5:30PM a driver came to collect us from the village where we were staying and drove us up to ward no 7. We were accompanied by Rachita, a INGO field officer, and three people who worked for her INGO's local partner. Rachita explained to us that her organization was concerned that the communities living in ward no 7 risked being isolated, as the roads leading up to this area were prone to landslides. The purpose of our trip

was, hence, to assess the situation before the start of the monsoons. We drove into the mountains in a Jeep, packed with eight persons, bumping up and down on a narrow dirt road along a deep precipice. The big rocks on the slope above us looked menacing. The potential hazards in this landslide prone area were clearly visible.

On our way to the ward, we passed various small groups of villagers who were walking down the road, carrying different rice plants and water containers. After driving for some time, we hit upon a truck that completely blocked the narrow road. We left the jeep and continued our journey on foot. We walked down a steep path into what appeared to be the heart of the farmlands on the slopes of the mountain. As we continued our descent a whole new community appeared. Chickens, goats, ducks, and dogs passed us on the slopes. At one point, we noticed that water was running down the rocky path. A quick scan of the area revealed that this was caused by a large water well with a badly leaking drainage hose. Children seemed surprised to see us walking there and followed behind us. As we continued down the path, we passed a small Hindu shrine decorated with characteristic Nepalese flags in blue, red, yellow, green, and pink.

Figure 2. Assessment in ward no.7

When we arrived in ward 8, our first impression - from a distance - was that it looked like a regular rural Nepali village. However, when we continued down the path we noticed that all the original houses had completely collapsed. New, temporary shelters had been constructed with CGI (corrugated galvanized iron) sheets. The temporary shelters appeared to have been constructed well. Most shelters seemed to be completed and inhabited by families. A thick layer of scents descended upon us. The smells of livestock mixed with the smell of food being cooked. It was dinnertime. Given that Rasuwa was one of the worst hit districts in Nepal, the normalcy of the scene surprised us. We noticed that small local shops in between the shelters were full of products. The logistics involved in small-scale local retail appeared to be functioning well. We got the impression that the people of this community were robust and self-reliant.

As we continued our descent, crickets were chirping and frogs were croaking. We passed various people who seemed busy working in rice and cornfields. After a while, Rachita told us that we had left ward 8 and entered ward 7, where her INGO was responsible. The local partner staff in our team examined some of the shelters there. They were not assessing the situation with the help of forms, but rather just took a look to see how the shelters had been constructed. They said that they were quite happy with what they saw. People had reinforced their shelters with tree trunks, stones and other locally found materials. Rachita remarked that the people living there would not leave the area because of the upcoming monsoon rains, even if they were at risk of being cut off from the rest of the world. She stressed that strengthening local resilience is central to survival as the resources people own to make a living are located in the area where they live.

Figure 3. Villagers rebuilding their temporal shelter with CGI sheets

Analysis: Zooming in and Zooming out

We see different aspects of resilience in this vignette. What stands out most is that the community itself was regarded as resilient by the NGOs. These professionals based their assessment primary on the fact that the people in the community seemed able to maintain their livelihoods, and thus appeared to have the capacity to cope (i.e. be persistent). However, as discussed above, there are other aspects of resilience worth paying attention to. In this section we zoom in and out between the level of the community and the level of the humanitarian response in order to explore these aspects in detail.

Humanitarian Logistics

Humanitarian logistics (HL) is central to the delivery of relief items and, hence, supports resilience in terms of persistence. It covers the procurement, transport, warehousing, and distribution of relief items that allow people to continue their normal routines in the aftermath of a disaster - or helps them return to these routines. We found that the vulnerabilities of target recipients determined to a large extent how challenging a given logistics mission was. At several points we witnessed a clear tension between centralized and local HL operations. Zooming in to the level of our case study - Rasuwa - we observed specific challenges for HL: roads endangered by landslides; limited space to land a helicopter; and no buildings that could be used as sustainable long-term warehouses. To deal with this situation, logisticians tapped into local capacities and resources: they created, for example, temporary storage locations in schools and tents and hired local truck drivers to deliver relief materials. Also, not having received much relief from outside, people in Rasuwa used their skills and networks to reconstruct their own houses with whatever items were available, such as CGI sheets scavenged from destroyed buildings. This highlights the importance of local capacity for humanitarian logistics.

Zooming out to the level of Nepal, we noted a number of challenges for centralized HL that affected the country as a whole. Some beneficiaries were hard to reach as a result of the damaged infrastructure and unsafe roads in the mountainous regions. Air transport was virtually impossible due to unfavorable weather conditions and a lack of helicopters. Furthermore, import restrictions imposed by the Nepalese government forced relief organizations to turn to local markets. However, these markets lacked the capacity to adapt to the enormous increase in demand. In their efforts to overcome these challenges, relief organizations turned to the capacities and resources of local people, creating opportunities for locals to deploy their adaptive capacity (for instance, by hiring experienced local transport professionals who used to work in the tourist industry). Relief organizations turned to alternative ways of transporting relief goods and shifted their focus to addressing those urgent local needs that could be addressed with goods that could be procured in the local market.

Looking at centralized HL – that is, at the level of IO and INGO headquarters - the main challenge constituted a lack of time-efficient tools to assess the benefits and limitations of decisions about logistical issues, such as identifying potential warehouse locations, scheduling transport, managing inventories, and/or developing

procurement plans. We found that relief organizations were reluctant to adopt tools that involved quantitative modeling or simulations and noted that they were skeptical about the usefulness of academic HL models in real settings. We found that decision-making was generally guided by experience and simple calculations. The ability to respond flexibly was a core asset due to the high levels of uncertainty and changing risks that mark a disaster setting. As a representative from United Mission to Nepal observed: *"Every five minutes… I'd say every three minutes... it depends... what new information comes, we have to change the plan".* Hence, when it comes to supporting community resilience, in the sense of persistence, it is key to enhance organizations' capacity to adapt to these changing conditions and to recognize - and draw on - local initiatives.

Coordination

As described in the vignette above, on our field trip to Rasuwa we were told that the local roads were at risk of landslides. We also saw a black rubber drainage hose that was leaking badly. These two examples illustrate the ways in which local infrastructure had been damaged and how this contributed to the vulnerability of the people living there. However, we also noted that the shops were full of products. Asking around we found that this was the result of human and social capital: people had the skills, knowledge and social connections required to ensure that the shops remained fully stocked, even in the aftermath of a major disaster. The interplay between the community's assets and vulnerabilities determined people's ability to cope in the face of a major crisis. Zooming out to the level of IO and the INGO headquarters, we saw that humanitarians recognized both the vulnerabilities and coping abilities of Nepalese communities. An IOM representative noted: *"the monsoons are coming, they need waterproof support. They are extremely resilient, but that minimum input, that needs to be there"*.

Zooming back in, we also saw that the people in Rasuwa had already built shelters, using whatever materials were available. Our inquiries revealed that this was in part contributable to their human and (bonding) social capital: they were able to work together effectively and had the skills and knowledge required to do so. Zooming out again, this was recognized at the level of IO and INGO headquarters. As such, an Oxfam representative noted the importance of building on local capacity during the relief operations: *"it is the CGI that they recovered from the houses that had fallen down…because many people don't wait for us. That is also a difference with Haiti, where people were much more dependent and waiting for the aid to come in"*. A person working for a Finnish NGO said,: *"the Nepalese people can adapt to situations very easily, if you can motivate the people they can really come together easily and work in a nice way"*. Indeed, the example of Rasuwa shows how people's human and social capital can shape their own - and their community's - adaptive capacity in the face of a major disaster.

However, social capital - in the sense of social relationships of trusts and reciprocity - does not link all households living in a region. Households that have little social capital and few useful ties to outsiders are very vulnerable. This problem was recognized by (some) professionals based at IO and INGO headquarters in Kathmandu: *"then there is of course the challenge of the forgotten communities, the untouchables. These are the people you will not find on the distribution lists that you get from the authorities. We checked the beneficiary list on ethnicity and found out that some people were missing there"*. Indeed, we noted that some communities were largely disconnected from networks that could give them access to humanitarian resources or information about the crisis. We contend that relief work that builds on local capacities and community networks has the potential to strengthen community resilience, but note that community networks reflect local inequalities and that - as a consequence - very vulnerable households may not be reached in this manner.

Information Management

In the field of information management we also noticed a tension between centralized and local practices. On our numerous visits to IO and INGO headquarters, we noticed that humanitarians continuously sought to update their situational awareness, gathering information from a range of sources about the needs of affected communities and the status of the relief operation itself. Needs assessments constituted an important source of information. Zooming in to information management at community level, we observed instances of how these needs assessments were carried out by local partner NGOs. These organizations conducted surveys to assess, for example, to what extent people were able to access water or produce food. In the vignette above we describe how a NGO assessed the local shelter situation: NGO staff did not use forms but relied on verbal communication. A general impression of the shelter situation in ward 7 was sufficient for them to conclude that this community had enough adaptive capacity for people to maintain their livelihoods – or find new ones – at least for the time being.

We observed a different information management process at the Village Development Committee (VDC) office in the village center. The VDC in Nepal constitutes the local government and belongs to a given national political party. It keeps track of the various needs of the people living in the area. Besides tracking the people and their needs, the VDC also monitors relief provided by NGOs, especially what items are distributed (food and water, non-food items, etc.). The VDC determines what needs should be prioritized and (where possible) directs the aid provided by NGOs to those with the most urgent needs. In an attempt to transform the VDC's paper-based system, an INGO had asked a member of our team to develop and help roll out a database system. This project constituted an attempt to restructure established processes so as to enhance the village's resilience, in the sense of transformative capacity.

Figure 3. The VDC office

Zooming out to the level of humanitarian information management in Nepal as a whole, we noticed a clear tension between information management practices at headquarters and local practices. On our visit we learned that almost every IO and INGO sought to improve their situational awareness by organizing their own data collection (generally through local partners). The majority of these organizations were in the process of adding granularity to their data. Whilst their initial assessments had been high-level, describing for example damage and needs at district level, when we visited six weeks after the disaster, the different headquarters were in the process of 'zooming in' themselves and conducting more assessments at household-level. As one disaster manager from the Red Cross observed: *"it's like a newspaper. If you read about an area you don't know it's always informative and seems right, but if you read about your own area, you always know it's incomplete"*. We noted a tension between the changing information needs of humanitarians based at headquarters (who wanted to add granularity to their data) and the data collection processes used by field staff operating at local level, who were often content with a general impression so as to get a feel for the situation.

We also noted that IOs and INGOs often operate in similar areas. Given that these organizations organize various needs assessments to fulfill their data needs, this poses a risk of efforts being duplicated. This highlights the importance of effective coordination. Local capacity could also play an important role here. Improved access to information and communication technologies could potentially enable communities to (at least partially) carry out their own needs assessments and data collection. Integrating such efforts into formal humanitarian coordination processes, would allow IOs and INGOs to build on and support local capacity.

DISCUSSION

What does exploring the three aspects of resilience by zooming in to the level of the community and zooming out again to the level of humanitarian operations, teach us about the community's ability to cope, adapt and transform - and the ability of the humanitarian community to support these different aspects of resilience? In the table below we list for each of our disciplines the most prominent findings at all levels as well the conclusions based on them.

	Logistics	**Coordination**	**Information sharing**
Zooming in	HL in affected areas demanded adaptation to - and use of - local capabilities, such as using school buildings for warehousing and hiring local trucks.	The local communities we visited were resilient due to their social and human capital, as shown by their ability to build shelters using scavenged CGI sheets.	Local NGOs sought to coordinate aid with a variety of stakeholders using a combination of verbal and standardized methods.
Zooming out	Decision-making in staging areas demanded flexibility and was therefore often based on experience and simple calculations, rather than on quantitative modeling or simulations.	Headquarters often sought to make use of communities' capabilities and networks to coordinate the delivery of aid. Most were aware that this approach could result in vulnerable people being excluded.	Headquarters sought to add granularity to its data so as to enhance its situational awareness and improve its accountability.
Mono-disciplinary conclusions	Work practices and tools in staging areas that draw on local capabilities are likely to enhance resilience in terms of persistence.	Approaches to coordination that draw on resources present in local communities are likely to enhance resilience in terms of adaptability.	Including local communities in data collection and connecting them to information networks is likely to enhance resilience in terms of transformability.
Multi-disciplinary conclusion	In all three disciplines we see the necessity to increase the adaptive capacity of humanitarians so they are better able to draw on local capacities and create a more inclusive and networked response.		

Table 1. Zooming In and Out on Three Different Aspects: a Holistic Conclusion

On the basis of our combined perspectives we noted that communities' existing capabilities were only partially enabled by the humanitarian response. There were few opportunities for members of local communities to link with humanitarian response networks and integrate their efforts with those of formal humanitarian organizations. Even though the efforts of humanitarian responders did boost communities' persistence, adaptability - and to a lesser extent – transformability, communities remained dependent on the IOs and INGOs for crucial information about the response, e.g. when they would receive what kind of aid. Being disconnected made the communities dependent, making it more difficult for them to harness their own capabilities and resources. Local communities were for this reason unable to take a leading role in the response - even at the local level - as they lacked the required information and contacts. Therefore, making humanitarian networks inclusive and accessible to affected communities has the potential to greatly boost community resilience. Doing so would require fostering inclusive and participatory network governance, which would strengthen the adaptive capacity of both IOs and INGOs and that of organizations and groups operating at community level (Boersma et al., 2014).

CONCLUSION

In this paper we have presented an analysis of three aspects of community resilience: persistence, adaptability and transformability, which draws on insights from our three distinct disciplinary perspectives: logistics, coordination and information management. In our approach we have integrated different levels of analysis (local versus humanitarian community) across different disciplines and across different aspects of resilience. This has revealed opportunities and challenges a single lens would not have shown. We noted that efforts to (re)build resilience in affected communities was mainly one directional and top-down. The focus of these efforts was primarily to foster community resilience in terms of *persistence* and *adaptability*. Little was done to enable communities to strengthen their own resilience in a bottom up way, for example by facilitating access to key resources and tools, *especially information* about the response - and direct links to humanitarian networks.

While the research presented in this paper only covers one case study, it demonstrates the usefulness of a more holistic view. A humanitarian response is highly complex and involves many different factors that influence each other. As such, issues like community resilience are not confined to a specific field of study or research approach. In this paper we have shown how multi-disciplinary research into a disaster response could be set up, analyzed, and described - and what potential insights it could yield. We suggest that, in order to arrive at insights that are useful to both practitioners and academics, more researchers in the ISCRAM community put effort into combining different disciplinary perspectives and methodologies.

REFERENCES

1. Levine, S., and Mosel, I. (2014) Supporting Resilience in Difficult Places: A Critical Look at Applying the 'Resilience' Concept in Countries Where Crises Are the Norm, OID, London.
2. Wildavsky, A. (1991) Searching for Safety, Transaction, New Brunswick.
3. Mitchell, T., and Harris, K. (2012) Resilience: A risk management approach. ODI Background Note, Overseas Development Institute, London.
4. Miletti, D. S. (1999) Disasters by Design: A Reassessment of Natural Hazards in the United States, Joseph Henry Press, Washington DC.
5. Comfort, L. K., Boin, A., and Demchak, C. C. (Eds.). (2010) Designing resilience: Preparing for extreme events, University of Pittsburgh Press, Pittsburgh.
6. Normandin, J. M., Therrien, M. C., and Tanguay, G. A. (2009) City strength in times of turbulence: strategic resilience indicators, *City Futures in a Globalising World: An international conference on globalism and urban change*, Madrid.
7. Folke, C., Carpenter, S. R., Walker, B., Scheffer, M., Chapin, T., and Rockstrom, J. (2010) Resilience thinking: integrating resilience, adaptability and transformability, *Ecology and Society*, 15, 20.
8. Oliver-Smith, A., and Hoffman, S. M. (1999) The angry earth: disaster in anthropological perspective, Routledge, New York.
9. Tierney, K. (2014) The social roots of risk: Producing disasters, promoting resilience, Stanford University Press, Stanford, California.
10. Colten, C. E., Kates, R. W., and Laska, S. B. (2008) Three years after Katrina: Lessons for community resilience, *Environment: Science and Policy for Sustainable Development*, 50, 5, 36-47.
11. Kendra, J. M., and Wachtendorf, T. (2003) Elements of resilience after the world trade center disaster: reconstituting New York City's Emergency Operations Centre, *Disasters*, 27, 1, 37-53.
12. Solnit, R. (2010) A paradise built in hell: The extraordinary communities that arise in disaster, Penguin Group, New York.
13. Paton, D. (2006) Disaster resilience: integrating individual, community, institutional and environmental perspectives, in: *Disaster Resilience an Integrated Approach*, eds, Paton, D. and Johnston, D., Charles C. Thomas Publisher, Springfield.
14. Weick, K. E., Sutcliffe, K., and Obstfeld, D. (2002) High Reliability: The power of mindfulness, in: *On high performance*, eds. Hesselbein, F. and Johnston, R., Jossey-Bass, San Francisco..
15. Aldrich, D. P., and Meyer, M. A. (2015) Social capital and community resilience, *American Behavioral Scientist*, 59, 2, 254-269.
16. Aldrich, D. P. (2012) Building resilience: Social capital in post-disaster recovery, University of Chicago Press, Chicago.
17. Vatsa, K. S. (2004) Risk, vulnerability, and asset-based approach to disaster risk management, *International Journal of Sociology and Social Policy*, 24, 10/11, 1-48.
18. Putnam, R. D., Feldstein, L., and Cohen, D. J. (2004) Better together: Restoring the American community, Simon and Schuster, New York.
19. Gioia, D. A., Corley, K. G., and Hamilton, A. L. (2013) Seeking qualitative rigor in inductive research notes on the Gioia methodology, *Organizational Research Methods*, 16,1, 15-31.
20. Menary, R. (2007) Writing as thinking, *Language sciences*, 29,5, 621-632.
21. Miles, M. B. (1990) New methods for qualitative data collection and analysis: vignettes and pre-structured cases, *Internation Journal of Qualitative Studies in Education*, 3, 1, 37-51.
22. Nicolini, D. (2009) Zooming in and out: Studying practices by switching theoretical lenses and trailing connections, *Organization Studies*, 30, 12, 1391-1418.
23. Yanow, D. (2009) Organizational ethnography and methodological angst: myths and challenges in the field, *Qualitative Research in Organizations and Management: An International Journal*, 4, 2, 186-199.
24. Barley, S. R., and Kunda, G. (2001) Bringing work back in, *Organization science*, 12, 1, 76-95.
25. Corbin, J. M., and Strauss, A. L. (2008) Basics of qualitative research: Techniques and procedures for

developing grounded theory, Sage Publications, Thousand Oaks, California..

26. Boersma, F. K., Ferguson, J., Groenewegen, P., Wolbers, J. (2014) Beyond the Myth of Control: toward network switching in disaster management, in S.R. Hiltz, M.S. Pfaff, L. Plotnick and A.C. Robinson (eds.), *Proceedings of the 11th International Conference on Information Systems for Crisis Response and Management ISCRAM 2014*. University Park, Pennsylvania, May 2014, 125-129