

# Local responses to disasters: recent lessons from zero-order responders<sup>1</sup>

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## **Introduction**

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The fields of disaster risk reduction (DRR) and disaster risk management stumble when it comes to deploying lasting programs to reduce community vulnerability to foreseeable hazards. Policy, communication and infrastructure are plagued by top-down implementation schemes, which lack feedbacks from the communities for whom the efforts are meant to serve. An implicit goal of this paper is to seek methods of freeing decision-making from this gridlock and discussing alternative DRR and DRM approaches. Here, we propose a broader definition of a notion introduced by Glantz et al. (2014, p. 78) in order to understand the surviving victims: “In truth, community members caught up in a disaster situation are the real ‘first responders.’ We add that the experiences of these individuals provide underutilized yet valuable commentary on DRR infrastructure and communication pathways.”

By formally identifying zero-order responders (ZOR), we are paving the road for them to join the list of vested stakeholders into DRR and DRM development: they are the first to the unfolding events of a disaster, because they live at ground zero. Their

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testimony to how they survived and their perception of pre-existing preventative programming is likely the truest compass on the clearest path to improvements and the rethinking of measures developed dominantly from the top down.

## **Responders, from first to zero**

After disasters happen yet before official first responders (FRs) arrive (civil protection, medical help, army or international support) affected population are demanded to face disasters on their own. As mentioned by Jalali, R. (2002, p. 122), “the local community undertakes all immediate search-and-rescue-type operations as outside help takes longer to arrive, hence it is their capacity that needs to be strengthened.” In some cases, days weeks or months after a disaster, after external help and media attention has moved on, affected people are still improvising to recover. How they undertake these charges plays a large role in shaping the context of their future risk to similar hazards. Because local populations live at ground zero of these events, they are by default the real FRs. With FR’s title already taken, people fighting to survive and thrive are better coined ZOR.

Disaster-affected people are usually identified as surviving victims. This idea can insinuate that they are populations passively waiting for assistance. As victims, outside organizations and governments tend to ignore their capacities to cope, improvise and be creative to survive and recover. This is to their detriment – for these skills are valuable resources to advance DRR and DRM. Here we redefine living victims to be ZOR – valuable new actors in DRR and DRM missions. In order to uncover their value, we introduce a few guiding questions: What can we learn from ZOR? What could be the scope and limitations of their actions? How can official FRs and organizations partner with ZORs to improve disaster responses capacities?

“FRs” are professionals (Arble and Arnetz, 2017) obliged to provide human services in disasters (Shepherd et al., 2017). FRs are representatives of the formal structures of governance and civil organizations, like Red Cross or fire fighters, who are the first from outside a disaster-affected area to come to the aid of survivors and stabilize growing damage. This group of stakeholders is imperative to increasing the survival rate and ensuing recovery of disaster-affected regions.

A number of reasons can limit FRs from near-immediate arrival on site of a catastrophe. Sometimes epicenters of impact are remote, the magnitude of the emergency is too big for complete coverage, or the lack of efficient disaster response

slows official and professional intervention. In these times, local populations must respond by calling upon and devising their own resources and skills. People's proactive responses to mediate disaster impacts are usually underappreciated or seen as last-ditch efforts. Worse, affected populations are often thought of as merely inactive victims. This portrayal is disempowering and portrays them as passive or helpless.

In many situations, the victim ideology could not be further from the truth – indeed communities are likely waiting for assistance, but not without undertaking proactive behavior. They develop on-the-spot life-saving responses through improvisation and innovation. These actions are often community-centered and unofficial. They reflect the perceptions and understandings of options for survival. Even though they are forced into survival mode, individuals take actions to adjust to an unfamiliar and uncertain near-term future. It is in their best, after-impact interest to courageously leverage all abilities to help themselves, their families and neighbors overcome the devastation and obstacles that might otherwise overwhelm them. Additional information about the nature of community resilience is observed during recovery. Resilience, rather than vulnerability, emphasizes the capabilities and methods of people coping with disasters (Gaillard, 2007).

By understating the disasters as “long-unfolding historical processes involving co-constitutive interactions between people (with their culturally contingent values, political systems, technologies, and practices) and their material environments” (Faas and Barrios, 2015, p. 289), we want to provide examples about how disasters can also trigger the development of societal skills. Weaknesses and strengths for in-place preventative measures are brought to light, and urgency lends agency to change. People are on the frontline of this learning opportunity.

As disasters unfold communities to undertake spontaneous acts of survival, guided by shifts in norms and social structure (Granot, 1995). ZOR are intrinsically folded into high levels of involvement, playing active roles in all stages of a post-disaster situation: immediate relief (Quarantelli, 1993), surveying of affected areas, regaining livelihoods, rebuilding homes and implementing effective disaster prevention processes for the future (Archer and Boonyabancha, 2011). Their needs, experiences and participation are invaluable commentary on how ordinary knowledge guides action and influences survival outcomes.

What is more, these qualities are a measure of peoples' perceptions pre-existing DRR/ DRM programming. Indeed, as end users of these measures, survivors'

appreciation and application cannot be overlooked. From that point of view, survivors represent relevant and new agents for steering potent new programming.

We propose that improvisation, learned from ZOR, can be shared with and taught to at-risk communities. By doing so, people can prepare for and improve their chances to survive weather disruptions and rebound in their aftermath. New disasters will occur and many in these communities will improvise as ZOR. However, can we learn from past ZOR to enhance future responses through step-like training in awareness and preparedness?

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## **Lessons from ZOR**

From the Yungay avalanche in Peru in 1970 (Oliver-Smith, 1979) through hurricanes Mitch in Central America in 1998 (Christoplos et al., n.d.) Katrina (USA, 2005) and

2010 Haiti earthquake (Pyles et al., 2018) examples of ZOR dealing with disasters are chronicled. And more emerge today. Recent extreme hydro meteorological events illustrate the value of recording ZOR's activities and underline the need for deeper, event-based research into citizen responses to disasters. Here we cite two striking, yet early-stage examples of ZOR testimony being leveraged differently for improved DRR programming.

### **Peru, El Niño Costero, 2107**

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From December 2016 to April 2017, a climatic anomaly related to El Niño[1] manifested in the Pacific Ocean off the Ecuadorian and Peruvian coast. The oceanic conditions produced extraordinary rains, particularly during March. The rains resulted in massive landslides and flooding along the Peruvian coastline adversely affecting more than 1.1m people. Over 100 casualties were documented and 155,000 people were displaced from their homes (OCHA, 2017). Following the event, a small team of researchers conducted civilian interviews probing what each did and needed at different stages of the unfolding event. The data indicated that a large constituency of people understood a surprising confusion amongst the more traditional DRR stakeholders. Namely, not all parties understood that the terms “El Niño Costero” and “El Niño Southern Oscillation” (Ramírez and Briones, 2017) have the radically differing meteorological outcomes. As a result, vested DRR stakeholders conducted poorly orchestrated action and even fell into paralysis (Table I).

### **Puerto Rico, Hurricanes Irma and Maria, 2017**

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On September 6, 2018, Category 5 Hurricane Irma made landfall in Puerto Rico. 175 mile per hour winds crippled the electric grid, leaving 1m people without power. Two weeks later, when 60,000–80,000 people were still without electricity, category 4 Hurricane Maria repeated high winds and dropped a devastating 30 inches of rain in one day. Public Power Utility Chief Executive, Ricardo Ramos (Puerto Rico Electric Power Authority, 2017), said that the electrical infrastructure had been destroyed. What is more, flooding and landslides isolated from FRs help a large fraction of the island's population, outside of major cities. Ten days following Hurricane Maria half of the Puerto Rico's population remained without fresh water. Dire living condition persisted for months. In the months following the hurricanes a comprehensive examination of related media was conducted. Several anecdotal stories emerged portraying the innovative and on-the-spot measures survivors took during the events. The lessons of people's actions surfaced; however, the unscrutinized

methods for harvested data, as described through potentially subjective media outlets, placed the integrity of conclusions from this research in question (Table II).

<b>Situation</b>	<b>ZOR actions</b>	<b>Lesson learned</b>
<i>Extraordinary heavy rains. Lack of clarification choose to stay in their house or to leave made with immediate and long-lasting and early warning</i>	<i>Local populations in vulnerable places</i>	<i>In risk situations, people's decisions needs in mind</i>
<i>Flash floods and landslides</i>	<i>Families leave their houses to looking for shelter with relatives. In some cases men stay near home to ensure security</i>	<i>Families and neighbors are perceived as the first line of support during emergencies. Community traditions and norms define the hierarchy of pro-action</i>
<i>Damaged and destroyed houses Damage community infrastructure</i>	<i>Family leaders returned back to their houses to clean up and rebuild Locals improvised to produce electricity and procure gasoline</i>	<i>Local population rely on personal expertise, skills and resources Local volunteers with skills and expertise (e.g. electricians) dole out charge for damage repair</i>
<i>Local population displacement to refugee camps</i>	<i>Local communities self-organized refugee camps. Partial help came from first responders (tents form municipalities and food supplies form civil society) People organized their camps by task sharing: cooking, child care, camp management and energy production</i>	<i>Social cohesion and local organization are the foundation for resource management and duty assignment during disasters</i>

**Table 1. ZOR actions and lessons learned from El Niño Costero, Peru 2017**

### ***Discussion points***

ZOR are not hapless victims. They partake in the survival process because they are forced to take actions to protect their families and neighborhoods. The titling of surviving victims as ZOR formalizes the recognition of their non-formal and professional expressions of disaster management. Above and beyond working within

pre-existing DRR programming, they are wielders of improvisation and creativity. This shift in framing acknowledges that ZOR interact with DRR resources and how they do this is a guiding factor in future DDR development. Other stakeholders in DRR would benefit from recognition of this reality and change their development schemes to assimilate testimonies from ZOR. For example, climate-related forecasts including early warnings should explicitly foster and incorporate its climate information products and especially feedback from the society about its warnings. The local communities know their environments; and when acknowledged and brought into DRR and DRM development planning they will be empowered to take more informed, trusted and effective responses.

<b><i>Situation</i></b>	<b><i>ZOR actions</i></b>	<b><i>Lesson learned</i></b>
<i>Back to back hurricanes demolishing the already prone electric power grid</i>	<i>Individuals and small business inverted direct current from cars to alternated current to run small appliances</i>	<i>Improvisation is used by ZOR to meet primary and secondary fundamental needs</i>
<i>High rains, winds and landslides wiped out community infrastructure</i>	<i>Transportation of hard goods across impassable rivers was rigged by suspended shopping carts on high-tension ropes</i>	<i>When pre-existing DRR infrastructure is lacking ZORs immediately innovate to fill in the gaps</i>
<i>Communities become isolated from FR and FEMA. In some cases for months</i>	<i>Without potable water communities tapped mountain streams and boiled resulting water for sanitation</i>	<i>Threats to community resources are resolving by individual creativity founded upon community-first values</i>

**Table 2. ZOR actions and lessons learned from Hurricanes Irma and Maria, Puerto Rico, 2017**

The two extreme weather examples, El Niño Costero (Peru), and the Hurricanes Maria and Irma (Puerto Rico) remind us of the urgent need for increased communication between more long-standing or traditional DRR and DRM stakeholders and local communities. We must dedicate resources and research to improve the dissemination of relevant climate- and weather-related information to disaster-related stakeholders. This means that we invigorate, link and balance top-down and bottom-up communications: as Allen (2006, p. 83) mentioned “community-based approaches are a fundamental form of participant empowerment and a compelling mechanism for enforcing the transmission of ideas

and claims from the bottom up.” The design and application of DRR and DRM are often overly dependent on top–down approaches. Besides, ZOR experiences might also help to uncover barriers in post-disaster measures, for example, the lack of community consultation in post-disaster relocations (Spiekermann et al., 2015). Organizations identifying needs and development for communities around such measures often lack community input, thereby lowering the chances that resulting infrastructure would be effective and sustainable. What is more, unidirectional management undermines the value of the users in the process of program development. Top–down strategies must be matched with a healthy balance of insights bubbling up from within communities. To fold these dimensions into DRR/DRM design means that we formally integrate ZOR into the alliance of recognized stakeholders.

The two recent extreme weather events cited above illustrate reactions that happen most of the time there is a disaster: local populations actively engage in what is perceived as necessary to survive. However, local responses have boundaries, meaning that improvised solutions can be bettered, or met with healthier or more effective options. Local or ordinary knowledge is not a perfect standalone resource that supersedes or overrides DRR and DRM programming. The lessons learned from ZOR make up one facet of inspirational and informed activity to reduce human vulnerability to hazards. Societal flexibility and adaptive capacities are new resources to fold into DRR and DRM development. Their inclusion should invigorate pre-existing alliance members with new ideas and fresh perspectives. Survivors are not simply a measure of the success or lack of success for DRR and DRM. ZOR are an underutilized resource, presenting opportunity to catapult DRR/DRM forward:

- First, they are the true end users, leveraging all resources in worst-case scenarios. This makes them probably the closest and most authentic test of programs. Individuals limited by cellphones without signal, lack of running water or dysentery outbreaks will react to use what is in place through the lenses of their priorities and knowledge, and their understanding and appreciation for infrastructure in place. Testimony from their experiences is one of the simplest guides for honing survival tactics.
- Second, as much as infrastructure or lines of information flow are critical resources in reducing community risk to hazardous events, ZOR command creativity, improvisation and resilience during recovery. It is only logical to interrogate and learn from the survivors. Their approaches could inform

workshops dedicated to training communities in calculated improvisation in situations of duress.

- Third, the inclusion of survivors, front-liners or ZOR in the host of essential DRR/DRM stakeholders formalizes the integration of community perspectives in the pursuit of more effective disaster risk management programs. Many of the bottlenecks or limitations of preemptive actions to reduce community vulnerability to hazards could be sidestepped at least to some extent by the advanced assimilation of ZOR's perspectives and knowledge.

### Note

El Niño results from anomalous air–sea interactions that enable a warm pool of water in the Western Pacific to shift eastward toward the Central and Eastern Pacific. Such shifts, associated with El Niño are linked to many adverse and anomalous climate, water, and weather impacts around the globe (Glantz, 2001). The most obvious impacts appear in the form of drought, flood, flash floods and fires each of which has ripple effects in societies and ecosystems. Because these impacts tend to recur in many places, they can be anticipated, planned for, and mitigated, if not avoided altogether. However, people often overlook the truth of traditional EN events as basin-wide events and not limited to warming along the Ecuador–Peru–Chile coast.

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