# STRIKING A BALANCE: CENTRALISING AND DECENTRALISING DISASTER MANAGEMENT THROUGH NEW TECHNOLOGIES

Policy Report

June 2019

**Martin Searle**

**HADR Series (Part 4 of 4)**

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## Executive Summary

In December 2017 the Centre for Non-Traditional Security Studies at RSIS identified four policy balances that must be struck when using emerging technologies in humanitarian operations. This report specifically explores how to balance the potential of emerging technologies to strengthen centralised disaster management against their ability to decentralise capacity, which could increase the autonomy of affected communities to directly manage their own risks. It presents two principal findings. First, investigating the potential for emerging technologies to decentralise elements of disaster management is under prioritised. Second, while both globally and locally oriented innovators are exploring some possibilities for decentralisation, they do so quite differently. The report offers a series of policy recommendations based on these two findings.

## Introduction

In December 2017 the Non-Traditional Security (NTS) Centre at RSIS identified four policy balances that must be struck when using emerging technologies in humanitarian operations.[1] These are as follows:

1. Balancing humanitarian uses of emerging technologies and other public goods;
2. Balancing the needs of disaster responders and those of the disaster affected;
3. Balancing the short- and long-term interests of those receiving aid;
4. Balancing the capacities of emerging technologies to both centralise decision-making and facilitate individual autonomy.

These provide a framework through which to research and interpret the impact of using emerging technologies for humanitarian purposes. This report explores the fourth balance.

The report draws on two months of field research conducted in Kathmandu, Nepal, between January and March 2019. The research was conducted by Associate Research Fellow Martin Searle, who was assisted by Associate Research Fellow Christopher Chen from 18 to 24 February. The fieldwork involved a mix of semi-structured interviews with government and non-government representatives, informal follow-up meetings and many more conversations with other humanitarian practitioners and academics based in the Nepali capital. The paper also draws on field data from the Philippines. Only conclusions with general applicability are reported.

[1] Searle, M., "Humanitarian Technology: New Innovations, Familiar Challenges, Difficult Balances," RSIS Policy Report, December 2017, https://www.rsis.edu.sg/wp-content/uploads/2017/11/RSIS_HumanitarianTechnology_Final.pdf

## Findings and Analysis

The initial policy paper that grounds this series presented the employment of emerging technologies to decentralise disaster management as potentially the most revolutionary use of such technologies in the humanitarian sector.[2] Emerging technologies present two practical advantages. In disaster response, making extremely localised updates about an unfolding calamity available to the people affected helps them reduce their own risks before external help arrives. Meanwhile, decentralising risk mitigation, preparedness and recovery encourages plans and policies to be "co-created" by the authorities, NGOs and communities. This maximises use of the latter's critical local geographic, political and economic knowledge, and memory of how past calamities have unfolded. Beyond these two benefits, decentralisation increases the autonomy of affected people. This helps redress the power discrepancy between them and disaster responders, which is at the root of many of the sector's largest challenges and indeed scandals. It is also a key component of the "Grand Bargain" initiative hosted by the UN's Interagency Standing Committee, and the Sendai Framework for Disaster Reduction.

Data gathered in Nepal suggest two particular insights in this area. They are each discussed below.

### More investment goes to centralising disaster management than to decentralising it

It was beyond the resources of this project to quantify investments in using technology to strengthen centralisation and decentralisation respectively. Nonetheless, the impression given by interviewees is that significantly more resources go to the former.

As discussed in the initial paper, there are structural factors contributing to this imbalance.[3] First, state and non-state actors within the existing humanitarian system are more likely to see ways of improving how that system currently operates than identify ways to do things differently. Second, both types of actors have clear institutional incentives to avoid reducing their own influence. To realise the promise of emerging technologies to increase the involvement of affected

[2] Searle, "Humanitarian Technology."

[3] For a good overview, see Levine, S., "Markets in Crises: The Implications for Humanitarian Aid," Overseas Development Institute, 2017.

people in disaster management decisions, these counter-productive incentives must be addressed.

**Locally focused innovators create more tools that decentralise disaster management**

The international and state humanitarian responders interviewed generally described innovation research that aids their own efforts to assist those in need. Such research sought to improve the efficiency or effectiveness of pre-existing aid operations, increase the transparency or accountability of existing programmes, or strengthen coordination across the sector.[4] In the words of one interviewee, this is because they operate as the "technical arms" of humanitarian organisations. Examples included using information and communication technologies for feedback on humanitarian programmes; mapping technologies for the organisations' own disaster response planning, risk mitigation and reduction efforts; or tech-enabled cash transfers principally as a substitute for centralised aid distribution. These innovators often expressed a more international perspective on humanitarian innovation, seeking out solutions to challenges that transcended their own local contexts.

In both Nepal and the Philippines, it was mainly locally focused institutions that reported ideas for using emerging technologies to help people affected by disaster to engage directly in their own disaster management. These include both for-profit and non-profit institutions. In one example, a Nepal-based start-up is pursuing natural language processing research specifically in the Nepali language for use with chatbots, interactive voice-recognition, or text-to-speech applications. An internationally focused innovator is unlikely to dedicate resources to a project like this, which is only useful within the country.

In another example, in both Nepal and the Philippines, locally focused innovators have used unmanned aerial vehicles (UAVs) together with open source software to create extremely detailed and highly localised maps. They delivered these to local communities to devise their own contingency plans for various disaster scenarios.[5] Combined with these communities' local geographic, political, economic and social knowledge, and memory of previous disasters, these maps have arguably produced better organised and more sophisticated preparation for

[4] Interview, technical platform manager, 6 February 2019; interview, three international organisation representatives, 18 February 2019; interview, manager, globally focused innovation centre, 19 February 2019; interview, technical adviser, international NGO, 21 February 2019.

[5] See "Maps for Everyone," Kathmandu Living Labs, http://www.kathmandulivinglabs.org/projects/map-for-everyone; Interview local NGO employee, Manila, Philippines, 22 August 2018.

future calamities. Reducing the role of NGO or government intermediaries was crucial to achieving this. This is especially true in countries like Nepal, where local governance structures outside the state have emerged in several locales owing to the state's historically limited presence there.

Mapping software, this time based on crowd-sourced data, was deployed by several local organisations during the acute emergency response phase of the 2015 Nepal earthquake. Making those real-time maps public meant the community-level response — which invariably occurs faster than the institutionalised one — was better organised. Importantly, however, several spontaneous response groups still reported being unaware of the maps' existence at the time, highlighting an opportunity to increase the reach of this decentralising technology by raising awareness of it.

**Locally focused disaster management decentralisation faces three challenges**

First, the architecture of software used to operationalise a set of data can limit the types of information that can be captured and shown on mapping interfaces.[6] Data points that do not fit the structure can be minimised, or even rendered invisible. Others that fit the architecture well can be exaggerated. As such, the software itself influences what becomes "knowable" about the disaster, and thus channels thinking towards taking a particular set of actions.

Such data biases engendered by the architecture of the software are exacerbated by a further concern. Analysis of data collected through such software is often undertaken by experts sometimes several steps removed from the context. The choice of experts is based in large part on the specific technical knowledge they possess. The interpretations of these experts are then communicated to people affected by the disaster. This distant management and analysis of data spreads the burden across more people, speeding up the process, to the clear benefit of the emergency response. But decentralisation suffers as local knowledge, experience and understanding is divorced from that interpretation and analysis. Consider the following analogous example reported from Kathmandu.

The 2015 earthquake seriously damaged two historic city squares: Kathmandu Durbar and Patan Durbar. In Patan, a town adjoining Kathmandu, pre-existing informal community organisations called guthis mobilised almost immediately and took a prominent role in reconstruction. They knew the square's role in

[6] On this, see in particular Burns, R., "Rethinking big data in digital humanitarianism: practices, epistemologies, and social relations," GeoJournal 80, No. 4 (August 2015): 477–490

political and economic life and rebuilt it accordingly. Today, the square reportedly continues to facilitate these community functions.

The guthis around Kathmandu Durbar were reported to be weaker owing to a history of greater state intervention in the management of the square, which is a major tourist attraction. Reconstruction was government-led, and prioritised archaeological and architectural forms of knowledge over local political and economic ones. The reconstructed square is probably more resilient to future earthquakes. But it reportedly no longer functions as a political or economic centre. Like this analogy, disaster management software too subjugates local political and economic understanding, in this case, in favour of technical knowledge. This risks similar negative outcomes.

The second challenge is to avoid romanticising local innovation.[7] Local innovators may be predisposed to explore the decentralisation of disaster management more. But they are as prone to social and political biases as foreign innovators are. While their prejudices will be different from those held by the latter, they exist nonetheless and are perhaps harder to unpick. This challenge is exacerbated by education and training, which often intersects with local socio-economic cleavages. As a result, privileged groups are overrepresented among innovators. While greater research is needed to quantify the extent of the problem, it does appear to be the case in Nepal.

Add to this a tendency among innovators in general to surround themselves with other, like-minded technical experts, and the risk of becoming disconnected from the reality around them grows despite their closer proximity. This is particularly worrisome in lesser-developed environments, given the relatively sparse regulation governing the use of new technology and innovation. This poses a risk to people in need, as noted in an earlier paper in this series.[8] Local innovators may need particular support in this regard.

The third challenge concerns the primacy given to standardisation. In Nepal, data collection and storage among government entities, NGOs and international organisations was described as fragmented and often lacking standardisation.[9]

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7 Interview with senior executive at local innovation centre, 22 February 2019.

8 Searle M., “Striking a Balance: Emerging Technologies, Humanitarian Needs and Other Public Goods,” (RSIS Policy Report, January 2019, https://www.rsis.edu.sg/wp-content/uploads/2019/01/PR190128_Emerging-Technologies.pdf

9 Interview, government official, 6 March 2019.

This undermines situational analysis and interagency cooperation, a problem that affects the humanitarian sector in general. Standardisation is thus being strongly pushed by states, international humanitarian organisations, and a companion paper to this policy paper,[10] as a means to improve these shortcomings.

However, while standardisation is important for centralised coordination and interoperability, it is not a pre-requisite for communities themselves to make use of data. Efforts to standardise data, and to explore uses of unstandardised data, must be undertaken together.

## Internationally focused innovators are decentralising access to skilled labour

Despite the overall imbalance noted above, in Nepal international aid organisations are exploring one avenue for decentralising elements of disaster management. Following a mix of government policy-making and active lobbying by non-government actors, housing reconstruction in Nepal has followed a so-called "owner-driven" approach. Through this policy, affected home owners have retained a degree of choice regarding the location, design and reconstruction of their homes, albeit within centrally determined parameters. At the same time, the policy aims to help owners comply with minimum building standards and access funding.

This owner-driven reconstruction effort relies on several activities based on particular digital technologies, beginning with the use of a tablet-based software application (app) that guides decision-making about the design of homes. Relevant variables regarding the cost and proposed location of the home are fed in, and the app provides a selection of regulatory compliant designs from which owners can choose.

Once construction begins, civil engineers — and, owing to inadequate numbers, final year engineering students — remotely monitor the quality of the building work. They visit construction sites to collect standardised, digitised data on ongoing work. This is uploaded to a database held by the government's National Reconstruction Authority. Government inspectors can thus monitor and periodically visit sites to certify compliance or recommend action to bring structures into compliance.

[10] Searle M., "Striking a Balance: Short- and Longer-Term Interests of People Receiving Aid," (RSIS Policy Report, May 2019.

That same data is also used to populate a public, web-based dashboard run separately by the Housing Recovery and Reconstruction Platform (HRRP).[11] This is based on FieldSight, a digital platform developed for the United Nations Office for Project Services for precisely this sort of remote monitoring. HRRP works to coordinate reconstruction projects and, in practice, to hold those being coordinated — government and NGOs — to account. The data is also used for more general housing policy advocacy.

Nepal's owner-driven reconstruction policy has its critics, whose complaints relate to the amount of reconstruction funding available, the slow release of money, insensitivity to local price fluctuations in materials and labour, and the contextual suitability of the regulations being imposed. But these issues do not relate to the technologies being used and could largely be resolved without altering the data curation and management process that they enable.

Compare this to the criticisms levelled at housing reconstruction elsewhere. Rebuilding efforts following both the 2004 tsunami in Indonesia and Hurricane Katrina in the United States in 2005 had demonstrably lower levels of involvement by people whose homes had been destroyed.[12] Housing built after the tsunami was often sold, or rented out, rather than occupied. Meanwhile, post-Katrina reconstruction has been criticised for imposing an NGO-driven agenda of "building back greener". While laudable in isolation, this agenda was not a priority of the people affected by the disaster and it produced homes that they ultimately rejected.

While it still has problems, Nepal's pursuit of owner-driven reconstruction — strongly facilitated by particular digital data management and software applications — appears to deliver more autonomy to affected people within the reconstruction process. It has so far avoided the negative results seen in Indonesia and the United States. As such, this particular use of technology appears worthy of further exploration.

[11] Interview, Manager, globally focused innovation centre, 19 February 2019.

[12] For an excellent discussion of both of these examples, see Smirl, L., Spaces of Aid: How Cars, Compounds and Hotels Shape Humanitarianism (London: Zed Books, 2015).

## Conclusion

There are clear advantages to decentralising disaster management. However, there appears to be much greater investment in using new technology to improve the effectiveness and efficiency of centralised humanitarian response. This is probably due to the greater resources available to innovators based at established disaster management organisations — governments, international organisations and NGOs — who face structural incentives to avoid challenging their respective positions and influence in the overall humanitarian system.

Those structural incentives that work against decentralisation are compounded by further practices. The architecture of the innovative software that humanitarians are using, and the interpretation of the data it presents, can side-line local knowledge that is important for successful disaster management. In addition, efforts to achieve data standardisation – while important for coordination and interoperability – risk overlooking ways that affected communities can use unstandardised data.

Most attempts to use new technology to put disaster management tools directly in the hands of disaster-affected people appear to stem from more locally focused innovators with less connection to the global humanitarian system. However, these innovators also possess biases of their own that challenge decentralisation.

Despite this overall imbalance, the Nepal case presented an interesting approach by centralised humanitarian responders to decentralise some activities. The case of housing reconstruction in Nepal suggests that government and non-government actors can make their existing pools of expertise in the various stages of disaster management available to local communities through digital data management platforms. The use of these technologies means that certain decisions regarding how those skills are used can be devolved to individuals or communities themselves while some level of remote surveillance and management by central authorities is still maintained to ensure proper quality and regulatory compliance. While there are evidently limits to what decisions can be devolved, in the housing reconstruction example the result appears to be a greater level of autonomy over the rebuilding process. Other uses of this approach to decentralise are worth exploring.

## Policy Implications

The above findings lead to the following policy recommendations, several of which accord with the UN Agenda for Humanity. Specifically, they could help improve inclusivity in decision-making, transcend humanitarian-development divides, reinforce local systems, and increase investment in local capacities.

Donors should:

- Ensure their portfolios maintain adequate focus on innovation that devolves disaster management capabilities to disaster-affected communities themselves.
- Strike a balance between funding innovators with a more global outlook and those focused on particular local challenges.
- Fund the creation of locally focused innovation centres in disaster-prone countries. Singapore, as a regional humanitarian and innovation hub, should consider leading on this.
- Ensure local for-profit and non-profit innovators receive support when innovating for humanitarian purposes, given the absence of relevant regulation. Again, given its general experience of balancing regulation with facilitating innovation, Singapore should consider leading on this.

Governments and international humanitarian NGOs should:

- Decentralise more aspects of disaster management to people who are affected directly.
- Acknowledge and mitigate their own structural predisposition to use new technologies predominately in ways that help their own activities. This might include directly funding innovation centres with stronger local focuses, or directly subcontracting innovation work to them. Such efforts would help develop crucial skills for economic growth.
- Use the example of Nepal's Housing Recovery and Reconstruction Platform to explore ways that remote management and monitoring of specialised skills can be used to increase local autonomy over disaster management.

- Continue efforts to standardise data collection and reporting, but recognise that standardisation is not a pre-requisite for decentralising many elements of data-based disaster management.

Internationally and locally focused humanitarian innovation centres should:

- Develop more formal relationships with one other.
- Ensure co-creation processes with disaster-affected communities to identify humanitarian challenges and develop solutions are adequately inclusive.
- Recognise the risks they run of bias and insularity and implement practices to reduce these threats.
- Increase general awareness of real-time public disaster response platforms so spontaneous community disaster responders can make better use of them.

Volunteer and Technical Communities, and academics should:

- Research the impact on disaster outcomes of software structures and the prioritisation of technological over local knowledge in interpreting data.
- Ensure that local analysts are involved in interpreting data.

## About the Author

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