The Reality and Dilemma in Using Community Risk Assessment as a Disaster Risk Reduction Tool in Ghana

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ABSTRACT

The purpose of the paper is to introduce qualitative methods as providing unique and critical contributions for developing risk reduction strategies at the local level. It summarises the principles and practices in study design, data collection and analysis and presents a synthesis of standards for ensuring rigor and enhancing credibility in qualitative research. The methodology involves a comprehensive literature review, which culled information from risk reduction research-related fields and years of field research experience. The findings reveal how the method can be used to understand complex social processes and capture more nuanced aspects of a phenomenon through the lens of the study community. Such qualitative studies are often exploratory and seek to generate novel insights using inductive rather than deductive approaches. They help uncover the beliefs, values, and motivations that underlie participants' actions and behaviours, which are crucial in implementing DRR strategies at the local level. Disaster risk reduction research seeks to inform the development and evaluation of policy guidelines that foster effective interventions and these aspects of risks may be most appropriately examined using the qualitative research methods.

1. INTRODUCTION

In recent years, there have been several calls on development practitioners to, as a matter of principle, include disaster risk reduction (DRR) or emergency mitigation strategies in their development plans and processes (Wisner et al., 2004; Hilhorst and Bankoff, 2008). This is due to the increasing recognition of the complex multi-risk nature of communities where the 'opportunity cost' of a stand-alone intervention is too high for the community to afford it without recourse to external funding. More importantly, the recognition also reflects the fact that the gravity of the impact of disasters can prevent governments from attaining their developmental targets, including the quest to alleviate excruciating poverty.

These calls come at a time when most governments tend to take the conventional approach to risk assessment in a 'natural disaster' silo and therefore concentrate their resources mainly on technical solutions. Governments generally fail to recognise how local capacities can affect DRR strategies, or how to empower the people to gain control over the determinants of hazards that confront them (GAR, 2009). The reality is that communities live in a complex multi-risk environment where the 'opportunity cost' of standalone interventions is too high for them to adopt such options without recourse to external support.

This gap in literature defeats the purpose of DRR strategies, which seek to build resilience, reduce vulnerability and create capacities for adapting to and coping with natural disasters.

Some unexpected events such as flooding affect not only the local economy (i.e., taxing local resources), but also the regional, national and sometimes even the global community. Yet, the dominant risk profile is one of small-scale recurrent disasters, which do not normally attract external funding. Such situations evoke pertinent questions that cannot be glossed over in our bid to develop an efficient DRR framework: How well do people in a community understand the potential risks confronting them? How well are they prepared in terms of their resources and capacities to handle those emergencies? What resource does the community lack and what does it already have? Are there any established modalities for fostering understanding between communities and risk managers? Understanding these questions holds the key to our appreciation of the vulnerability level of a community, which is also contingent on their perception and knowledge of risk.

According to Hilhorst and Bankoff (2008), people's ideas about risk and their practices in relation to disasters constitute the sextant and compass with which they measure and chart the landscape of vulnerability. They argue that perception is not knowledge, nor does knowledge necessarily translate into action. Yet, perception is important in understanding why they exhibit a certain behaviour. Hilhorst (2008) categorises people's perception into three social domains of knowledge that correspond to science, governance or local customs, emphasizing that all three are equally valuable in understanding what makes people vulnerable and how they can set about ameliorating that condition.

By inference, reducing disaster risk and its adversarial impact demands a comprehensive human-centered risk assessment approach, complete with capability and vulnerability evaluations. This is because vulnerability is embedded in complex social relations and processes and should be understood within its local context (i.e., what makes certain people vulnerable). Such an approach minimises not only societal vulnerabilities by avoiding (prevention) or limiting (mitigation and preparedness) the adverse impact of hazards, but it also aids in prioritizing them (Kulatun-

ga et al., 2010). Such a risk assessment seeks to reduce loss and prevent the escalation of risk in a community through proper distribution and concentration of resources.

Guided by these dynamics and attributes of vulnerability, this paper evaluates community risk assessment (CRA) as one of the bottom-up, community-led approaches to DRR. Following these introductory remarks, the next section provides an overview of DRR as a concept, highlighting the challenges in its conceptualization and implementation. The paper then interrogates the virtues of qualitative research, examining specifically how communities can become involved in DRR, and provides guidelines for enhanced community participation. The paper concludes by making recommendations for policy consideration with the intent of fostering greater consultation, collaboration and partnership among key stakeholders in future DRR approaches.

2. AN OVERVIEW OF DISASTER RISK REDUCTION (DRR)

A disaster is generally a risk magnified or an extreme event that overwhelms the capacity of the affected community to protect lives and livelihoods, requiring external help in dealing with the losses (Wisner et al., 2004; UNISDR, 2009). It arises from hazards and typically, it is its impact on human life that distinguishes it from hazards. Thus, hazards need to be managed in order to reduce their impact on human lives and the ways of doing so are varied and evolve over time. The earliest and still predominant approach in managing hazards is for agencies to provide relief to victims once a disaster occurs. Although such rescue assistance is vital for saving lives, it nonetheless makes some level of loss almost inevitable. Apart from undue delays, relying on external support is not desirable for at-risk communities, particularly when the communities themselves have some in-situ capacity to deal with the threat.

The need for a fundamental paradigm shift has become more imperative in recent years as society increasingly pays a higher price for poor development choices. The introduction of neoliberal policies such as privatization, trade liberalization and increasing globalization, to some extent made preventive approaches, which sought to reduce the very founda-

tions of disaster-risks, redundant. This development, coupled with the threat of future climate change, makes the call for an altered approach extremely urgent. Rather than waiting to respond to an event (post-hoc reactiveness), disaster managers are being urged to adopt risk reduction strategies including capacity building for resilience to address not only disaster impacts but also the factors that turn a hazard into a realised disaster. It is hoped that this will reduce the need for resources for post-disaster response activities and influence future development agendas (UNISDR, 2009).

Generally, DRR refers to the practice of reducing disaster risks through systematic efforts to analyse and reduce the causal factors (Blaikie et al., 1994). To a great extent, reducing exposure to hazards, lessening vulnerability of people and property, managing land and the environment wisely, and improving preparedness for adverse events are all different facets of ensuring efficient DRR for sustainable development (White et al., 2004; Gaillard and Maceda, 2009). Yet in most countries in the developing world in particular, national DRR policies and institutional mechanisms to pursue this agenda remain at various degrees of completeness (AU/NEPAD, 2004). Thus, their effectiveness in stemming the tide of increasing vulnerability to and impact of disasters is limited. This calls for a strategic approach to improving and enhancing the effectiveness and efficiency of DRR since in order for development activities to be sustainable, they must reduce risk; the alternative being that unsound development policies increase disaster risk - and disaster losses.

Principally, DRR activities involve every part of society, the government, and the private sector. They continue even after a disaster, increasing resilience for future disastrous events. This presents the reason why the Hyogo Framework for Action (2005-2015), the United Nations' blueprint for DRR, endorses the importance of mainstreaming DRR measures within urban planning and development, a point reiterated by former UN Secretary General, Kofi Annan who eloquently noted that "…we must shift from a culture of reaction to a culture of prevention…it is more humane… also much cheaper…" (1999).

This approach becomes imperative in Ghana, where poverty discrepancy and the skewed provision of infrastructure services are not uncommon. In Accra

(the National capital of Ghana) the median household income for the entire city is $ 8.86 per day, while the highest income areas - Airport Residential, Roman Ridge, Cantoments and Airport West- have an average household income of $ 294 per day. The very poor areas have an average household income of $ 3.5 per day (CHF International, 2010). In such situations, disasters become a symptom of incomplete, inappropriate or inequitable development. Indeed, Joseph Deiss (2011)[1] rightly articulates this relationship, suggesting that, "by wiping out major development gains, such as school buildings, hospitals and energy grids, disasters perpetuate a cycle of under-development, poverty and disempowerment". In this regard, sustainable DRR initiatives must explicitly identify local associations, unions, NGOs, religious bodies, etc., to participate in the assessment of disaster risks, early warning systems, enhancement of community resilience capacity, reduction of hazards and risks, and preparedness strategies and activities.

2.1. Interrogating Models for Disaster Risk Reduction

According to the UN Secretary-General, "the more governments, UN agencies, organizations, businesses and civil society understand risk and vulnerability, the better equipped they will be to mitigate disasters when they strike and save more lives"-- Ban Ki-moon[2]. This comment underscores the fact that DRR is about choices and is "everyone's business". It shows that approaches to DRR are varied, as there are multiplicities of risk factors. It is a conceptual framework intended to systematically avoid (prevent) and limit (prepare/mitigate) disaster losses in lives and the social, economic and environmental assets of communities (InfoResources, 2009). DRR must be undertaken well before disaster can strike, shifting the focus away from responding to disaster to prevention, preparedness and mitigation activities.

Since 2005, the cornerstone of DRR has been the Hyogo Declaration with the overarching goal of building resilient communities by 2015. In this regard, there are two possible approaches. The top-down approach involves decision-making by "experts". Disregarding community opinion and consensus-seeking, the decision-makers seek refuge in technology-based models, imposing programmes on people who are expected to benefit from such deci-

sions. This approach generally leads to dependency and lethargy among 'the local people'. It focuses on monitoring techniques like sophisticated hazard mapping, the implementation of buffer zones and physical mitigation measures such as flood barriers (Luna, 2007).

Such an approach fails to take into consideration the socio-cultural beliefs and livelihood patterns of the affected society, generally resulting in inappropriate interventions that are destined to fail. The literature is replete with instances that illustrate how failure to seek local knowledge and consent has led to the failure of otherwise well-intended policies. A case in point is the failure of the Kwabenya Landfill Project in Accra, Ghana (see Oteng-Ababio, 2011; Owusu et al., 2011). The project was one of the development assistance programmes implemented by the UK Department for International Development (DFID) in 1991. Even when the metropolitan assembly failed to meet the DFID funding conditionalities, the World Bank granted the assembly $ 96 million support for the proposed engineered landfill in 2011. The feasibility studies, project design and initial preparatory work costing over US$ 2 million were completed in 2002. Although a well-intentioned project which, if successful, would have improved solid waste management in the city, failure to consult, involve and plan with the community stalled the project.

Another failed government intervention was the Keta Sea Defense Project. The Keta Lagoon[3] is a large body of fresh water separated from the salt waters of the Gulf of Guinea by a narrow strip of land. This isthmus experiences severe and continuous erosion and a large portion of residential and public infrastructure in Keta was lost to the sea. Should the isthmus be breached by the sea, drastic changes in salinity levels and flow within the lagoon would occur, with quite catastrophic consequences not only for local agriculture and the fishing industry, but also for those who live in Keta and the surrounding area. This informed government decision to build a sea defence wall to protect and stabilise the shoreline from Keta to Hlorve. The project failed to consider the possible down-drift transfer of the problem, thereby consigning communities like Kedzi, Horvi, Vodza, etc., to perpetual tidal waves and continued coastal erosion (Keta Municipality, 2012).

Recent research (Allen, 2006; Oteng-Ababio, 2012) has challenged the dominance of the top-down approach to DRR. Allen (2006) for example extols the virtues of the bottom-up approach, which has as its objective community empowerment and the transfer of ideas from the "bottom to the top". He believes that such an approach ensures that policies and technologies answer to the needs of the community and create awareness about local risks and self-protection. An effective approach among vulnerable local communities is to ensure that those vulnerable to disasters are not seen as passive victims, but key (active) actors in dealing with the threat and thus increasing their own resilience.

This is because a community at risk has inherent skills, knowledge and experience that can be built on for DRR. Their indigenous knowledge holds in-depth understanding, based on their familiarity and engagement with the surrounding geography, natural environment and local affairs. The bottom-up approach provides an opportunity for the community-at-risk to contribute and increase their commitment and belongingness to DRR activities. Suffice it to state that though a community may be living in a fragile area, its members' understanding and familiarity with the locality, developed through the day-to-day engagement with the surrounding geography, can be a great asset. The local people, according to UNISDR (2006), must be engaged in all aspects of the DRR process, including the identification, analysis, planning, implementation, monitoring and evaluation, in order to reduce their vulnerabilities and enhance their capacities. This provides them with the opportunity to participate in DRR activities, a practice rightly articulated by Hauser (2004): 'We must never merely provide people with programs which have little or nothing to do with their own pre-occupations, doubts, hopes, and fears... It is not our role to speak to people about our own view of the world, nor to attempt to impose that view on them, but rather to dialogue with the people about their view and ours'.

Potter et al. (1999) also argue that direct community involvement ensures that information about risks and hazards is communicated in a manner and language that is accessible to all, and that such participation generates community ownership, which is vital for sustainable, long-term achievements. They see the process as a way of mobilising community resources, both human and material, to achieve effective risk re-

duction. The inclusion of local government officials from the early planning stages bestows some authority to the final plan and ensures sustainability. The approach ensures the co-production of knowledge rather than the primarily extractive research approach often employed in knowledge gathering (Cargo and Mercer, 2008).

It ensures that the community is not only a beneficiary but also one of the main actors employing data collection methods designed for people of different educational backgrounds, which encourages community participation and acceptability. Community-level participation also develops local capacity, building self-esteem and confidence, knowledge, and teamwork of the entire community, helping "outsiders" (experts, consultants, government officials, etc.) to better understand the community's development activities. In this way programmes will achieve practical and more effective results, while community life will become more stable and hopefully, sustainable..

The foregoing is not intended to downplay or pretend to be oblivious to the challenges in the bottom-up approaches. In some cases, certain cultural beliefs and livelihood patterns tend to increase the vulnerability of some communities towards disasters. The fishing community of Faana near Accra for example has been subjected to persistent sea erosion, yet the residents have refused to re-locate due to their traditional beliefs (Oteng-Ababio et al., 2011). In some instances, poor economic conditions can also compromise technological improvements, even with community participation. This requires striking a balance between DRR activities and community-based measures through a proactive and systematic engagement with affected communities, broadening community understanding of DRR measures rather than blindly accepting them. Ultimately, any community-based risk assessment that integrates community knowledge and scientific knowledge is most appropriate in DRR.

3. EXPLORING THE VIRTUES OF QUALITATIVE METHODS FOR DRR RESEARCH AND PRACTICE

Generally, qualitative research is a form of scientific inquiry that spans different disciplines, fields, and subject matter and comprises many varied approaches (Crabtree and Miller, 1999). It can be used to understand complex social processes, capture essential aspects of a phenomenon from the perspective of study participants and uncover beliefs, values, and motivations that underlie individual actions (Denzin and Lincoln, 2000). The methodology, which is normally exploratory in nature, seeks to generate novel insights using inductive (starting with observations and developing hypotheses) rather than deductive (starting with extant hypotheses and testing them with observations) approaches.

In other words, qualitative research, which describes the complexity, breadth, or range of occurrences, stands in contrast to quantitative methods, which count occurrences (e.g. estimates prevalence, frequency, magnitude, incidence). Qualitative research seeks to hypothesise about a phenomenon, its precursors and consequences, while quantitative research seeks to test hypotheses statistically. Moreover, quantitative research is performed in randomised or nonrandomised experimental and natural settings and generates numeric data through standardised processes and instruments with predetermined response categories, unlike the former, which occurs in a natural (rather than experimental) setting and produces text-based data through open-ended discussions and observations.

Engaging with both types of methods is increasingly recognised as valuable, as capitalizing on the respective strengths of each approach ensures verification of findings and helps to generate more comprehensive, complementary and robust data (Denzin and Lincoln, 2000). Significantly, the two can be used concurrently or sequentially, and emphasis may be placed on either component or equal weight given to both. In using CRA in a DRR study, preliminary quantitative 'surprising or inconsistent' data are generated that are later examined into greater depth with a follow-up qualitative component.

3.1. The Tenets of Community Risk Assessment in DRR Research

The term community in this paper is understood as a group of people with common needs or sharing common interests and living within a geographically defined area (i.e., a community has both social and geographical dimensions) (Rifkin et al., 1988). It is also understood that these individuals may have varying perceptions of disaster risk depending on their so-

cial class, education, age, gender, etc. Yet, the adoption of CRA enables the community to unite and analyse its eminent threats, particularly in urban spaces where residents are often not only environmentally challenged, but also economically overstretched (Smith and Petley, 2009).

Community risk assessment is a communication between the researcher[s] and participants, driven by the participants to profile a community and collect general background information about the community and its hazards. Through the process, a community is able to identify, assess, analyse and rank its disaster risks and hazards, investigate its vulnerability levels and its capacity, as well as determine those who are most vulnerable. The community will have a better understanding of local development circumstances and the likely impact of disaster impact. Community members will also understand their capacity in coping with and potentially reducing disaster risks, and foster better relationships between the community and related stakeholders.

The approach is one of the methods that have evolved over the last few years that engage communities developmentally and use highly participatory approaches (Holloway and Roomaney, 2008). Terminologically, the approach may have different names and acronyms, yet they all use many of the same tools, including the ability of the local community to appreciate climate change and other global issues. In practice, the approach involves hazards, vulnerability, capacity assessment and interrogation of people's perceptions of risk (CISC, undated). Hazard assessment is the process through which community members identify and analyse the hazards or threats that may potentially affect them, while vulnerability assessment enables them to analyse the factors of risks (root causes) that underlie their vulnerability. Capacity assessment involves the identification of community coping strategies for disaster preparedness, mitigation and/or emergency response. An important component of DRR is improving the community's perception of risk. This will bring to the fore their various conceptions with respect to the risks related to different factors (social, economic, demographic, and cultural) that affect their lives.

A range of tools can be adopted to increase stakeholder participation or engage the community in risk assessment; these include informing the community, soliciting their inputs and organizing participatory planning. Informing members of the community can be done through the use of flyers, news articles and published meeting notes, while soliciting their inputs can be done through the use of mail-in-surveys or meeting with key community representatives. Participatory planning involves organizing public meetings, charrettes and visioning workshops. Most of these tools involve group work, preferably with trained facilitators. This affords the community an opportunity to appreciate the nature and scale of the risks it faces, to determine what is needed to reduce the risk, including new local initiatives, outside resources and technical expertise. Significantly, proper procedural planning is imperative for any CRA; it minimises risk and substantially reduces loss. It helps in implementing appropriate mitigation strategies, which distinguish disaster preparedness from pure relief work, and also allows bodies like the Town Development Committees to integrate these strategies into their development plans.

CRA gathers information related to the livelihoods of the community, their coping capacity, local risk and hazards. Studies by Blaikie et al (1994) and Pelling and Wisner (2008) indicate that in recent years the *modus operandi* of most practitioners in DRR has shifted to identifying and evaluating root causes of vulnerability rather than analysing disasters in isolation. Ultimately, CRA aids in the identification of scientific knowledge that could be lacking within a community and places the would-be victims in the lead role in actively planning, designing, implementing and evaluating activities. This is important since coping capacity, level of vulnerability and requirements vary from one community to another and according to gender, livelihood patterns, age, etc. (UN, 2009).

3.1.1. Increasing Stakeholder Participation

Theoretically, CRA is a tool that facilitates the identification of vulnerable groups in a community and evaluates the available local capacities that might help increase their resilience. It particularly ensures that traditional societies and cultures are not marginalised but rather made an integral part of the development process. The critical issue is how to achieve an acceptable framework and guidelines on how to engage the community.

3.1.2. Preparatory Work and Community Education Stage

The operationalization of CRA can be divided into three main stages (see Table 1): a preparatory (information) stage, the actual assessment (solicit input) stage and the collation of assessment results (participatory planning) stage. The assessment is premised on the fact that risk is not just concerned with the present or the future but is intimately also a product of the past as articulated by Oliver-Smith (1979; p 96): "a disaster is a historical event – and the aftermath of disaster is the process of coming to terms with history". Hilhorst and Bankoff (2008) suggest, 'Why disasters happen is a political question, yet understanding how it occurs is a social and historical one'. By inference, it can be argued that the present condition has historical contexts that may transform a hazard into a calamity and determine whether people have the resilience to withstand its effect or are rendered vulnerable to its consequences.

The preparatory stage involves the identification and profiling of the community at risk. The activities may include public meetings, which are scheduled at times that are convenient for community participants, and may also mean holding meetings during the eve-nings or other times outside of typical business hours. This can be done at the request of a vulnerable community, or by agencies in disaster management that can identify vulnerable communities using set criteria (e.g., most disaster prone area; most vulnerable to a particular hazard; least served by the government; possibility of replication or spread effects to other communities).

Agbogbloshie, the biggest informal settlement in Ghana with a population of about 89,000 (Housing the Masses, 2010) has, for example, attracted much academic attention, not only because of its critical role in the urban economy (Grant and Oteng-Ababio, 2012), but also because of its lack of basic infrastructural services due to its "so-called" informal status (Melara et al., 2013). From Table 1, the potential ways to inform the community include notices displayed in stores and in churches, as well as door-to-door personal invitations.

The objective at this stage is to become familiar with the community in order to understand their livelihood patterns and the nature of local hazards (Kulatunga et al., 2010). This also involves establishing contact with key stakeholders, an important preliminary step in any planning process, and includes intro-

Table 1. Methodological Approach to Community Risk Assessment (CRA)

	Main activities	Community involvement tools	Expected outcome
Phase 1 Preparatory work and community education	- *Scoping the risk context and the feasibility of risk reduction initiatives.* - *Establishing enabling local stakeholder and institutional arrangements* - *Do background research on the settlement's risk and development profile.* - *Making clear administrative and logistics arrangements with key stakeholders*	***Informing (educating) the community*** *- Through the newspaper, television, radio, community website/newsletter, libraries, stores, churches, and other public locations* *- Depository in public place* *- Flyers/meeting announcement, inserted in water/electricity bill* *- Telephone calls/direct mailing to NGOs, CBOs* *- Door-to-door personal invitation* ***Provide community fact sheets/citizen briefs*** *- Should be clear, concise (in lay-man's terms)* *- Provide basic information* *- Provide contact information and additional resources*	- *Clarity and agreement on settlement(s) to be supported.* - *Identification and engagement of key stakeholders from the settlement and local government.* - *Consolidated information on the settlement's development (including maps, aerial photos and reports)*
Phase 2 Participatory risk assessment (soliciting community input)	- *Conduct a risk assessment that is participatory, inclusive and robust*	***Community meeting*** *- Open participation* *- Adequate meeting facility (size, handicapped, accessible, audio/visual)* *- Well-chosen meeting time and duration* *- Sensitivity towards minorities (translation)* *- Facilitation if necessary* *- Understand dynamics within community* *- Build trust among facilitators and community* ***Workshops/training sessions*** *- Tailored to the information needs of community* *- Keep audience awake and engaged* *- Relaxed atmosphere and time for networking* *- Hands-on segments*	- *A useful and robust CRA* - *Shared understanding and agreement on the settlements risk profile*
Phase 3 Visioning and participatory planning	- *Write up the report and communicate the findings to the community.*	**- Strategic planning process** *- Design charrettes, community meetings* *- Involve all stakeholders* *- Provide sense of ownership/pride* *- Potential to unite community and provide full community support for a project*	- *Commitment by key stakeholders to jointly reduce identified risks.* - *A written and disseminated report for key stakeholders.* - *Results will be inputs for risk reduction planning and provides indicators for monitoring and evaluation of changes in vulnerability and capacity of the community.*

Source: Adapted from Holloway and Roomaney (2008),

ductory meetings and contacts with government organizations (including those in disaster management fields), and with related stakeholders such as the Red Cross members of the local community, including community-based and vulnerable groups.

This initial stage involves providing secondary (quantitative), site-specific data that will provide the community with adequate background information, help in the identification of the relevant issues and facilitate their participation or provide input to decision-making. The basic elements of such a community profile include the socio-economic information, livelihood activities and spatial characteristics, and where possible, the area historical data, disaster history, development and research reports as well as census data. Such information can be obtained from libraries, government sources, research centres and other secondary data sources (reports, maps), and should be presented in a format that community representatives can understand.

At this stage, the requisite human resources and structures as well as logistics planning for the assessment are organised and developed. An assessment team is established with the participation of the local people who are subsequently trained in the skills to work with the community (how to organise a community meeting, facilitate group discussions, facilitation) and knowledge of participatory risk assessment tools. For the initial community familiarization interactions, it is generally helpful to use more than one format – using verbal presentation accompanied by written handouts, and if necessary, the services of a translator. This educational component may be accomplished by using several of a variety of activities, including informational meetings, community day or 'fair' to bring together different age groups and/or the adoption of visual aids – maps, pictures or conceptual drawings.

3.1.3. Participatory Risk Assessment Stage

The second phase in a CRA process is a field-based assessment of hazards, local vulnerability, community capacity and people's perceptions of risks. This information is collected in community workshops employing participatory methods as well as interviews and focus group discussions with community members. As already noted, such communication is a two-way process where the researcher or facilitator provides information to the community and vice versa. The main objective of the community dialogue is to gather data that will facilitate planning to reduce the magnitude of hazards, exposure and sensitivity to hazards and increase the community's coping capacity and assets. Table 2 presents the different participatory mapping tools used for community-based disaster risk reduction (Twigg, 2004; Benson et al., 2007).

Data is collected by employing appropriate assessment tools with the active participation of the local residents and other key stakeholders. For example, conducting a familiarization tour, or a '*Transect Walk*' to possibly locate, confirm and acquaint oneself with the geography of a community; its natural resources and hazards; and its land use patterns, and to understand its problems, is a particularly essential exercise. It helps identify the coping strategies of community members, which in most cases, they themselves may take for granted and fail to acknowledge. The service of a trained facilitator is paramount in this process, which also enables the identification of 'hidden' community assets.

It is important to carry out additional FGDs with residents and opinion leaders to gather the information on the locality, the people, common hazards and the community's livelihoods, as well as gain insight into their existing preparedness, coping strategies and institutional arrangements. The goal of such focus group discussions (FGDs) is to encourage frank, open and spontaneous discussions, and this is one of the cardinal features of qualitative methods: the research team moves back and forth between the data collection and data analysis process to allow new avenues of inquiry to develop as additional data is/are collected.

Generally, the goal of such community interactions is to encourage frank, open and spontaneous discussions. In some cases, the information from both secondary (quantitative) sources and community-profiling sessions (qualitative) may be ordered into categories and placed in a matrix (see Table 3). It is possible to complete a separate matrix for each identified hazard, and this can be used to test the impact of a development initiative on community vulnerability and capacity and for monitoring during implementation. Suffice it to re-echo that, "informed consent of communities can pave the way for fruitful discussions so that a well-conducted CRA builds a shared under-

Table 2. Main characteristics of the different forms of participatory mapping used for disaster risk reduction

Type of participatory mapping	Principles	Advantages	Disadvantages	References, e.g.
Ground mapping	People draw the map in the sand/ground with a stick or their fingers	Very easy to set up and cheap Familiar to most people Less eye contact Flexible	Temporary Limited semiology Neither scaled, nor geo-referenced Value often dismissed by public officials and scientists	International Federation of Red Cross and Red Crescent Societies (2007)
Stone mapping	People draw the map using stones, branches, paper and other locally available materials	Easy to set up and cheap Familiar to most people Less eye contact Flexible	Temporary Neither scaled, nor geo-referenced Value often dismissed by public officials and scientists	International Fund for Agricultural Development (2009)
Sketch mapping	People draw the map on the sheet of paper with coloured marker pens	Relatively to set up and cheap Permanent Large semiology Most often stored locally	Unfamiliar to many people Rigid (difficult to correct and adjust) Neither scaled, nor geo-referenced Value often dismissed by public officials & scientists	Von Kontze and Holloway (1996) Oxafam (2002) Abarquez and Murshed (2004) International Institute of Rural Reconstruction and Cordaid (2007)
Scaled 2D mapping	People draw on a scaled base map with marker pens or push-pins and yarns	Relatively easy to set up Permanent Large semiology Scaled Enable dialogue with public officials and scientists Most often stored locally	Unfamiliar to many people Often requires an external facilitator to provide the base map	International Federation of Red Cross and Red Crescent Societies (2008) Gaillard and Pangilinan (2010)
GPS mapping	People walk around the area to be mapped and plot features with GPS. Data are eventually incorporated into a GIS	Permanent Large semiology Scaled and geo-referenced Credible to public officials and scientists	Unfamiliar to most people Costly and difficult to set up Requires external facilitator to train participants People seldom enter the data themselves into the GIS	Kienberger and Steinbruch (2005) Tran *et al.* (2009) Peters *et al.* (2009)

Source: Cadag, and Gaillard (2012)

Table 3. An Example of Vulnerability and Capacity Matrix

Potential Hazard (Flooding)	Vulnerabilities	Capacities
Physical and Material *What is vulnerable?* *What resources exist to address vulnerability?*	*Houses and farmlands in low areas;* *Water supplies easily contaminated by floods;* *Food supplies get cut;*	*People have boats to save belongings;* *Identifiable evacuation centre exists.*
Social Organisation *Who is vulnerable?* *What resources exist to make them less so?*	*People in outlying areas (ie. Families);* *Migrant workers;* *People unable to swim (particularly women)*	*People's organisation at community level;* *Warning system exists;* *Disaster response committee functions.*
Motivation and Attitude *What attitude led to vulnerability?* *What capacity exists to improve the situation?*	*Individualism;* *Lack of community spirit/cooperation.*	*New positive attitude by young people* *Voluntary organisations*

standing of local risks and coping strategies. It can strengthen cooperation and trust among participants, which is as important as generating reliable assessment results, especially in settlements where residents do not know each other well or where there has been limited cooperation between residents and local authorities" (Holloway and Roomaney, 2008: 44).

3.1.4. Visioning and Planning Stage
The last phase of the CRA methodological ap-

proach involves the collation of assessment results and sharing with the community through public meetings and visioning workshops. In other words, the report is shared among communities, local government agencies and other stakeholders. Community meetings are organised to keep stakeholders informed of the results and to get feedback to aid policy planning and implementation. Although desirable, it is impractical for all community members to attend a CRA workshop or report back meeting because of sociocultural practices. For example, in a male-dominated Muslim society in northern Ghana, it is socially unacceptable for married women to openly engage their husbands in public discourse. Thus, the timing, choice of venue and composition of feedback sessions are important.

Findings of a risk assessment can inform appropriate and acceptable risk reduction planning, providing indicators for monitoring and evaluation of changes in community vulnerability and capacity. The information collected is also used to prepare hazard maps showing common hazards, their magnitude and likelihood of occurrence. Such maps are generally powerful instruments that give visual expression to realities that are perceived, desired or considered useful (Chambers, 2008). However, some participatory mapping, normally conducted under the guidance of 'experts', tends to be unduly influenced by the 'experts' views', therefore overshadowing and even replacing indigenous conceptions or local knowledge (Crooke and Kothari, 2001). Ultimately, one of the benefits in the CRA process, apart from involving local emergency services (an invaluable source of knowledge), is in obliging planners to consider natural and human-made hazards and infrequent threats that are all too often ignored.

4. MANIFESTING CRA IN PRACTICE - THE REALITIES AND THE DILEMMA

In recent years, the Ghanaian economy has been impacted by numerous natural and man-made disasters, differing in scale, magnitude and prevalence (see Oteng-Ababio, 2012; 2013a,b). With many local communities struggling in conditions of poverty, the government and its development partners are challenged to address widespread vulnerability and investigate specific hazards, constrained by locational, financial

capacity limitations. Disaster managers are encouraged to guard against adopting a simplistic notion of vulnerability but rather to appreciate its dynamism and fluidity. DRR must be prioritised on both national and local level, and must make conscious efforts to produce and implement DRR planning that treats problems holistically.

This article has highlighted the fact that, if used effectively and purposefully, CRA can effectively reduce the losses associated with disasters. It is evident that the challenge for disaster practitioners and development organisations is to ensure that institutions and policies benefit communities - the most often forgotten in disaster and development plans – responding to situations, vulnerabilities and capacities at the local scale. Kulatunga et al. (2010) suggest that a CRA requires the active participation of all local stakeholders in order to reach consensus on/about risk reduction strategies that are owned by the communities themselves. Community participation in risk reduction reduces the gap between the local authority and those at risk. As a result of its participatory nature, CRA provides a platform for the socially deprived to share their knowledge on specific hazards and to recommend options to reduce vulnerabilities.

This discussion has stressed the relationship between poverty and disasters that should inform national level planning for both risk reduction and development objectives. Governments need to develop policies, institutions and mechanisms to address the needs of the poorest to effectively reduce disaster risk. For example, with regard to Agbogbloshie, a settlement in Accra (Ghana), due to its "illegal" status, residents are denied urban sanitation services, compelling them to discharge their waste (solid and liquid) into the nearby Korle Lagoon. Described as the most polluted water body in West Africa (Boadi and Kuitunen, 2003), the lagoon has been dammed in parts/places by urban farmers who harvest water to irrigate their vegetable farms (Oteng-Ababio, 2013b). This poses the risk of a future public health disaster.

The approach has been experimented several times in Asia and the Pacific where poverty and chronic hunger persist, with around 635 million people living on less than one dollar a day. Examples include setting priorities for the development of a research agenda for water management in Khon Kaen Province, Thailand (Caldwell et al., 2002), sustainable

agriculture development in the uplands of West Sumatra, Indonesia (Dendi and Shivakoti, 2003), or the application of participatory technology development to improving crop-based pig production systems in Vietnam (Peters et al., 2005). These approaches recognise that the poor themselves are the key agents for their transformation.

National strategies that address environmental hazards and livelihood practices should consider the implications of future developments, such as infrastructure construction, population settlement and natural resource use for the likelihood of disasters. By identifying and prioritizing hazards, thereby developing risk reduction strategies, a CRA helps to provide critical information for the local community, its leaders and authorities to optimise existing capacity to successfully reduce disaster risk and identify the need for support. A successful CRA can also facilitate community development and capacity enhancement activities.

Although the main objective of CRA is to identify local hazards and the vulnerability of the people, evidence suggests that these are not generally the priorities of most communities at risk (Hossain, 2009). Rather, most communities are concerned with maintenance of their day-to-day livelihoods, considering natural hazards and vulnerabilities as inevitable factors that they must adapt to. The low economic status of some communities can be a barrier in getting their commitment and participation in CRA activities, particularly with participants engaged in daily income activities (Hossain, 2009).

Another challenge to conducting CRA is the human resource or capacity constraint. For example, trained facilitators are needed to coordinate and facilitate the activities in a true participatory manner and to ensure maximum outcome. Garnering the support of, and representation from different groups is important for the success of any CRA project, but poses socio-cultural challenges among different social and ethnic groups. Adequate representation across these different groups challenges the CRA process.

Some socio-cultural attitudes also hamper the success of CRA activities, especially where communities are divided in terms of their income status, religion or race. Elite classes do not normally and easily accept the joint participation of the 'under privileged' (Hossain, 2009), while Islam, for example, discourag-

es the dominance of women within the household. Women are therefore reluctant to participate in workshops with their husbands. Such tendencies create biases and impact negatively on research outcomes.

Van Aalst et al. (2008) assert that a CRA cannot adequately assess all aspects of hazards or vulnerabilities of the community, especially when it involves some technicalities. The hazard risk from buildings prone to an earthquake, for example, requires specialised knowledge about the structural stability of the building, which in all probability, cannot be evaluated by the community alone. A CRA must therefore often include the opinions of experts external to the community. The outcomes of CRA are empirical descriptions of mainly human actions, which are subject to ambivalences, and preferences that are not necessarily ordered and heuristic to guarantee the universal applicability of conclusions. Some communities, as in the case of Faana, for example, believe that natural hazards and vulnerabilities cannot be avoided and accept them as fatalism (see Oteng-Ababio et al., 2011). It is thus important to understand the dynamic nature of disaster risks, drawing on local knowledge gleaned through CRA activities.

5. CONCLUDING REMARKS

"Disaster risk reduction is everybody's business" requiring everybody's effort to deal effectively with it remain proactive and prevent the occurrence of disaster (Holloway and Roomoney, 2008). This paper has shown that one way of achieving the overarching objective of DRR is to involve all stakeholders through CRA in identifying community needs, 'enhancing risk reduction and coping skills' and building the resilience of residents at risk, rather than trying to implement and enforce exogenous policies and practices. This paper has offered a pathway to understanding what makes people vulnerable and how that condition is related to disasters, and by extension, development. With empirically based community-generated information, the resultant policy interventions can be tailored to specific disaster hazards and risks applicable to specific vulnerable communities.

CRA is a pragmatic attempt not only to empower the community to take a leading role in risk reduction processes but also to provide officials and the key stakeholders with a tool that will enable them under-

stand and address the factors contributing to their vulnerability. Meaningful community involvement is also beneficial in improving information flow, facilitating community understanding of local government, allowing for community advocacy for collaboration, minimizing conflicts and promoting environmental justice. The paper however acknowledges some of the shortcomings of CRA – extensive use of human resources, the need for trained facilitators, and cultural attitudes of socially deprived communities (Kulatunga et al., 2010). It is hoped that integrating appropriate scientific knowledge and principles will invariably generate local knowledge that will inspire and better equip the communities to alleviate the negative impact of disasters.

The paper does not dispute the virtues of quantitative methods, which until recently had been the preferred option for disaster risk research. It perhaps reinforces the statement attributed to Albert Einstein that; 'not everything that can be counted counts, and not everything that counts can be counted'. To ensure better planning and the implementation of appropriate DRR strategies in the future, top-down (which is of recent history in DRR) and bottom-up approaches should be mutually reinforcing (Stallings, 2006).

Significantly, in adopting CRA, stakeholders must be open and honest from the beginning with regard to what issues they will or will not be able to address. If the limits are not very clear, the community may experience disappointment and disillusionment when the process identifies issues that cannot be addressed. It is also important to develop a common understanding of "community risk assessment" among all those involved. If community members understand their participation to mean one thing while city managers, for example, hold different views, effective participation may be seriously compromised. Above all, city authorities, planners and policy makers need to repeatedly recognise and acknowledge the need to build capacity for all stakeholders for informed decision-making.

A significant challenge posed by the CRA approach to DRR, which perhaps demands further research, is how lessons learned from diverse community-based adaptation initiatives may be shared across different regions, contexts and local realities of scale. How can highly contextual local change processes inform generic national or sub-national policies and processes that can be implemented in all localities? While local knowledge is increasingly acknowledged to be critical to development, the difference between formal and informal knowledge systems remains a source of conflict. CRA planning will predominantly take place at the local level. Yet, in order for scaling-up to happen, there is a need to develop the appropriate institutional mechanism (scaffoldings), to facilitate dialogue between practice and policy, without increasing bureaucratic processes. The process of scaling up will require significant investments in institution building and staff capacity development, requiring significant time and resources.

NOTE

1 Sixty-fifth General Assembly Informal Thematic Debate (General Assembly First Debate on Reducing Disaster Risk; 9th February, 2011.

2 General Assembly first debate on reducing disaster risk held on 9th February 2011.

3 The stretch of land between Keta and Kedzi was eroding at a rate of from 4 to 8 m/year, and by the end of 1998, was less than 50 m wide in some places (Appeaning Addo, 2011).

REFERENCES

Allen, K. M., 2006. Community based disaster preparedness and climate change adaptation: Local capacity building in the Philippines. *Disaster*, 30(1), 81-101.

Annan, K., 1999. *Preventing War and Disaster: A Growing Global Challenge - 1999 Annual Report on the Work of the Organization.* United Nations.

Appeaning-Addo, K., Jayson-Quashigah, P. N. and Kufogbe, K. S., 2011. Quantitative analysis of shoreline change using medium resolution satellite imagery in Keta. *Ghana Marine Science,* 1(1), 1-9.

Benson, C., Twigg, J. and Rossetto, T., 2007. *Tools for Mainstreaming Disaster Reduction Guidance Notes for Development Organizations.* Pro-vention Consortium, Geneva.

Blaikie, P., Cannon, T., Davis I. and Wisner, B., 1994. *At Risk: Natural Hazards, People's Vulnerability and Disasters.* Routledge, London.

Boadi, K. O. and Kuitunen, M., 2003. Municipal solid waste management in the Accra Metropolitan Area, Ghana. *The Environmentalist,* 23 (3), 211-218.

Cadag, R. D. and Gaillard, J. C., 2012. Integrating knowledge and actions in disaster risk reduction: The contribution of participatory mapping. *Area*, 44 (1), 100-109.

Caldwell, J. S., Sukchan, S., On-Ok, W., Kabaki, N., Ogura, C., Prabpan, M., and

Rattanarpom, P., 2002. A farmer participatory approach to development of a research agenda for water management priorities in Nong Saeng Village, Khon Kaen Province, Thailand. *JIRCAS Working Report* No. 30, 33-41.

Cargo, M. and Mercer, S. L., 2008. The value and challenges of participatory research: Strengthening its practice. *Annual Review of Public Health*, 29, 325-350.

Chambers, R., 2008. *Revolutions in Development Inquiry.* Earthscan, London.

CHF International. 2010. Accra Poverty map: A guide to urban poverty reduction in Accra.

CISC (Center for International Studies and Cooperation). Undated. *Framework for community based risk management in Vietnam.* Retrieved from http://www.ceci.ca/assets/Asia/Asia-Publications/CB-DRM-Framework.pdf on May 20, 2013.

Crabtree, B. and Miller, W., 1999. *Doing Qualitative Research* (2nd Ed.). Newbury Park, California.

Crooke, B. and Kothari, K., (Eds.), 2001. *Participation: The New Tyranny?*. Zed Books, London.

Dendi, S. and Shivakoti, G. P., 2003. Assessment of participatory extension approaches for sustainable agriculture development in uplands of west Sumatra, Indonesia. *Asia-Pacific Journal of Rural Development*, XIII (2), 19-42.

Denzin, N. and Lincoln, Y., 2000. *Handbook of Qualitative Research* (2nd Ed.). Thousand Oaks, California, Sage.

Gaillard, J. C. and Maceda, E. A., 2009. Participatory three-dimensional mapping for disaster risk reduction. *Participatory Learning and Action*, 60, 109-118.

GAR (Global Assessment Report). 2009. *Global Assessment Report on Disaster Risk Reduction*. United Nations International Strategy for Disaster Reduction Secretariat, UNISDR.

Grant, R. and Oteng-Ababio, M., 2012. Mapping the invisible and real African economy: Urban e-waste circuitry. *Urban Geography,* 33 (1), 1-21.

Hauser, D., 2004. Community participation: Partnering with youth. *Transition,*14 (3), 1.

Hilhorst, D., 2008. Complexity and diversity: Unlocking social domains of disaster response. In Bankoff, G., Frerks, G. and Hilhorst, D., (Eds.), *Mapping Vulnera-bility, Disasters, Development and People.* Earthscan, London, UK.

Hilhorst, D. and Bankoff, G., 2008. Mapping vulnerability. In Bankoff, G., Frerks, G. and Hilhorst, D., (Eds.), *Mapping Vulnerability, Disasters, Development and People.* Earthscan, London, UK.

Holloway, A. and Roomoney, R., 2008. *Weathering the Storm: Participatory Risk Assessment for Informal Settlements.* Periperi Publications, University of Cape Town.

Hossain, A., 2009. Project Report 2009, Internal lessons learnt exercise, Comprehensive Disaster Management Program (CDMP), Bangladesh. Retrieved from http://www.bangladeshstudies.org/files/CC_bibliography_annotated.pdf on March 12, 2010.

Housing the Masses, 2010. People's dialogue on human settlements: Final report on community-led enumeration of Old Fadama community, Accra-Ghana. Retrieved from
http://www.sdinet.org/media/upload/documents/2009.May3.2010.Old_Fadama_Enumeration-1_1.pdf on August 21, 2011.

InfoResources, 2009. Disaster risk reduction: a gender and livelihood perspective.
InfoResources Focus, No. 2/09.

Kulatunga, U., Amaratunga, R. D. G., Zaman, M., Biswan, A. and Parvez, A., 2010.

Community risk assessment for disaster risk reduction: challenges and future. Paper presented at the Construction, Building and Real Estate Research Conference of the Royal Institution of Chartered Surveyors (CO-BRA), 2-3 September 2010, Dauphine Université, Paris. Retrieved from
http://usir.salford.ac.uk/9743/1/Community_risk_assessment_for_disaster_risk_reduction_-_challenges_and_future.pdf on May 23, 2011.

Luna, E. M., 2007. Mainstreaming community-based disaster risk management in local development planning. Paper presented at the Forum on Framework-Building for Investigation of Local Government Settlement Planning Responses to Disaster Mitigation, 17 January, Alternative Planning Initiative (ALTERPLAN), Quezon City. Retrieved from
http://www.alterplan.org.ph/documents/EmmanuelM-Luna_MainstreamingCommunity-asedDisasterRisk-ManagementInLocalDevelopmentPlanning.pdf on November 21, 2010).

Melara, J. E. Grant, R. Oteng-Ababio, M. and Ayele, B.,

2013. Downgrading - an overlooked reality in African cities: Reflections from an indigenous neighborhood of Accra, Ghana. *Applied Geography,* 36, 23-30.

Oliver-Smith, A., 1979. The Yungay avalanche of 1970: Anthropological perspectives on disaster and social. *Disaster*, 3 (1), 95–101.

Oteng-Ababio, M., Owusu, K. and Appeaning-Addo, K., 2011. The vulnerable state of the Ghana coast: The case of Faana-Bortianor. *Journal of Disaster Risk Studies*, 3 (2), 429-442.

Oteng-Ababio, M., 2011. Beyond technical details: The stalled Kwabenya engineered sanitary landfill project in Accra, Ghana. *Geografisk Tidsskrift-Danish Journal of Geography,* 111 (2), 169-179.

Oteng-Ababio, M., 2012. Neglected vulnerabilities in a rapidly urbanizing city: Reflections on earthquake risks in Accra. *Journal of Housing and the Built Environment,* 27 (2), 187-205.

Oteng-Ababio, M., 2013a. Prevention is better than cure: Assessing Ghana's preparedness (capacity) for disaster management. *Jamba: Journal of Disaster Risk Studies,* 5 (2), 1-11.

Oteng-Ababio, M., 2013b. Unscripted (in) justice: Exposure to ecological hazards in Metropolitan Accra. *Environment and Planning A,* 45 (5), 1199-1218.

Owusu, G., Oteng-Ababio, M. and Afutu-Kotey, R. L., 2011. Conflicts and governance of landfills in developing country city, Accra. *Landscape and Urban Planning,* 104, 105-113.

Pelling, M. and Wisner, B., (Eds.), 2008. *Disaster Risk Reduction: Cases from Urban Africa.* Earthscan Publication, London.

Peters, D., Tinh, N. T., Hoan, M. T., Yen, N. T., Thach, P. N. and Fuglie, K., 2005. Rural income generation through improving crop-based pig production systems in Vietnam: Diagnostics, interventions, and dissemination. *Agriculture and Human Values,* 22, 73–85.

Potter, C. S., Klooster, S. and Brooks, V., 1999. Interannual variability in terrestrial net primary production: Exploration of trends and controls on regional to global scales. *Ecosystems,* 2, 36−38.

Rifkin, S. B., Muller, F. and Bichmenn, W., 1988. Primary health care: On measuring participation. *Social Science and Medicine,* 26, 931-940.

Smith, K. and Petley, D. N., 2009. Environmental hazards: Assessing risk and reducing disasters. *Geographical Research,* 47 (4), 454–455.

Stalling, R. A., 2006. Methodological issues. In Rodriguez, H., Quarantelli, E. L. and Dynes, R. R., (Eds.), *Handbook of Disaster Research.* New York, Springer, pp. 55-82.

Twigg, J., 2004. Disaster risk reduction: Mitigation and preparedness in development and emergency programming. *Good Practice Review*, *9*, Humanitarian Practice Network, London.

United Nations, 2009. *Making Disaster Risk Reduction Gender Sensitive*, UN/ISDR, UNDP and IUCD, Geneva.

UNISDR (United Nations International Strategy for Disaster Reduction), 2009.
Terminology on Disaster Risk Reduction. Geneva, ISDR.

UNISDR (United Nations International Strategy for Disaster Reduction), 2006.
Lessons for a Safe Future: Drawing on the Experience of the Indian Ocean Tsunami Disaster. Geneva, ISDR.

Van Aalst, M. K., Cannon, T. and Burton, I., 2008. Community level adaptation to climate change: The potential role of participatory community risk assessment. *Global Environmental Change*, 18, 165-179.

White, P., Pelling, M., Sen, K., Seddon, D., Russell, S. and Few, R., 2004. *Disaster Risk Reduction: A Development Concern.* Norwich, Overseas Development Group, University of East Anglia.

Wisner, B., Blaikie, P., Cannon, T. and Davis, I., 2004. *At Risk: Natural Hazards, People's Vulnerability and Disaster.* London, Routledge.

AU/NEPAD, 2004. Medium to long term framework studies for Africa's Infrastructure; Accra, Ghana.

Keta Municipality, 2012. Coastal Erosion at Keta Lagoon, Ghana' Ministry of Works and Housing, Unpublished Report, Accra, Ghana