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The politics of participation in community-based early warning systems: Building resilience or precarity through local roles in disseminating disaster information?

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ABSTRACT

This paper challenges the implicit assumptions and material effects of community-based early warning systems (CBEWS) that mobilize resilience as their objective. Informed by five months of fieldwork in communities enrolled in a CBEWS initiated by the development organization Practical Action (PA) in Nepal's lower Karnali River Basin, I examine the inherent risks that accompany the participatory logic of even the best-intentioned interventions framed in terms of resilience. These risks include the ways in which assumptions inherent in the logic of resilience, when applied in concrete projects like CBEWS, can have the effect of unintentionally naturalizing vulnerability and individualizing responsibility for self-securitization in the name of empowerment. In the process, they may provide an excuse for a government's neglect of its marginalized citizens. This can occur if participatory interventions overlook structural dimensions of vulnerability and do not balance the demands they make of communities with efforts to hold governments accountable for protecting their vulnerable citizens. PA's CBEWS is a particularly informative case through which to examine these issues because, in addition to having unintended side effects representative of similar initiatives to build community resilience to disasters, PA is also working proactively through partnerships with the Government of Nepal to involve the state in solutions. For this reason, PA's CBEWS can both highlight concerns about the unintended effects that any DRR project framed in terms of resilience can have on communities and provide a model for how similar organizations navigating difficult political terrain can work with governments to give them greater responsibility.

1. Introduction

After plummeting 10,000 vertical feet out of the Himalayas, the Karnali River tears through a narrow gorge below the village of Chisapani before splitting into a fan of waterways that crisscross southwestern Nepal's alluvial floodplains. Facing the slicing rain, a middle-aged woman lifts her skirt to descend a staircase toward the turbulent river to read the water level on bands running up the canyon wall. As the gauge reader at Chisapani, Ditya Gurung[1] is contracted by Nepal's Department of Hydrology and Meteorology (DHM) to manually collect and report live precipitation and river level data to their headquarters three times daily throughout the year. During the four months of monsoon, however, when Nepal receives 80% of its annual precipitation [32], Gurung is expected to monitor the river every two hours. The burden of Gurung's routine is made considerably heavier as she is also responsible for relaying this information via a community-based early warning system (CBEWS) to over 52,000 Nepalis between Chisapani and the Nepal-India border 20 km downstream.[2]

Since 2010, this network of mostly rural farmers has participated in a CBEWS initiated by the international non-governmental organization (INGO) Practical Action (PA) to advise villages across the Karnali River's vast floodplain when they are in danger of inundation [59]. Filling a gap where the Government of Nepal (GoN) had no effective mechanism for disseminating warnings directly to its citizens, PA's CBEWS uses DHM's existing gauge station and a decentralized communication chain to provide two to three-hour lead times for 74 flood-prone villages along the lower Karnali River [45]. If the river level exceeds ten meters, Gurung initiates a series of three graduated

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[1] All research was conducted in accordance with guidelines laid out and approved by the University of Colorado Boulder's Institutional Review Board. The author obtained informed consent from all research participants prior to including their comments in this study, and individuals mentioned by name have been given pseudonyms.

[2] DHM also installed an automatic sensor at Chisapani in 2010 that relays live river level data directly to its Kathmandu headquarters. While some DHM representatives now describe manually collected data simply as backup should the automatic system fail, other individuals stated in interviews that they trust and rely on the gauge reader's information far more than the automatic system. Either way, it is the gauge reader's manually-collected data that is directly disseminated to downstream communities through the lower Karnali's CBEWS.

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Fig. 1. An example of a hand-operated siren used within villages to alert and mobilize residents when an early warning is received. Photo by author.

warnings by calling downstream communities, who then relay the message of pending inundation locally via hand-held sirens and megaphones (Fig. 1).

This effort to establish an CBEWS in the Karnali Basin exemplifies a growing trend in which INGOs are increasingly investing in "people-centered" interventions like early warning systems (EWS) and other community-based initiatives to build local resilience to disasters [49,51]. Particularly in developing countries like Nepal, where the central government does not have the capacity to actively invest in mitigation activities and formal forecasts rarely reach those most vulnerable, this devolution of responsibility to communities not only 'makes sense' but also follows the Hyogo Framework for Action, which asserts that 'at-risk' communities should be active participants in both disseminating and responding to disaster information [49]. Thus, this approach to disaster risk reduction (DRR) is meant to empower local people and is also intended to build local resilience to disasters as communities are taught by INGO facilitators how to better help themselves manage local risks [29].

While resilience is an incredibly malleable concept with definitions and applications too diverse and contested to discuss in detail here (see [5,6,10,53]), this article focuses on its use as a central goal of numerous community-based DRR interventions within the humanitarian and development sectors since the 1990s to respond to climate-induced disasters [1,6,18]. In this context, resilience is understood and defined by the United Nations (UN) as, "the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions" ([50], p. 24). While the term resilience emerged in the early 1970s as an alternative way to understand ecological systems [17,21], its broader application within the humanitarian and development sectors grew in the 1990s as practitioners found this framework useful for 'empowering' people across the developing world to channel a sense of neglect into positive action while facing a future of climactic uncertainty [5]. This radical translation of a descriptive term from the field of ecology into what has become a very specific way of thinking and living in society was largely enabled by the Stockholm Resilience Centre, which has served as a mediator between theorists of socio-ecological resilience and practitioners of development organizations [53].

While such a focus on building resilience to disasters through community-based solutions has been advocated for by the UN and is largely celebrated among practitioners [4,18], some critics object to what they see as a neoliberal shift in disaster management whereby the pervasive use of resilience may enable responsibility to be shifted from governments to communities through new forms of participatory governance [2,24,29,54]. In communities where the government has never extended its services, most people are used to facing disasters on their own. However, as INGO initiators of CBEWS and other community-based interventions mobilize resilience frameworks and celebrate people becoming 'empowered' to take responsibility for their own protection, the world's most marginalized communities are increasingly being made to volunteer their own labor to provide services within their communities and to neighboring villages where governments have failed to extend them. While many INGOs describe this process as building local resilience to climate-induced disasters, I question such claims by examining how the participatory logic of even the best-intentioned community-based solutions can also reinforce precarity and, if left unexamined, may enable the continued marginalization of vulnerable people expected to rely on themselves for protection.

In this article, I confront how development interventions that use the neoliberal discourse of resilience to frame and justify their work can unintentionally depoliticize and even exacerbate local vulnerabilities by ignoring preexisting inequalities and 'empowering all' people to secure themselves in the absence of an adequate response from the state. Informed by the work of scholars who expose the social, political, and economic roots of disaster [9,44,53,57], and interrogate the discursive objectives and material effects of resilience applications [2,15,16,18,20,43,54], I raise critical questions about the politics of participation for both academics and development practitioners involved in the design and implementation of community-based 'solutions' to disaster. Using PA's CBEWS as a case study to highlight issues symptomatic of the broader field of community-based DRR, – I argue that there are inherent risks that accompany the participatory logic of even the best-intentioned interventions, framed in terms of resilience. These risks include the ways in which assumptions inherent in the logic of resilience, when applied in concrete projects like CBEWS, can have the effect of unintentionally naturalizing vulnerability and individualizing responsibility for self-securitization in the name of empowerment. In the process, they may even provide an excuse for a government's continued neglect of its marginalized citizens. This can occur, I argue, if participatory interventions overlook structural dimensions of vulnerability and do not balance the demands they make of communities with efforts to hold governments accountable for protecting their most vulnerable citizens.

PA's CBEWS is a particularly informative case through which to examine these broader issues because in addition to having unintended side effects representative of similar initiatives to build community resilience to disasters, PA is also working proactively through partnerships with the GoN to more actively involve the state in solutions. For this reason, I argue that PA's work in the lower Karnali can both highlight concerns about the unintended effects that any DRR project framed in terms of resilience can have on communities, while also providing a model for how organizations navigating similar difficult political terrain can work with governments to give them greater responsibility rather than allowing initiatives to further the burden of vulnerable peoples.

2. Case study selection and discussion of methods

This article is informed by five months of qualitative fieldwork conducted in July 2015 and from August to December 2016 as part of a broader research project to understand how floods become disasters for local people in the chronically-flooded lower Karnali River Basin. Fieldwork was primarily conducted in Nepal's Bardiya District on the island of Rajapur, a large, fan-shaped landmass formed from sediment

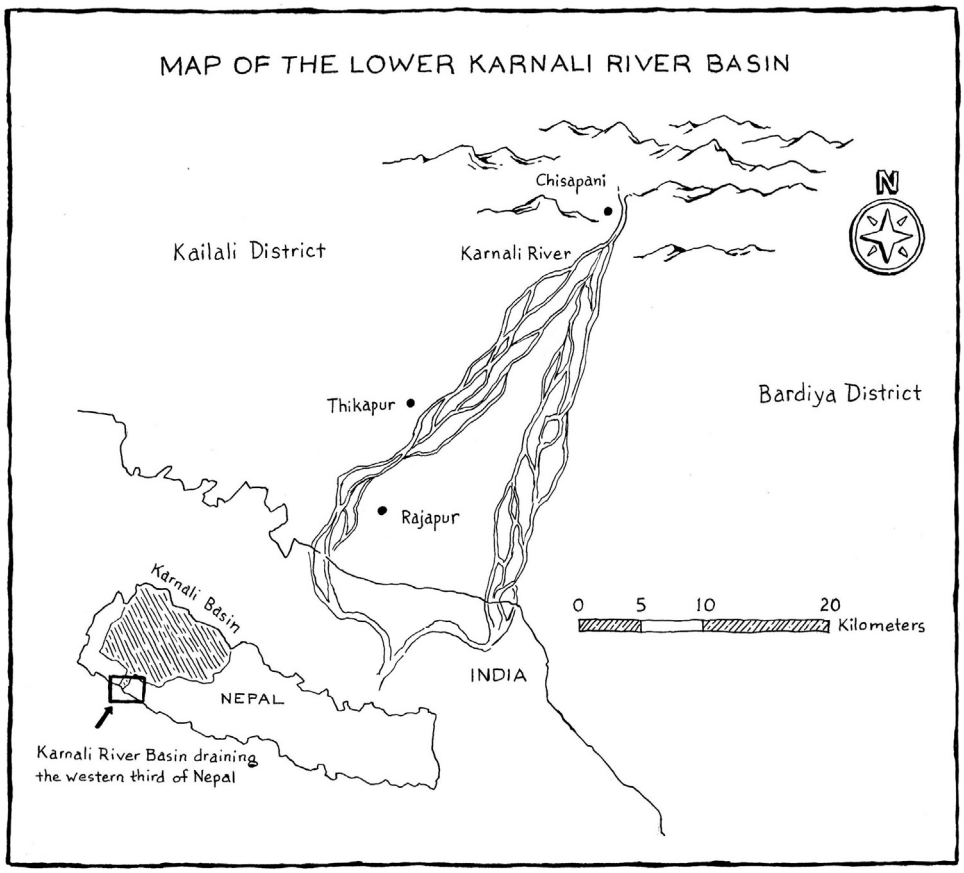

Fig. 2. A map illustrating the lower Karnali River Basin and the island of Rajapur, a triangular landmass extending from Chisapani to the Nepal–India border. Map by Bryce Gladfelter Illustration.

deposited as the Karnali River emerges from the Himalayan foothills (Fig. 2). Constantly being reshaped by the river's shifting channels, Rajapur is a place that knows flooding intimately, with major inundation events occurring in 1983, 2009, 2013, and most recently in 2014 [45]. Despite its geographical vulnerability, Rajapur is home to nearly 100,000 people, 80% of whom are indigenous Tharus who initially settled there because of the island's fertility [19], but were later marginalized by higher caste Nepalis and pushed to the island's most flood-prone edges. Due to Rajapur's precarious geography, complex social and political history, and central position in a number of interventions to mitigate disasters, including PA's CBEWS, I selected it as a case study to examine how disasters in Nepal are both made and 'solved,' and who precisely benefits.

Data was collected using a mixed methods approach involving 25 focus groups with project beneficiaries and 200 semi-structured interviews with local residents and representatives of both government agencies and NGOs involved in efforts to mitigate flooding in Rajapur. I first conducted interviews at national-level offices and then worked down to the district, village, and household levels, before moving back through each scale. This telescoping approach to data collection enabled me to access interlocutors with varying degrees of power over and knowledge about interventions in Rajapur and also provided opportunities for follow-up. In July 2015, I also engaged in participant observation and conducted interviews at PA's regional office in Nepalgunj and with their local partner, the Centre for Social Development Research in Rajapur. There, I joined field staff as they led trainings on disaster preparedness, organized street performances to educate communities on how to respond to early warnings, and met Chisapani's gauge reader to discuss her role in dissemination. These interactions enabled me to more intimately understand the politics of local participation in PA's CBEWS and to return to villages the following year to capture participants' perspectives on and experiences with the CBEWS.

Interviews with government and INGO workers were conducted in English, while interviews and focus groups in Rajapur were conducted in Tharu and Nepali with the assistance of two local translators. During data collection in villages, I recruited interlocutors based on availability and individuals' capacities to offer a balanced perspective in terms of gender, age, and caste/ethnicity. Since this study was especially concerned with the uneven distribution of project benefits within communities, focus groups and interviews especially targeted Rajapur's most marginalized people. During conversations, an interview guide provided a framework for understanding how residents experience floods and their impacts, explain causality, understand their own vulnerability, and reflect on their participation in interventions. Finally, all interview transcripts and field notes were digitally scanned and analyzed using a thematic and descriptive coding structure developed iteratively throughout data collection and analysis.

3. Disaster management and the role of community-based interventions in Nepal

Disaster management in Nepal operates through a combination of top-down government protocols developed in the 1980s to manage the distribution of relief materials and more recent community-based interventions coordinated by INGOs to supplement these formal systems [47]. While networks like the Nepal Risk Reduction Consortium and Disaster Preparedness Network have attempted to coordinate the efforts of diverse institutions mitigating and managing disaster impacts in Nepal [59], most government agencies territorially guard their formal roles in response and many INGOs bypass government offices seen as too top-down to effectively serve communities [48].

Fig. 3. Villagers enrolled in PA's community-based early warning system practice evacuations in preparation for monsoon. Photo by author.

To bridge this gap, the UN has invested heavily in assisting the GoN to develop more progressive disaster policies and build the capacity of state agencies responsible for managing crises. For example, in 2009 the Ministry of Home Affairs enacted a National Strategy for Disaster Risk Management intended to build a culture of prevention and mitigation across scales [30]. More recently, the Ministry of Federal Affairs and Local Development created a set of guidelines that have been used in disaster management plans for nearly 650 village development committees across Nepal [54]. These efforts helped to shape and garner support for Nepal's new Disaster Risk Mitigation and Management Act, endorsed by Parliament in September 2017 after a decade of deliberation [41]. While this political development is celebrated as a progressive shift in how the GoN approaches disasters, it remains unclear how and to what extent this policy, like the Natural Calamity Relief Act of 1982 before it, will translate into tangible changes in the way Nepalis anticipate, experience, and recover from disasters [33].

In fact, it was the GoN's limited focus on mitigation and inability to translate previous disaster policies into tangible action within communities that inspired many INGOs to take their interventions directly to Nepal's people [31,48]. PA, for example, built Nepal's first CBEWS in 2002, at a time when communities across the nation received no information about impending floods from their government [45]. This CBEWS built on the East Rapti-Narayani River was initially just watch towers and a community-based alarm system that relayed information across villages with flags and megaphones. In order to better secure themselves, communities were engaged in awareness campaigns where each village formed a community disaster management committee, mapped local flood risks before each monsoon, and participated in mock evacuation drills (Fig. 3) [40]. Recognizing that the GoN was not reaching rural Nepalis with its top-down dissemination of disaster information,[3] PA expanded its own interventions into seven more river basins, including the Karnali, developing the capacity of hundreds of villages to anticipate and respond to disasters on their own. These self-sufficient networks of human infrastructure were later enhanced by integrating data from DHM gauge stations to lengthen lead times and linked to an SMS system for disseminating early warnings.

Therefore, while PA has built some of the most-celebrated CBEWS in South Asia and has been invested in Nepal's flood-prone communities for longer than many other intervening organizations, one could also argue that by assisting people in continuing to live with floods without also making demands of their government, this CBEWS has repackaged as resilience and encouraged continued reliance on the resourcefulness that people were forced to cultivate over decades of political conflict and state abandonment during and after the Maoist conflict (1996–2006). Whether organizations such as PA intend to do so or not, this positions them as actors in larger debates over the responsibility of the state in meeting the needs of its citizens and addressing the structural dimensions of vulnerability. This is a topic I turn to in the next section, as I examine PA's CBEWS in the Karnali Basin to consider how participatory interventions framed in terms of resilience do not necessarily empower local people, but by depoliticizing the root causes of their vulnerability and shifting the weight of responsibility onto the shoulders of those most directly impacted by disasters may also disempower them [2]. While PA does not claim that its CBEWS will achieve resilience on its own, the expectation is that this system should also be combined with programs that empower residents to adapt and diversify their livelihoods ([46], p. 9), *not* necessarily that structural vulnerabilities will have to be recognized and addressed. Thus, even in this broader vision of resilience, in which CBEWS are only a part, responsibility for coping with disasters remains on the shoulders of the most vulnerable.

Addressing the structural roots of vulnerability is an inherently political act that is not always possible for INGOs to engage in directly. However, it is important to recognize and address how INGOs, which are often legally bound from acting politically, increasingly initiate or are asked to lead community-based DRR and resilience initiatives for or in place of 'incapable' governments. This neoliberal positioning of responsibility on communities and away from the state is a reality that many INGOs face and that leads many to articulate a very narrow role for themselves of supporting the state on its own path, while empowering communities to protect themselves in the meantime. In the process, INGOs can become complicit in a system of neglect by simply working to fill gaps rather than catalyzing more fundamental structural change. This is where PA, as I show later, offers a path for how other INGOs implementing similar community-based DRR projects might begin to more actively address underlying vulnerabilities by holding the state accountable through indirect interventions and by working collaboratively with other local organizations that can do such advocacy more effectively.

4. Critiques of intervention: disasters without roots and the production of resilient subjects

Climate scientists have suggested that an increasingly unpredictable and more intense monsoon will exacerbate the effects of floods and droughts across the Himalayan region, striking the poorest and most vulnerable populations first [36,38]. Recognizing that immediate attention will be required to respond to the effects of climate change, many organizations working to mitigate disasters in the region are either reframing their existing interventions or mobilizing new ones that focus on preparing people for an impending deluge of climate-*induced* hazards. While it is undeniable that climate change will, and already is, intensifying disasters in places like the Karnali Basin, this narrative, followed by a call for resilience, can dangerously strips disasters from their structural roots and shift attention away from people's rooted, contextual, and historically situated vulnerabilities to a forward-looking, contingency of climate-induced risk for which they are made individually responsible ([2]; see also [18,20]).

Disasters, most especially those exacerbated by anthropogenic climate change, cannot be blamed on nature alone, when, in fact, they already lay nascent in a landscape [58], "prefigured" by social, economic, and political conditions that structure and shape uneven exposure ([25], p. 27). Vulnerability—or "the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard" ([57], p. 11), as Ribot [44] reminds us, "is, by definition, the social

[3] At the time of research, DHM was preparing a bulletin, two times daily during monsoon, that was publically available through its website and that was also disseminated by e-mail to the Ministry of Home Affairs, and through its central-level office, to district officials responsible for responding to disasters (i.e. District Disaster Management Committees and District Emergency Operation Centers). Flood advisories, however, were often inaccessible to rural villagers because of their online format and rarely reached those individuals most vulnerable to floods in a timely manner through formal communication chains.

precarity found on the ground when hazards arrive […] It does not fall from the sky" (p. 667). However, by shifting attention away from the reasons *why* certain people are more vulnerable than others before a flood even strikes, the current discourse of climate change followed by a call for resilience elides the ways in which disasters are not only climate-*induced,* but socially and politically *produced* through development, infrastructure, and policies that serve certain people over others [9,57].

This is not to say that interventions like PA's do not acknowledge the role of vulnerability in shaping disasters, as one of the three main factors contributing to disaster risk alongside exposure to hazards and the frequency or severity of the event [3]. In fact, PA, like most INGOs implementing CBEWS, conducts participatory vulnerability and capacity assessments prior to, and often intermittently throughout, their projects [27]. However, rather than revealing historical patterns of marginalization that make certain people more vulnerable, the focus of assessments is on "identifying who and what *will* be affected, and who will need assistance" ([37], p. 42). This is often represented as an apolitical ranking of who is most 'at risk,' or likely to face the impacts of a future hazard (i.e. exposure), based on a set of universal variables such as gender, age, reproductive status, physical ability or proximity to a hazard [18]. In theory, this approach enables vulnerability to become universal, a 'relative' measure of potential impact capable of being compared across regions and disasters [3], without becoming entangled in a mess of place-based specificities.

Furthermore, this focus on peoples' potential exposure to disaster rather than *why* certain populations are already more vulnerable enables intervening institutions to promote more politically neutral 'solutions' that avoid the politics of historical inequalities and focus instead on building local capacities to cope with, and adapt to crises from where people currently stand [20,54]. This often leads to interventions that attempt to better predict and contain disasters like floods through improved modeling, visualization and dissemination technologies, rather than taking more complicated and politically charged responses [2,18,20,44]. Since most INGOs operate both within the bounds of foreign nations and under the purview of outside donors, confronting the political dimensions of disaster, particularly when the state has exacerbated the exposure of certain groups, could compromise their ability to function in the future. Indeed, this may be why the social, political, and economic dimensions of vulnerability are factors more often recognized in literature than dealt with in practice (see [28,39]), for it is precisely this apolitical gloss over structural dimensions of vulnerability that allows INGOs to operate without being closed down by the states in which they work. Yet, at the same time, this stance also makes them complicit in perpetuating inequality and structural patterns of uneven vulnerability.

In the case of PA's CBEWS, many field staff were hired directly from participating communities in Rajapur and are intimately aware of historical patterns of dispossession that "prefigure disaster" and shape local exposure ([25], p. 24). Some staff members are even the descendants of Rajapur's original Tharu inhabitants, whose land was confiscated in the 1950s and 1960s as political elites from Kathmandu and farmers from the mountains began to settle the Tarai [22]. According to oral histories, Rajapur's land was so fertile that it attracted hundreds of powerful landlords, who manipulated the Tharus into giving up their land and later forced them into debt and multi-generational bondage through the *kamaiya* labor system. Traditionally a form of short-term bondage between neighbors and relatives, this social safety net ensured families were fed and sheltered as they paid off their debts [42]. As it was appropriated and made permanent, however, much of Rajapur's indigenous population essentially became slaves forced to labor for wealthy landlords.

When nearly 20,000 families of these bonded laborers were emancipated in 2000, they were thrown onto Rajapur's streets. With the central government consumed with the Maoist Conflict, the newly-liberated '*mukta' kamaiya* ('freed' bonded laborers) were forced to build

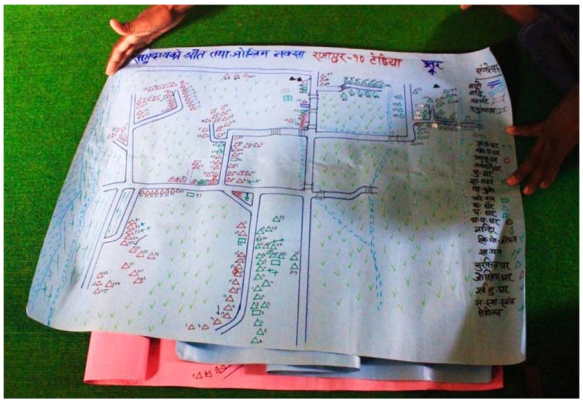

Fig. 4. An example of a vulnerability map made by PA field staff in partnership with one of the 74 communities participating in the CBEWS. Photo by author.

shelters on whatever land they could find. Controlled by Kathmandu and seen as wasteland, most of these flood-prone, water-logged, and otherwise marginal spaces became the land eventually granted to each *mukta kamaiya* family registered with the government. However, many households were never counted in official surveys, as families fled to India during the war for safety or employment. As a result, approximately 70,000 undocumented, landless and otherwise dispossessed *mukta kamaiya* people continue to squat along both branches of the Karnali River.

While this explanation of local vulnerability and uneven exposure is known intimately to most PA field staff, it does not translate into the CBEWS where, as is the case with most DRR interventions, the *causes* of disaster are treated primarily as biophysical phenomena. On social vulnerability maps (Fig. 4), people are marked vulnerable if they were, for example, elderly, pregnant, disabled, or live in close proximity to the river ([37], p. 35, 40–42). These indicators used to document flood risk, however, are severed from the socio-historical context in which they are produced. Therefore, vulnerability in Rajapur is accounted for not as an "economically and politically induced condition" ([9], p. 632) produced through one's socially regulated exposure to danger ([7], p. 25), but rather as a set of descriptive variables. Mapping risk and exposure in this way distances the analysis, and intervention, from contentious dimensions of vulnerability. This is common in many community-based DRR programs and is also evident in PA's work in the Karnali Basin where it has tried to build local resilience to disasters without explicitly recognizing who is *sukumbasi* (landless), without citizenship, or was once enslaved in its vulnerability assessments.

This tendency to neglect historical circumstances that explain *why* and *how* certain populations have been made vulnerable is characteristic of interventions like CBEWS that are increasingly being repackaged as building resilience and focused on forward-looking, normative 'solutions' to disaster that blame no one for the current situation. Uneven exposure, in this context, is not something to be addressed by targeting the structural roots of disaster, but rather by 'empowering' victims to become *better,* more adapted human beings [16,43]. For example, in a manual developed by PA with the INGO Mercy Corps for how organizations should build CBEWS, the organizations state that rather than "getting into vulnerability," "CBEWS suggest that people can be capable, resilient and able to protect themselves" and, "not see themselves as victims" ([37], p. 9, 43). Through this language, standard in many community-based DRR interventions, participants are not encouraged to question or resist the structures that have made them precarious, but rather to become resilient within them instead [16]. While in some ways this technical reframing and depoliticization of vulnerability may enable INGOs to at least 'do something tangible' for precarious people in the communities they serve and build legitimacy with the state to later engage it in more politically-charged arenas, that next step is not always taken.

This ability to leverage the language of empowerment while disembedding people from broader social and political communities that might otherwise sustain them, after all, illustrates the ideological fit of resilience with neoliberalism [16,53]. As an approach to governance built on the free market and small government, neoliberalism is characterized by "deregulation, privatization, and withdrawal of the state from many areas of social provision" ([23], p. 3). Similarly, resilience when coopted by neoliberal regimes and applied through participatory interventions to 'empower' and transform at-risk people into "prepared disaster-resilient communities" ([35], p. 6), can provide a mechanism for decentralizing risk and its reduction to communities while relieving the state and other institutions from obligations to provide security [20]. Butler and Athanasiou [8] have even gone so far as to frame such a retraction of social protection as a violent "responsibilization," whereby the state elides responsibility to its citizens by rolling back social welfare or denying a need for it. While many people in places like Nepal have never experienced robust forms of social protection and PA's CBEWS fills a gap rather than displaces existing support structures, the possibility of state responsibility can be foreclosed by a call for resilience that frames state assistance as not only unnecessary, but capable of creating a 'dangerous' sense of dependency [13,16].

Thus, while the decentralization of DRR through CBEWS and other participatory approaches does not inherently leave citizens further marginalized and abandoned by their governments, the use of resilience *can* enable a government's responsibility to provide protection in times of crisis to be exchanged for a commitment to train its citizens, through partnerships with INGOs, to support their own lives in a space of abandonment. In this context, survival becomes not the responsibility of the state, but an opportunity for the vulnerable to channel their precarity into positive action by continuing to "live out the catastrophic moment" ([15], p. 85). This is embodied by one of PA's beneficiaries, who noted, "we community people must work together to help ourselves […] It will always be possible that external help might not come" ([40], p. 15).

In this framework, communities are celebrated as cohesive, self-reproducing spaces where people secure one another through informal safety nets offered by one's extended family and neighbors [12]. While it is true that the world's most precarious people rely heavily on local social networks for survival, this fact should not be romanticized, and certainly not used to justify the continued isolation and 'resilience' of a state's vulnerable communities. After all, this "village myth of self-sufficiency" ([34], p. 81) overlooks the very real material limits of group-based self-sufficiency and the ways certain lives are marginalized not only by broader structures of power but also village-level inequalities. By making interventions 'participatory' and asking community members to identify their own risks and solutions, interventions can also reinforce the interests of local elites and silence the marginal, while still packaging it as the result of a democratic process [2,29].

Informed by these critiques of resilience and participatory responses to disaster, I now turn to PA's efforts to build resilience in the lower Karnali to highlight the ways in which people participate in and benefit from its CBEWS unevenly. My goal here is not to demonize or diminish the very real ways that this intervention has positively served Rajapur's communities, but rather to expose the dangers present in any intervention that assumes, even implicitly, that by empowering local people to more effectively face and respond to disasters it inherently builds their resilience and reduces vulnerability.

5. Results and discussion: confronting the assumptions and expectations of interventions that build community resilience to disasters

Before PA's intervention in the lower Karnali, Rajapur residents explained that their old systems for predicting floods were largely limited to watching the sky for rain or observing the color of water flushed from the hills. Sometimes they studied the movements of birds, listened for the cries of livestock, or looked for ants marching away from the river. While these methods speak to an intimacy with one's surroundings, they were not always reliable nor did they provide much notice before a flood. For example, in a major flood that struck Rajapur in 1983, one villager recalled, "The flood came so suddenly, there was nothing we could do. We tried to escape by dugout canoe, but many people drowned and all our cattle were swept away. In one flood, we lost everything." For this reason, Rajapur's residents value that with PA's CBEWS they have a two to three-hour lead time to evacuate and secure their valuables. While this cannot prevent all devastation, community members stress that they now lose far less than previously, a sentiment documented in other reviews of the intervention's success at supporting local preparedness [45,59].

It is for these real material gains and tangible capacity to save lives that organizations like PA build CBEWS, especially in places like Nepal where there has been little government support extended to populations suffering chronic disasters. Yet, as CBEWS align more closely with frameworks of resilience and mobilize local empowerment as their stated goal, even interventions deeply valued by participants can redistribute responsibility onto communities and enable the state to remain absent from solutions. Examining people's experiences with PA's CBEWS, I analyze the unintentional effects that this intervention has had on participating communities including the implicit assumptions it makes about individuals' capacities to respond to early warnings and the burden of dissemination it inevitably extends onto local volunteers. Yes, there are material ways in which PA has improved the lives of the Karnali's most marginalized people that deserve recognition. However, I also argue that to some extent it has reproduced their precarity in other unintended ways by not fully accounting for Rajapur's situated political history that leaves certain populations unequally vulnerable to disaster and by failing to anticipate the potential consequences of a resilience discourse that shifts the burden of mitigating disasters from the GoN onto vulnerable bodies.

5.1. The limits of intervention

While PA's CBEWS has been able to translate live river level data into more accurate flood forecasts with longer lead times that enable people to evacuate and secure their most essential valuables during major floods [45,59], this intervention still serves residents unevenly and incompletely and does little to address people's underlying vulnerabilities. While this may not be the goal of CBEWS on their own, it certainly seems an essential part of any intervention that claims to build resilience. Fundamentally, residents better positioned to respond and with transportable resources, like cash, benefit most from early warnings, while the most vulnerable either go unreached or are able to do little about a pending disaster.

The village of Anantapur, for example, has been enrolled in PA's CBEWS for over six years, and yet as one 75-year-old man lamented, "Even with an early warning, there is only so much we can salvage in a few hours." Before monsoon begins, he explained, many people move their grain from traditional earthen vessels called *dheri* into more portable sacks and preposition them in oxcarts to be moved to higher ground. However, everything that they own and depend upon but cannot carry with them—including their homes, crops, and livestock—must be surrendered to the river. "Over and over again we lose everything," another farmer explained. "Our crops become ruined even before we can harvest them."

Such chronic loss is common across Rajapur, with floods affecting not only those whose livelihoods depend on agriculture, but especially *sukumbasi* and *mukta kamaiya* who continue to squat on the island's dangerous riverbanks. Here, they are not only more exposed to inundation, but are also limited in their capacity to respond to early warnings. Frequently, these communities live furthest from village centers and cannot always hear the sirens there. Many do not have easy access to life vests and must travel several kilometers to the closest

flood shelter. In Kutiana, for example, 10 landless *mukta kamaiya* households living nearly a kilometer from the main village on the area's lowest, most flood-prone land, described the barriers they face in benefiting from the CBEWS.

> Every year, three to four times a monsoon, it is like an ocean here. The river becomes chest deep. While the early warning system is active here, the main village where the siren is sounded from and life vests are kept is almost a kilometer away by footpath. If a flood comes in the middle of the night, it touches us first. Maybe we will hear the sirens, maybe we will not. But even if we do, how will we carry everything with us?

This uneven exposure to danger and limited capacity to respond to early warnings is a reality that Rajapur's poorest families live with as they continue to squat on the riverbanks and on the margins of the very communities they once labored in as slaves. Furthermore, many once-powerful landlords continue to act as local politicians, manipulating the distribution of recovery funds and negotiating with contractors so that government-funded embankments are built to protect their constituents, while displacing powerless communities of *sukumbasi* and *mukta kamaiya*. This leaves many of Rajapur's most flood-affected and marginalized people more exposed to disaster and alone in their recovery.

"When it floods here, people come to look, but they never come to help," explained one *mukta kamaiya* man, bitter over how often he and his neighbors had been abandoned by more privileged villagers. "The *burghar* [traditional village leader] here doesn't care because he lives in a safe place." While the CBEWS has enabled certain actions like tying the beams of their homes to trees so the wood can at least be recovered, many *mukta kamaiya* and *sukumbasi* must rely on their own savings, support networks, or take out loans to rebuild even basic shelter. Yet these dimensions of vulnerability are invisible, not necessarily *to* those individuals implementing PA's CBEWS, but *within* the system itself and the project's assessments of local risk.

Thus, while the CBEWS saves lives in Karnali Basin, it does so unevenly and in a way that does not prevent, but may even enable a violently precarious way of living to continue. This is true particularly for the island's most vulnerable people. For example, another cluster of *mukta kamaiya* families participating in the CBEWS described abandoning their homes and moving everything they own to their relatives' well before the rainy season even begins. "During monsoon, we live in empty houses, keeping just what we need to eat and sleep with us. We work our fields during the day, but always we are listening for the siren."

In this way, even where the PA's CBEWS has been successful at reaching Rajapur's most vulnerable people, in many ways, it ends up preserving and even normalizing a certain *kind* of life for them: one in which, because they live most intimately with danger and have the furthest to flee, they now live on standby, ready to abandon everything they own and depend upon at a moment's notice. While I do not claim that the perpetuation of a violently precarious, albeit resilient, life is intentional here or unique to the Karnali and PA's work for that matter, I do want to highlight what can occur when an intervention works to 'empower' local people to anticipate and survive crises while failing to also confront the ways in which disasters become chronic for *certain* people through their historical marginalization and continued exclusion from local forms of social protection. After all, it is not that Rajapur's most vulnerable households are excluded from PA's intervention. In fact, they are usually mapped as particularly 'at-risk' during pre-monsoon vulnerability assessments. Yet, it is only the fact that they live particularly close to the river that registers them as such, while the *reasons* why the live there to begin with go unaddressed. Moreover, the impact of 'making people aware' of their own precarity through these exercises is limited when they already know it acutely, but can do little about it.

Finally, it is important to recognize that for some communities

Fig. 5. Residents of Mujara travel by boat across the east branch of the Karnali River from Rajapur. During floods this is the only way to evacuate the island's population of 850 sukumbasi. Photo by author.

included in the lower Karnali's CBEWS, like Mujara's 850 landless households who live in the middle of the Karnali River's east branch (Fig. 5), receiving an early warning means almost nothing. During Rajapur's violent political history, Mujara, hardly more than a large sandbar, offered a refuge to many laborers enslaved to Rajapur's wealthy landlords. Some escaped to Mujara while still bonded, others came only after being freed. However, most were never registered in government surveys because of their remoteness, and thus, never had access to land allocations. As a result, people have stayed not by choice, but due to a lack of other options even as their island has since been whittled away by bank carving and increasingly severe floods.

"Every year the river swallows our entire island," Mujara's *burghar* relates. "But to evacuate 850 people by boat across a swollen river would be to risk death itself. Even if we had enough boats to carry us all, there is nowhere to go. The current is so strong it is impossible to stand." For this reason, he explains, when people build their homes in Mujara they sink pillars deep into the ground.

> This is how they survive: When a flood comes, they break their own walls so there is less pressure on the structure. With rope, they tie whatever possessions they can to the frame. Then they climb onto their roofs, dragging the children and elderly with them. They wait for days, battered by rain under umbrellas and tarps. No way to stay dry. No way to cook. Nothing to drink but the river itself.

In this place of profound vulnerability, it is not uncommon for people to die of exposure waiting for the water to recede. "During floods," another resident explains, "we are left to protect ourselves."

Through PA's intervention, the community of Mujara was given five canoes and hundreds of life vests: resources that, in theory, should enable them to better respond to an early warning. While these have not gone unappreciated by the community, there is little they can do to secure themselves in a place like Mujara. As the *burghar* pointed out, even with three-hour's notice, how do you evacuate 850 people by canoe? In a crisis, where do you even take them?

The case of Mujara underscores the limits of any intervention that tries to prevent disasters and build resilience simply by empowering people to be better prepared for floods. Even if an early warning is perfectly conveyed to communities, not all recipients will be able to respond. While this is a reality recognized by INGOs and development organizations in their publications and guidelines, the *reasons* that people fail to take action are often assumed to be issues of miscommunication, misunderstanding, or a lack of appreciation for the urgency of their situation [27,28,37]. While these factors could be addressed by altering messaging or organizing more trainings, data from my interviews and focus groups in Rajapur reveals that people often fail to act instead due to a fundamental lack of material resources or the social and political agency to secure themselves. This is a reality that cannot be altered by better information or training alone.

In order to prevent disaster then, interventions have to pair early warnings with other material investments to help secure vulnerable communities. This has to begin with not only documenting *who* is vulnerable and in what ways, but also by "tracing out the chains that cause and disable capacity" ([44], p. 679). For example, *how* have people come to be 'at-risk' in a particular place and *why* do they remain unable to escape disaster even with a warning? An approach to DRR beginning with such questions involves "disaggregating the structure of poverty" within a specific place, situating it historically, and accounting for processes of marginalization that extend into the present ([58], p. 127). While PA's work in the lower Karnali Basin has benefited many people in ways that should not be overlooked and that have been richly documented in other places [14,45,46,59], it is also important to understand that its CBEWS is only a starting point for reducing local flood risk through ongoing work that must not only be based on building peoples' resilience, but also situated in and tied to their underlying vulnerabilities. Shifting now to the politics of dissemination, I examine the ways in which the CBEWS in the lower Karnali also risks bracketing the responsibility for disaster prevention on already vulnerable bodies by re-enrolling people in their own networks of self-sufficiency.

5.2. The burden of dissemination

When PA first established its CBEWS in the Karnali Basin in 2010, they asked Chisapani's gauge reader to share the river level data that she and her family had been sending to DHM since 1962 with downstream villages (Fig. 6) [59]. Although Gurung's daily stipend provided by DHM was a modest 200 Nepali rupees (~2 USD) and she was offered no additional compensation, she readily agreed to notify downstream residents of impending floods on top of her normal reporting duties. As the CBEWS was expanded over the years to include more communities between Chisapani and the Nepal-India border, however, Gurung gradually became directly responsible for the safety of 52,000 residents downstream by conveying river level data to 74 communities by phone and fielding questions from concerned residents.

Thus, Gurung's job collecting and sharing information about floods on the Karnali River became a great social responsibility. As she was enlisted in the CBEWS, Gurung was not only accountable to DHM's scientists, but also to tens of thousands of people whose lives depended on her warnings. Although this was not necessarily a responsibility that was hers to bear, failure to reach the gauge and efficiently disseminate data came to mean endangering the lives of tens of thousands downstream. Thus, Gurung's own precarity deepened as the new expectations of her role in PA's CBEWS asked her to take greater risks herself. While Gurung's own agency must be recognized in her decision to take on this role, it is equally important to consider how any system that expects people to volunteer their labor or put themselves in positions of greater risk for the benefit of others, may be structured differently.

Fig. 6. Chisapani's gauge reader observes the Karnali River's water level using a manual gauge. Photo by author.

Gurung's willingness to shoulder this burden is even more profound given her family's history. "I learned to read the river from my father," she explained in an interview, toddling behind him as he went daily to the gauge station in Chisapani. In 1989, however, he slipped while descending to the river during a storm and drowned in the churning waters below. Despite his death on the job, Gurung explained that her family received no support from DHM and struggled to pay for his cremation and survive financially. Even so, the family did not abandon their post. When Gurung was appointed by DHM to replace her father, she was given a temporary position and the few benefits that had been extended to him were retracted even though she performed the same job.

"At first, they paid me only 10 rupees a day," Gurung remembered, an amount equivalent to 0.1 USD today. "After three years, they added five rupees to my wage. Three years later, another 20." In this way, Gurung's daily income grew incrementally to the 200 rupees she receives today. While this is insufficient, in Gurung's opinion, for the dangerous work she performs, she insists that she is happy and proud to serve as Chisapani's gauge reader. "We manage," she insisted, smiling at the end of our conversation. "I have a small shop on the side for extra income and when I need rest, my 19-year-old daughter takes over reading the gauge." Yet even as Gurung willingly takes on new burdens of dissemination for the benefit of downstream communities, the fact remains that her situation is hardly more secure now than her father's was decades ago. While DHM installed a handrail on the steps to the river, it still provides no insurance or compensation for injuries to any of its gauge readers.

Today, vulnerable Nepalis downstream are warned about disaster primarily by the labor of this single woman who continues to risk her life for their benefit.[4] What is more, in 2015 PA extended its CBEWS across the border to serve an additional 400,000 Indians living on the floodplains of Uttar Pradesh (Fig. 7). As these individuals were not receiving early warnings from their own government, and as DHM cannot share data directly with India, PA saw itself well positioned to serve communities by informally relaying live river level data across the border from Nepal to fill another gap where institutional, legal, and political barriers prevent state action. In July 2015, volunteers from four villages in Rajapur were taken to meet and exchange contact information with Indians living in flood-prone villages downstream and now, if Rajapur residents receive a warning from the gauge reader, they will relay it over the Indian border. The irony, however, is that in PA's effort to mitigate the effects of trans-boundary disasters the gauge reader and the marginal Nepalis she serves are being asked to not only secure their own lives, but also to take responsibility for their equally vulnerable downstream neighbors.

While this may be framed as a perfect case of 'community empowerment,' it also could provide an excuse for two states to neglect their duties of dissemination and continue to ignore the reasons why

[4] As previously mentioned, permanent DHM employees were sharing some responsibility for disseminating flood information through its website and formal channels of communication at the time of research. However, in this format, information remained largely inaccessible to rural villagers, and as a result, I found that most people in the lower Karnali Basin depended almost exclusively on the gauge reader for information about impending floods.

Fig. 7. Representatives from upstream Nepali and downstream Indian communities are paired and exchange contact details so that they can share river level data in the event of an impending flood. This was part of an exposure visit coordinated by PA in 2015. Photo by author.

certain people are more vulnerable than others. In the case of PA's intervention in the lower Karnali Basin, extending the CBEWS downstream into India multiplied the number of beneficiaries by nearly tenfold. This expansion could be framed as an indicator of the system's success, however, fundamentally it is neither the Governments of Nepal nor of India that have invested more time, finances, technology, or resources into their vulnerable citizens. Rather, the burden of dissemination continues to rest squarely on other precarious individuals in Nepal who have volunteered to relay the warnings they receive to Indians further downriver.

One has to question to what extent a system like this can be endlessly extended to serve more vulnerable populations when it already depends upon a few bodies spread dangerously thin. Today, over 450,000 people depend directly on Gurung as a source of information. Should she slip, like her father did, the whole system fails. While not all CBEWS are structured so precariously, this example highlights the danger of any intervention that leverages resilience and its discourse of endlessly replenished strength to 'empower' local people while failing to acknowledge the ways in which the systems being built and extended may remain exceptionally fragile. While claiming to build resilience and empower local people, interventions like PA' s can, in fact, build systems that require already marginalized bodies to not only bear the precarity of their own situation but also to take on new responsibilities, like the dissemination of their own early warnings. For this reason, I argue that institutions like PA must confront how their efforts to mitigate disaster with CBEWS may not only offer some security to communities but also reproduce the precariousness of the bodies they claim to save. In the Karnali Basin, this will depend, in part, on the extent to which PA continues to build relationships with the GoN and actively enroll its agencies in disaster mitigation within the context in which it is working.

With this in mind, I now turn to specific actions that PA has taken to cultivate relationships with government agencies in Nepal and to hold them accountable to their mandates. No intervention is without its limitations and unintended consequences. Yet, it is precisely because PA has worked so diligently at the national level to relieve the burden of dissemination and securitization that its CBEWS has extended, that makes it an ideal case to not only expose the dangers of interventions that claim to build local resilience to disasters, but also to discuss an alternative approach for conceptualizing responsibility. In particular, I highlight some of the creative ways that PA has worked within its limits as an INGO operating in Nepal to try to address structural causes of vulnerability, further protect people within its CBEWS, and support the government's communication of early warnings more justly that make it a model for similar organizations.

5.3. Working toward protection through state investment and government accountability

Rather than allowing the 'success' of their CBEWS to become an excuse for state inaction, PA has also pushed DHM to take responsibility for supporting flood-prone communities like those in the lower Karnali. While direct advocacy is not always feasible, PA has strategically partnered with the media to put pressure on government officials and hold them accountable to the public. For example, in June 2016, PA collaborated with a Kathmandu-based journalist to encourage DHM to initiate an SMS-based EWS that would send text messages to individuals located in river basins where flooding was imminent rather than relying on telephone and email-based communication chains. As PA had been developing a flood forecasting model in partnership with DHM [14,45], it hoped to put forecasts to use through more comprehensive and automated methods of dissemination. The journalist spent days in the Karnali Basin, interviewing the gauge reader and local beneficiaries. With these stories, he returned to Kathmandu and arranged a meeting at the Ministry of Information and Communications to discuss investment in better dissemination. After the conversation was broadcast on television, a meeting was convened with key stakeholders and just two weeks later, DHM launched Nepal's first automated SMS-based EWS in eight major river basins [26]. In its first season of operation, the system sent 1.5 million text messages.

That same year, Gurung along with seven other gauge readers started to receive a bonus of 3000 Nepali rupees (~30 USD) per month during the four months of monsoon [46]. These EWS management funds established at the district level financially support gauge readers for their constant labor and phone calls throughout monsoon. Prior to this payment, gauge readers involved in CBEWS across Nepal received the same compensation as others who reported only to DHM and were paid 200 rupees per day year-round. These material gains for gauge readers like Gurung were a direct response from the GoN to an advocacy campaign carefully initiated by PA at the national level [46].

As PA has pushed DHM to better compensate gauge readers and reach residents directly through an SMS EWS, the burden of dissemination that the CBEWS previously extended onto taxed bodies like the gauge reader's and community volunteers' has been partially relieved. By sending warnings via text message, there is now less risk of CBEWS failing should Gurung be unable to reach everyone. In this way, PA has worked to enroll DHM as a more active partner in their initiatives and support the development of a state-led EWS to increase the lead time, reach, and effectiveness of disaster information dissemination in Nepal. Moreover, PA's ability to press the GoN to better compensate its gauge readers has provided better remuneration to precarious individuals like Gurung who take incredible risks to collect and disseminate data on behalf of the GoN and vulnerable citizens. While this 12,000 Nepali rupee annual 'bonus' does nothing to lessen the physical dangers of Gurung's job, it does cover the cost of dissemination that she previously paid for from her own salary.

Additionally, PA continues to invite government officials to the Karnali Basin to see their CBEWS and meet participants as part of their strategy of "bringing people of power to the ground," as one INGO representative described it. Although a slow and tedious process, it is this broader work "connecting DHM with communities," that I argue is even more important than 'empowering' local people to mitigate disaster in the Karnali Basin. After all, as articulated in the Sendai Framework for Disaster Risk Reduction, "each state has the primary responsibility to prevent and reduce disaster risk" ([51], p. 13). In this way, PA with its eight-year history of working in the Karnali Basin and even longer commitment to DRR in Nepal provides an example for how INGOs can effectively invest not only in vulnerable people, but also in governments so that their community-based solutions to disasters do not erode or prevent the extension of state programs, but rather serve to complement and enable them [28].

Nonetheless, DHM's current focus on predicting floods and

disseminating forecasts still "locates risk in the hazard itself" ([44], p. 677), treating disasters as an objective phenomenon that can be anticipated and prevented through better calculation and dissemination [52]. Even its financial investment in gauge readers is a cash bonus without social benefits that, one could argue, makes the readers responsible for better securing themselves through a rational use of their income. As a result, even as the GoN has become more actively involved in DRR at the national level through DHM, in this case it does so primarily through apolitical technologies that shift attention away from the uneven landscape of vulnerability into which disasters slam and the early warnings that precede them land. This connects to concerns raised above through the example of Mujara, regarding the ways in which systems that rely strictly on the dissemination of information do nothing to resolve the inequality of exposure. Thus, mitigating disaster in villages across Rajapur will require more than an EWS, or any intervention focused on empowerment for that matter, even if it is led by the state. Any solution to disaster will have to recognize people's fundamental vulnerability and work toward greater social and political protection through policy and material investments to secure the most precarious people. This is not something that PA or any intervening institution can do alone, but that they may play a role in facilitating through the relationships they foster with the government.

As with many INGO and donor-initiated resilience initiatives, PA's extensive and positive efforts to inspire DHM and the GoN to both launch a government-led SMS EWS and to better compensate gauge readers, still do not address the root causes of disaster in the Karnali. Yet, even though the GoN is primarily taking on responsibility for mitigating disasters there through the apolitical realms of DHM hazard prediction and dissemination, this case presents an opportunity to begin a more robust conversation about rights and entitlements alongside resilience. If residents of the lower Karnali, for example, begin to develop a relationship with the state as an institution that exists to serve them, then people may begin to respond to the structural roots of their vulnerability through a democratic process that forces the government to redress the political dimensions of their marginalization.

In Rajapur, the only group currently taking a rights-based approach to issues faced by *mukta kamaiya*—including their chronic exposure to flooding—is Kamaiya Mahila Jagaran Samaj (KMJS), an NGO founded in 2007 by a local ex-*kamaiya* woman. Although this organization had been sending delegations to government offices in Kathmandu and district headquarters for over a decade, at the time of research only the first families were being resettled from precarious riverbanks on safer land in the island's interior. KMJS's lengthy and, at times, bitter struggle to redress their structural vulnerability highlights the challenges of any 'solution' to disaster that focuses on holding the government accountable through a democratic process. This is especially the case in the Tarai, where citizens have been frustrated for decades by Nepal's lack of local elections and most recently experienced the nation's political restructuring through the 2015 Constitution as a continuation of historical patterns of their marginalization [54]. Nevertheless, KMJS's recent political success at mobilizing state action suggests that, especially if coordinated with other institutions like PA, a broader, more holistic approach to mitigating disasters and reducing vulnerabilities in Rajapur is possible.

6. Conclusion

Resilience, at least in its current form and applications, may not be the best framework to inspire interventions that address the structural roots of disaster. However, so long as this concept continues to mobilize CBEWS and inspire efforts at DRR in frontline communities, there is a need for intervening institutions to reframe their current narratives of 'empowerment' and 'responsibility.' Instead of prescribing a 'resilient life' that is "within the limits of their own powers of self-reliance" for the vulnerable ([11], p. 68), humanitarian workers might consider what it would mean to 'empower' people not to an individualized capacity to self-secure, but rather to "the ability to influence the political economy that shapes entitlements" ([55,56], as cited in [44], p. 686). All interventions can be "damaging or emancipatory" depending on how they restructure rights ([44], p. 685). Security should not be the sole responsibility of vulnerable individuals. Rather it must involve holding governments accountable to their citizens and designing social protections to support the most marginal in a world of more frequent crises.

Institutions cannot assume that their CBEWS necessarily build resilience or the capacities within communities that they might hope. As I have argued in the Karnali Basin, CBEWS can actually reproduce precarity by deepening the responsibilities of specific individuals within an information chain, like gauge readers, and by extending the burden of dissemination to local volunteers if those institutions do not work to proactively anticipate, understand, and combat these effects. While INGOs like PA cannot single-handedly change the deeper political dimensions of vulnerability that constrain people's capacity to act, i would argue that the causal roots of disaster have to be where any 'solution' begins. Certainly, confronting the *why* behind vulnerability is always a socially and politically contentious process; however, as Ribot [44] asserts, "this is our responsibility" (p. 698). To do anything less, particularly when intervening in structurally marginalized communities that have been *made* more vulnerable, is to risk reproducing and deepening the violence of past actions that have put certain people in places of elevated danger.

If the goal of humanitarian and development organizations is to build "people-centered EWS" [49,51], then they will have to not only look forward and toward the skies, anticipating and mitigating the next disaster, but also backwards and to the ground where historical patterns of marginalization continue to structure people's uneven experience with and capacity to resist disasters. Current efforts to communicate early warnings may also have to change, beginning not with attempts to *reach* more people through new technologies that better disseminate information, but by listening first to people's stories about how they became precarious to begin with. With a deeper and more situated accounting of the human topography that structures risk, interventions may become more meaningful and useful to vulnerable people.

While the roots of vulnerability must be where any intervention begins, it is equally important for implementing institutions to question how they evaluate their own projects. In the case of PA's CBEWS in the lower Karnali, for example, if success is measured strictly by the number of bodies enrolled in the system then the staggering 452,000 people participating between Nepal and India is only cause for celebration. If evaluation metrics dig deeper into the politics of dissemination and response, however, this number becomes more complicated. When we consider not only who receives an early warning, but also who is capable of responding to it and to what extent, then the 'success' of a CBEWS may look very different.

Furthermore, as I have shown through an analysis of the social and emotional weight that CBEWS place on individuals who bear the burden of dissemination, simply folding new communities into a system and extending its reach downstream does not inherently build local resilience. In fact, it sometimes exacerbates the precarity of certain individuals already enrolled in the system. As a result, there is an urgent need to confront the politics of people's participation in CBEWS—including both their role in disseminating information and responding to it—and to critically assess the material effects of these interventions. In the process, we may need to rethink not only the place from which interventions begin, but also how we evaluate and improve our attempts to reduce disaster risk and build resilience.

In the end, information can only do so much to secure people. Therefore, if INGOs who initiate CBEWS take their objective of mitigating disaster seriously, then they have to move beyond the mere provision of warnings and trainings within vulnerable communities to address the structural roots of disasters and the ways people already bear their impacts unevenly. Rather than starting with an assessment of what people need to *do* in order to be better prepared, interventions

might begin by examining what the most marginalized people still *require*—materially, socially, and politically—to respond to a flood or an early warning. Until these gaps are closed, vulnerable people will continue to face disasters exacerbated by a changing climate, but equally created by policies, projects, and political acts of dispossession that expose people to danger unevenly. To ignore these processes is to enable disasters to continue.

Precluding disasters will require not only focusing on technologies of predicting hazards, but also working with the state through a discourse of rights, social justice, and entitlements to serve and secure the most vulnerable communities long before hazards strike. This process will necessarily look different in each locale, just as disasters are phenomena constituted by a web of entangled social, political, and biophysical processes that cannot be explained, predicted, or prevented at a distance from the material realities that people face in a particular time and place.

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