


# Crisis Mapping: A Phenomenon and Tool in Emergencies

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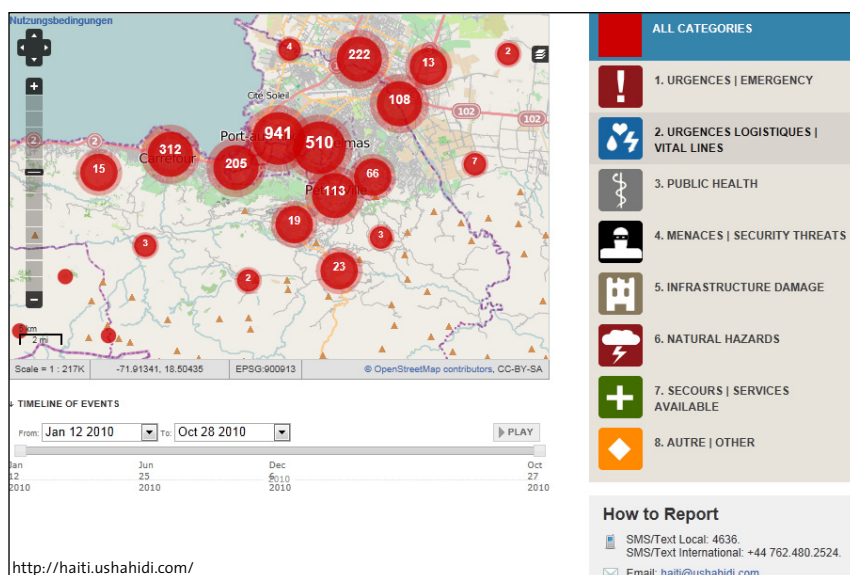
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# CRISIS MAPPING: A PHENOMENON AND TOOL IN EMERGENCIES

The damage caused by the 2010 earthquake in Haiti is well known. Less known is the dynamic crisis mapping effort that emerged alongside disaster relief. To visualise the crisis space, volunteers combined satellite imagery data with real-time crowdsourced crisis information using new media tools. Crisis mapping has since been used in various contexts – showing how non-state actors are using new media to provide and visualise information during crises. State actors should invest in understanding this phenomenon and the circumstances in which crisis maps are valuable contributions to crisis management.



The crisis map used for Haiti: Improved crisis management response.

We are living in an information-saturated world characterised by the mediatisation of almost all aspects of life. Beyond the traditional media, rapidly expanding ‘new’ communication tools – mobile devices and internet platforms that provide easy access to e-mail, blogs, and social media portals like Twitter, YouTube, or Facebook – are giving citizens new pathways to share information.

The increasing use of new media tools in crisis situations cast a light on the political dimensions of the trend. Not only do they provide a springboard for individuals to publicly contest or legitimise the actions of governments, which can fuel or dampen crises, but they also enable a specific role of the public. Naturally, a re-

flex of some state officials has been to react defensively or with annoyance to this shifting media space, as such tools challenge the traditional information dominance of governments, can come with explicit or implicit calls for democratisation of information or increased transparency, or are used to “blame and shame” governments for their actions or inaction, respectively.

An intriguing component of this larger trend is the emergence of crisis mapping – an example of how an increasing number of citizens now participate in crisis communication. Formed at the intersection of emergent behaviour, social activism, citizen journalism, and the democratisation of geospatial information, crisis map-

ping is both a process and an outcome that combines various streams of “crowd-sourced” information that is verified, categorised, and visualised by volunteers using satellite imagery and open-source mapping platforms. For instance, in the aftermath of the March 2011 earthquake-tsunami in Japan, Georepublic Japan and OpenStreetMap Foundation Japan launched a crisis map that provided and visualised real-time information on news and official reports as well as information provided by the crisis-affected community (via SMS/text and internet platforms) on evacuation centres, damages, and requests for help.

To understand this trend, a more differentiated view of crisis mapping as a *phenomenon* and as a *tool* is needed to understand its benefits and limitations as well as its larger political and social effects in various settings. As a bottom-up phenomenon, crisis maps are signs of a type of social behaviour that can offer relevant insight for discussions on building community resilience. As a tool, crisis mapping should be seen as a contribution to the larger crisis management toolbox. While mapping efforts are mainly initiated and managed by non-state actors, governments have had a multifaceted role in the process. In the future, states should view this tool as a source for information-gathering, crisis response planning, and crisis communication that can provide states with an additional dynamic, low-cost way of engaging the broader population as well as seeing and analysing the terrain both during and after a crisis.

**The phenomenon:  
Resilient bottom-up behaviour**

Crisis maps are best understood by focusing on the specific context in which they emerge. First, today’s crises are increasingly complex, have disproportionate effects, and shift between extremes – involving multiple actors, phenomena, and speeds. They often challenge the ability of states to sufficiently protect their citizens by creating more and different damage than anticipated as well as overwhelming the capacities of first responders. Also, national and international audiences mercilessly dissect governments’ performance in crisis situations.

Second, the emerging norm is for people to use new media to communicate the effects of a disaster (when and where possible). On the one hand, new communication media and the interaction they enable are thus complicit in making the crisis environment more complex. On the other, they also provide new solutions for dealing with complexity. Crisis mapping leverages the innate desires of people to share information during emergencies. Rather than letting this information get ‘lost’, it captures, verifies, and structures it to help with crisis management efforts.

This technique of pooling together disparate information is known as “crowdsourcing”. The neologism stands for the trend of

*Crisis mapping leverages the innate desires of people to share information during emergencies.*

leveraging the mass collaboration enabled by Web 2.0 technologies to achieve certain goals, often in the business context. Somebody – the crowdsourcer – broadcasts a problem to a community, which then works autonomously or in some loosely coordinate fashion to volunteer ideas and feedback. It is rewarded via soft or hard benefits, the former referring to intellectual recognition or satisfying some type of volunteering or philanthropic desire whereas the latter refers to (monetary) compensation.

In the case of crisis mapping, the problem is how to efficiently and quickly overcome a crisis or disaster. The crowdsourcer uses volunteers (one aspect of “the crowd”) who receive information from the crisis-affected community (the other aspect of “the crowd”). The collected information is systematically evaluated and aggregated in order ultimately to visualise the situation on the ground. Both communities enjoy the rewards: The crowdsourcer and volunteers can exercise philanthropic (but at times also political) interests, while the members of the crisis-affected community fill a need to communicate their situation and be a part of a self-help initiative that may improve their chances to receive assistance more quickly.

Crowdsourcing is, of course, greatly enabled and sped-up by technology. But the

underlying pattern in behaviour when people are confronted with crisis situations deserves attention in its own right. Rather than just wait for crisis responders, individuals are increasingly using ICT tools to be more active in the crisis response phase. This spontaneous behaviour can be seen as an expression of the adaptive and resourceful nature of human beings – and as a trait related to the inherent resilience of some groups and communities (cf. CSS Analysis No 60 ☞).

**The tool:  
The diversity of crisis maps**

In 2008, crisis mapping was used to address post-election violence in Kenya; however, it was not until January 2010 that the broader utility of crisis mapping caught the eye of the international community when within 4 days of the earthquake in Haiti a crisis map was launched. As a testimony to its utility, in one case a man sent an SMS/text message requesting assistance, and soon after relief agencies responded with supplies. In all, the success of the crisis mapping effort showed the promising role that this tool could have for large-scale disasters – effectively creating a direct line between citizens and relief worker that helped guide responders to assist people and deliver critical supplies. Ever since, crisis mapping has been used in many different settings and places, becoming a catch-all term for a diverse set of processes and products (cf. table).

Selected crisis mapping initiatives					
Case	Haiti January 2010	United States April 2010	Russia July – Sept 2010	Japan March 2011	Libya Spring/Summer 2011
URL	<a href="http://haiti.usahidi.com/">http://haiti.usahidi.com/</a>	<a href="http://oilspill.labucketbrigade.org/">http://oilspill.labucketbrigade.org/</a>	<a href="http://russian-fires.ru/">http://russian-fires.ru/</a>	<a href="http://www.sinsai.info/">http://www.sinsai.info/</a>	<a href="http://libyacrisismap.net/">http://libyacrisismap.net/</a>
Crisis	Earthquake	Deep sea oil rig explosion	Wildfires	Earthquake/Tsunami	Political Crisis
Initiator	Individual/organisation	Grass root (Louisiana Bucket Brigade (LABB))	Individual	Individual/organisation	Intergovernmental Organisation (UN OCHA)
Main Partners	Emergency Information Service (EIS), InSTEDD, Ushahidi, Haitian Telcos, Tufts University & US State Department	Tulane University Disaster Resilience Academy	Russian bloggers	Georepublic Japan; OpenStreetMap Foundation Japan	UNOSAT, NetHope, & Volunteer Technical Community
Aim of map	Report emergencies; Public health issues; Security threats; Infrastructure damage; Natural hazards; services	Track oil spill effects & response; provide visible testimony of community impacts	To link those who need help with those who want to help; listed assistance centres	Reports & notices from public and private officials; News on disasters; Evacuation centres & requests for help	Track conflict events (armed confrontations, attacks, etc.); list needs & responses; track mass displacements
Who uses the map	Emergency responders; Diaspora community; Media; Government officials	Local stakeholders (citizens, universities, businesses, etc.); Media	Local stakeholders (those needing and offering help); Media	Local stakeholders; Diaspora Community; Public & Private actors; Media	Emergency responders; Diaspora community; Government officials; Media
Role of map	Test-ground for crisis mapping; better maps of Haiti; reference point for crisis responders	Provided public insight and accountability; info on clean-up efforts	Delivery of relief	Go-to map for corporations, government, and organisations; created transparency in crisis relief	Increased situational awareness
Role of government	Core partner in the effort (US government)	Not directly involved, aware of the map; provided information	Not directly involved; After crisis, Civic Chamber of Russian Federation became involved	Not involved initially, became involved by submitting reports	Intergovernmental body (UN) involved and led the effort

First, crisis maps emerge in all types of crisis: From natural disasters (small and large) to accidents, social unrest or other political conflicts. Depending on the specific context in which they emerge, the aim of the mapping activities varies slightly, though they are all tailored to the specific needs of the affected community. The initiators are mostly individuals or grass-root organisations that typically join up with more official organisations and the private sector (e.g., telecommunication agencies). Over the years, maps have generally become more dynamic by feeding information back to the crowd. This phenomenon is called crowdfeeding: a “bottom-to-bottom” horizontal type of communication for local rapid response (or information of the crowd, by the crowd, and for the crowd) that greatly elevates the utility of crisis maps.

As the phenomenon matures, crisis mapping is also becoming more institutionalised. On the one hand, platforms (like Ushahidi, which emerged in the context of the Harvard Humanitarian Initiative, HHI) are becoming easier to use and increasingly well-known. On the other, an organisation called Crisis Mappers launched a standby volunteer task force in late 2010. It enlists tech-savvy mapping volunteers to serve as assistants to other mapping efforts around the globe. These people were used in the more recent effort led by the UN OCHA Information Management unit in Geneva to use crisis mapping at the height of the 2011 political crisis in Libya. This latest map and other uses of crisis maps by state bodies not discussed here seem to signify the latest trend: Crisis mapping is no longer the purview almost exclusively of individual activists, but increasingly also that of governmental and intergovernmental bodies.

### Understanding the challenges of crisis mapping

Though much more research is needed to understand, first, why crisis maps emerge in some contexts and not in others, and second, their short-term and long-term effects, the cases so far point to at least four crucial issues for their emergence, some of which have direct bearing on their usefulness: the ability and the willingness of a large set of actors to share information, the quality of the data that is available, and the motivation and skill of the crisis mappers.

First, for people to be able to share information, they require not only basic tools but also working communication lines. These are often overwhelmed or damaged during crisis situations, particularly during natural disasters or in settings where the communication infrastructure is underdeveloped or poorly maintained. Depending on the context, the reliability of crisis mapping efforts can come into question when there is an asymmetry between the ability of volunteers to monitor, verify, and geo-code crisis information and what the crisis responders on the ground can provide and access.

The second issue is the willingness to share. If the government in question is not benign, or is not willing and ready to allow its citizen free and uncensored access to information channels and means of distribution, then distrust and fear of retribution can impede participation in crisis mapping projects, especially when they are of political nature.

The third issue is the quality of data. Particularly in conflict settings, geographic data can be challenging to acquire; first, it requires a partner who can provide advanced (typically commercial) satellite imagery to get an accurate reading of the terrain. Second, in contrast to natural disasters or technical accidents, states – but also non-state actors – might be willing to manipulate the info-domain by trying to flood the public sphere with false or manipulated information.

Fourth, crisis-mapping efforts are becoming more complex and thus require massive coordination and capacity. In the case of Libya’s crisis map, for instance, hundreds of volunteers worked with various partner organisations. Issues arose with coordination (within and between volunteer teams) and concerning technical and knowledge capacity. For mapping efforts to work, there is a need for leadership nodes to coordinate with volunteers and partners, thus imposing some rules and structure. Tensions could arise between the bottom-up volunteer spirit that has characterised crisis mapping for the most part and a more top-down structured approach. In addition, the more complicated and time-intensive these undertakings are, the more likely it is that purely altruistic motivation and soft benefits will no longer be sufficient to sustain these efforts.

Regardless of the context, the reliability of this tool and the data provided is not absolute. From the viewpoint of Western governments, the use of crisis maps in complex humanitarian aid situations or smaller type emergencies in the Western world seems relatively uncontested, as they mainly benefit peer-to-peer horizontal information-sharing and problem-solving, which thus far neither contests nor impedes governmental communication or response efforts. In other contexts with greater socio-political, cultural and economic sensitivities, more issues arise regarding the potential misuse of crisis maps by (state) officials or other bodies. In this respect, one concern is that this could be used as a tool to apprehend dissenters, for example.

### The state as meta-governor

These open questions aside, crisis mapping has emerged as both a phenomenon and a tool in today’s complex emergencies. If viewed as a phenomenon, crisis mapping reveals, first, the adaptive, resourceful, and creative nature of communities. By engaging local populations to improve their capacities to help themselves, their ability to absorb and quickly recover from sudden shock or physical stress is enhanced. In other words, crisis mapping enhances their resilience. States should invest in further researching this domain to understand how crisis mapping could be more actively leveraged to create the conditions for people and their institutions to collectively act to prevent a crisis or mitigate its effects.

Second, in today’s global media environment, it is rare for a crisis to not be internally and externally critiqued. It is a many-to-many information-sharing environment that demands transparency. Governments can no longer operate only with traditional crisis communication frameworks where they only share information hierarchically and between selected actors during a crisis event. Crisis mapping can help governments become sensitised to this shift and also help them to modernise their frameworks. At the very least, they have to update crisis communication schemes in order to be able to react to crisis maps depicting crises that “they” are in charge of.

Seen as tools, crisis maps can be used by the whole of society – especially states – to improve situational awareness in a crisis and help coordinate relief so that commu-

nities can quickly bounce back from crisis. However, governments should appreciate the emergent, bottom-up quality of the crisis-mapping field. Rather than trying to take ownership of the process, governments should create and support the conditions for their success. The best way to approach this is as a meta-governor, which mainly implies coordination, promotion, and stimulation activities. Part of this “organisation of self-organisation” consists in the creation of framework conditions that allow networks to organise.

To overcome the challenges associated with crisis mapping as outlined above, states as meta-governors can do four things: first, they can, as they often do anyway, quickly restore communication lines when they are down; second, they should ensure that they or other actors are not impeding the willingness of people to freely share information; third, they can provide some proprietary information to which crisis mappers have no access; and finally, they can provide monetary incentives to kick-start crisis mapping efforts where necessary.

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