

1.1. A CONTEXTUAL AND PROACTIVE APPROACH TO SOCIAL VULNERABILITY ASSESSMENT: A REVIEW OF THE COMMUNITY-BASED DISASTER MANAGEMENT STRATEGIES IN THE UNITED STATES

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Abstract

Current models to measure social vulnerability to disasters are based on the analysis of demographic and socioeconomic indicators. This taxonomic approach, however, is criticized for ignoring the contextual aspects of vulnerability. Thus, it is critical to frame the benefits and challenges of the contextual and proactive approach, whose underlying principles are found in Community-Based Disaster Management [CBDM]. To accomplish this goal, a literature review focusing on the theorization of social vulnerability was carried out, alongside with the analysis of the CBDM strategies developed, or being developed in the United States. Results indicate that the contextual and proactive approach is useful in identifying the vulnerability of people and communities, its root causes, and in acknowledging their coping capacities. As a conclusion, this alternative approach is a valuable complement to the analysis of vulnerability provided by taxonomic models. Furthermore, there should be an effort to shift the emergency management paradigm from a government-centric approach to a more community-centric approach.

Keywords: contextual and proactive approach, community-based disaster management, communities' empowerment, Project Impact, United States, vulnerability assessment, Whole Community

Resumo

Os atuais modelos de avaliação de vulnerabilidade social a desastres são baseados na análise de indicadores de natureza demográfica e socioeconómica. Porém, esta abordagem taxionómica é criticada por ignorar os aspectos contextuais associados à vulnerabilidade social. Destemodo, é fundamental enquadrar os benefícios e desafios da abordagem contextual e participativa na avaliação de vulnerabilidades sociais, cujos princípios orientadores estão presentes na Gestão de Desastre Baseada na Comunidade (GDBC). De modo a concretizar

este objectivo, uma revisão da literatura focada na teorização de vulnerabilidade social foi efetuada, conjuntamente com a revisão das estratégias de GDBC desenvolvidas, ou em desenvolvimento nos Estados Unidos. Os resultados indicam que a abordagem contextual e participativa é útil na identificação da vulnerabilidade de pessoas e comunidades, suas causas de raiz, e também no reconhecimento das suas capacidades de resposta. Em suma, esta abordagem alternativa é um instrumento importante para complementar a análise de vulnerabilidade social desenvolvida pelos modelos taxionómicos. Adicionalmente, deverá haver um esforço para promover uma mudança de paradigma na gestão de emergência, de um modelo centralizado no governo para um modelo mais centralizado nas comunidades.

Palavras-Chave: abordagem contextual e participativa, gestão de desastre baseada na comunidade, fortalecimento da comunidade, Project Impact, Estados Unidos, avaliação de vulnerabilidade, Whole Community

"Vulnerability can become a key concept in translating that multidimensionality into the concrete circumstances of life that account for a disaster..."

Oliver-Smith (2004: 9)

Introduction

In the last decades the vulnerability paradigm has been emphasized by both academia and practitioners in order to focus attention on the interactions established between social, built and geophysical environments. This concept is commonly accepted as relevant to disaster risk management (Birkmann, 2006), but there is not a consensus regarding the most effective approaches to measure the social system's vulnerability to natural hazards. While the taxonomic approach, based on statistical data of vulnerability indicators, is prevalent among scholars and practitioners (De Marchi and Scolobig, 2012), there has been the emergence of alternative views, for instance, the contextual and proactive approach (Wisner, 2004, 2006). This approach aims to identify the historical roots of communities, their socioeconomic, political and cultural backgrounds, as well as coping capacities, in order to contextualize the communities' vulnerability to natural disasters (Wisner, 2004, 2006). In addition, the contextual and proactive approach aims to engage the individuals and communities in the assessment of their vulnerability (Wisner, 2004, 2006).

Accordingly, the main purposes of this paper are to acknowledge how vulnerability is being theorized in academia, with a focus on the contextual and proactive approach, and to examine if and how this conceptualization is being implemented in the field. Since this approach is being implemented through the CBDM strategies, it is particularly important to analyze the principles, policies, actions and outcomes associated with these strategies. On one hand, this examination will allow us to determine how the theoretical framework of the contextual and proactive approach is being used in practice and, on the other hand, to identify the strengths, weaknesses and challenges associated with this alternative approach.

This paper is organized as follows. The first section primarily reviews vulnerability in the frame of disaster management, and discusses its prevalent (taxonomic) and alternative (contextual and proactive) theoretical and practical approaches. Section two examines the operationalization of the contextual and proactive approach based on the analysis of CBDM strategies developed, or being developed, in the United States. The last section draws conclusions concerning the operationalization of the contextual and proactive approach on vulnerability.

The Social Vulnerability Paradigm: Theorization and Operationalization

Vulnerability is a prominent concept within the disaster risk reduction framework (Blaikie et al., 1994; Oliver-Smith, 2004; Rodriguez and Russell, 2006). Birkmann (2006) advocates that vulnerability redefined the conceptualization of disasters by focusing on the multiple dimensions that lead to the occurrence of these harmful events. Indeed, disasters arise from the interactions between natural hazards and the vulnerabilities of individuals and communities that emerge from the socioeconomic, cultural, political, and institutional spheres (Rodriguez and Russell, 2006; Wisner et al., 2004). Measuring these vulnerabilities, however, involves a certain degree of complexity due to the fact that vulnerability is a multidisciplinary and multifaceted concept (Birkmann, 2006), leading to distinct definitions and conceptual frameworks.

As stressed by Birkmann (2006), there are actually more than one dozen definitions, concepts and methods to conceptualize and operationalize vulnerability. Regarding the distinct nature of vulnerability conceptualization, while the human ecology approach argues that vulnerability results from underdevelopment and powerlessness processes that characterize the social geography of places (Hewitt, 1997), the political ecology approach emphasizes the culturally constructed relationship established between man and the environment to highlight the genesis of vulnerability's conditions and processes (Oliver-Smith, 2002). From a more social perspective, Blaikie et al. (1994) emphasizes the social conditions that determine the susceptibility of individuals and communities to natural hazards. These authors are actually conceptualizing the same concept - vulnerability - but all of them from distinctive perspectives. Consequently, there are multiple vulnerability approaches that translate an abstract concept into a practical tool, for instance, the double structure of vulnerability (Bohle, 2001), the framework of hazard and risk (Davidson, 1997), and the press and release (Blaikie et al., 1994).

There is a general agreement that the identification and evaluation of vulnerability is a crucial step towards the promotion of disaster resilient societies, however, there does not exist a general agreement in terms of vulnerability's definition and theoretical approaches that support the operationalization of the concept.

The theorization and operationalization of vulnerability, furthermore, is highly influenced by three properties. Vogel and O'Brien (2004) advocate that vulnerability is multidimensional and

differential because it varies across physical space, and among and within the elements at risk. The identification of an individuals' vulnerability is critical, but it is equally important to determine the households' and communities' vulnerability to natural hazards. In addition, the same authors argue that vulnerability is scale dependent since it suffers variations on the spatial and temporal scales and according to the units of analysis. Finally, since vulnerability's driving forces are in permanent evolution, this concept is dynamic (Vogel and O'Brien, 2004). For example, population growth due to demographic shifts frequently leads to the occupation of hazardous areas, thereby increasing the individuals' and communities' exposure to natural threats (Hewitt, 1997).

The most common conceptualization of vulnerability focuses attention on the domain of 'social' vulnerability. This dominant conceptualization, however, encompasses a wide range of domains surpassing the 'social' aspects related to vulnerability and including socioeconomic, political and cultural factors among others. According to Hewitt (1997: 27), social vulnerability is influenced by and dependent on factors that result "from the activity and circumstances of everyday life or its transformations". Cannon et al. (2003: 5) advocates that social vulnerability is determined by multiple characteristics, such as "the lack of access to resources, including information and well-being; livelihood and resilience, for instance, lack of assets, income and qualifications; limited access to political power and representation; certain beliefs and customs; and weak buildings, infrastructures and lifeline utilities". In addition, social vulnerability is not exclusively related to individuals' and communities' vulnerabilities, but rather comprises other fragilities, for example, the given form of the built environment (Cutter et al., 2003; Hewitt, 1997). Within this perspective, vulnerability is grounded within an "intrasocietal" realm, incorporating demographic, social, economic, political, cultural, institutional, technological and physical factors (Rodriguez and Russell, 2006). Therefore, indicators such as age, gender, race, disability, ethnicity, social class, type of occupation, income, unemployment rate, dependency on one single economic sector, immigrant status, political ideology, density and quality of built environment, land-use, housing tenancy, family and the presence of informal support networks must be considered to understand social vulnerability to natural hazards (Cutter et al., 2003; Dwyer et al., 2004; Martins et al., 2012; Morrow, 1999).

Social vulnerability has been theorized and used in distinctive ways by researchers and practitioners. The prevalent theoretical and practical approach to social vulnerability's assessment is the taxonomic approach (Birkmann and Wisner, 2006; De Marchi and Scolobig, 2012; Kuhlicke et al., 2011; Wisner, 2004, 2006), which operationalizes social vulnerability based on the analysis of a wide range of indicators and indices (De Marchi and Scolobig, 2012), such as age, gender, education, race, employment, and economic resources. The outcomes of this approach are used to support risk reduction policies. The taxonomic approach, however, has been questioned for multiple reasons.

Firstly, and probably foremost, the taxonomic approach is highly criticized for ignoring the contextual side of vulnerability (Wisner, 2004, 2006). For instance, using a predetermined number of indicators to describe the vulnerability of different sociocultural, economic and political realities can potentially lead to inaccurate representations of vulnerability. Secondly, and stressed by De Marchi and Scolobig (2012), the taxonomic approach seems to fail to explain the relationship between a given vulnerability factor and the indicator chosen to measure it. For example, women are usually classified as highly vulnerable. However, is it correct to extrapolate that all women are evenly vulnerable? Does an elderly woman without financial resources, share the same vulnerability as a young woman with financial resources? This apparent lack of reasoning can lead to both underestimation and/or overestimation of the social group's and community's vulnerability. Thirdly, taxonomic models usually measure social vulnerability as a static phenomenon when its driving forces are mainly dynamic (Kuhlicke et al., 2011). Demographic, socioeconomic, political, and technological factors are in permanent evolution and lead to different levels of vulnerability. Fourth, the measurement of vulnerability with checklists of indices and indicators does not allow capturing intangible

elements that determine the social vulnerability (Birkmann and Wisner, 2006; De Marchi and Scolobig, 2012; Kuhlicke et al., 2011). For instance, how is it possible to capture faith, traditions, fortitude, bravery, and/or fatalistic behavior with a set of social vulnerability's indicators?

In order to address some of the aforementioned limitations and weaknesses associated with the taxonomic approach, an alternative view was proposed: the contextual and proactive approach (Wisner, 2004, 2006). This approach is labelled contextual because it aims to frame the set of conditions, such as socioeconomic, cultural and political, that facilitate contextualizing the vulnerabilities of individuals and communities. Furthermore, according to Wisner (2004, 2006), this approach is proactive since it is not exclusively centred in the examination of vulnerability and hazard, but also identifies the coping capacities through a self-assessment process developed by the communities themselves. Ben Wisner's proposed approach actually focuses on the local knowledge, social capital and coping capacity of communities. In addition, he advocates that this approach allows integrating empowerment and sustainable development strategies into disaster risk reduction. The underlying principles of this approach are found in the CBDM strategies.

The contextual and proactive approach addresses some of the challenges of measuring social vulnerability. First, engaging the communities in their own vulnerability assessment is of added value because it allows determining the levels and patterns of vulnerability across different units of analysis, such as individuals, families, organizations, and communities. This highlights the multidimensional and differential nature of vulnerability. Second, engaging communities in a self-participatory process recognizes the spatial-temporal variation of vulnerability, its driving forces, and allows the communities to verify the potential benefits of their disaster risk reduction efforts. Third, the identification of the socioeconomic, political, and cultural backgrounds of the social systems enables contextualizing the framework in which their vulnerability is created (Wisner, 2004, 2006). For example, the contextual and proactive approach focuses on cultural factors, many of them with some influence on the people and communities' behaviors when a disaster occurs (Mercer et al., 2012). Fourth and finally, the contextual and proactive approach does not follow a tendency criticized by Bankoff (2004) in which vulnerability does not consider the local knowledge of communities and their historical-cultural adaptations to disasters. Wisner's approach actually recognizes the coping strategies that individuals and communities develop. Furthermore, some studies focusing on CBDM strategies (Gaillard et al., 2008; McAdoo et al., 2009) emphasize the role of local knowledge in the behavior of the indigenous communities that survived the 2004 Indian Ocean Tsunami.

This chapter provided a brief insight regarding the concept of social vulnerability and its theoretical and practical utility. Initially, the multifaceted nature of this concept was highlighted as well as its main properties. Independent of the theoretical and practical approaches being used in its operationalization, the multidimensional/differential, scale dependent and dynamic nature of vulnerability directly interferes with the assessment of social vulnerability. The multiple dimensions covered by the 'social' vulnerability conceptualization were examined too. Furthermore, two of the approaches to social vulnerability were reviewed, namely, the taxonomic and the contextual and proactive approaches. Inherent to the first case are flaws that jeopardize its efficacy, while the contextual and proactive approach is hypothesized to be effective for the assessment of the community's vulnerability to natural hazards.

Given one of the purposes of the paper, which is to acknowledge if and how the conceptualizations of vulnerability are used in practice, it is important to examine the CBDM strategies, since they are the most visible dimensions of the contextual and proactive approach (Maskrey, 2011; Wisner, 2004, 2006). As indicated earlier, these strategies potentially encompass some of the principles advocated by the proponents of this approach.

Community-Based Disaster Management in the United States

We specified in the previous section that the operationalization of the contextual and proactive approach to vulnerability assessment is implemented through the CBDM strategies. In order to understand if and how this approach is being used in practice, the next paragraphs will enumerate, examine, and discuss the principles, strategies, actions, and outcomes of the CBDM strategies developed or being developed in the United States. The purpose of focusing on each one of these CDBM aspects is not only to understand its characteristics, but more importantly, to understand if the underlying principles of the contextual and proactive approach are beneficial for improving the way communities manage their exposure to natural risks.

Community-based disaster risk management strategies are becoming more relevant due to the influence of both academia and governmental/intergovernmental institutions. The increasing number and magnitude of natural disasters occurring worldwide, such as Hurricane Katrina (2005) or the Haiti earthquake (2010), drew the attention of policy-makers and international organizations to the urgency of promoting disaster risk reduction strategies. The CBDM is among these risk reduction strategies. The International Decade for National Disaster Reduction, a United Nations initiative approved by the Resolution 44/236 (IDNDR, 1999), played a pioneering role by addressing the necessity to integrate the local communities in the disaster management strategies.

The Hyogo Framework for Action 2005-2015, a United Nations plan that aims to promote the resilience of nations and communities to disasters, also gives a predominant role to the CBDM strategies. One of the strategic goals of this plan is “the development and strengthening of institutions, mechanisms and capacities at all, in particular at the community level, that can systematically contribute to building resilience’s to hazards” (UNISDR, 2007). In the US, for instance, the decade of the 1990s saw the implementation of FEMA’s “Project Impact”, an initiative for the “building of a disaster resistant community” (FEMA, 1997). Other initiatives were carried out by FEMA in the last decade, as we will mention further in this paper.

In the mid-1990s FEMA revealed a plan that had the purpose of guaranteeing the adoption of disaster mitigation programs, policies and strategies at the state and local scales. This plan, the “National Mitigation Strategy”, emphasized the urgency for American communities to develop “practices, policies, and capabilities” (FEMA, 1997), in order to minimize human losses, material damages, and socioeconomic disruptions caused by natural disasters. One of the strategies of this plan was a mitigation initiative labeled “Project Impact”.

Classified as a bottom-up approach since the development of disaster mitigation strategies are allocated to local communities, Project Impact was primarily conceptualized with the aim of guaranteeing that the communities were actively engaged in the mitigation practices and efforts (Wachtendorf et al., 2002), and in the identification and assessment of both hazards and vulnerabilities. According to FEMA (1997), Project Impact had four major principles and/or goals: (i) the promotion of community partnership, seen as a nuclear step towards the increase of their resistance to future disasters; (ii) the identification of both hazards and vulnerabilities to support the mitigation measures to be developed; (iii) the identification and prioritizing of the risk reduction measures in the community; and finally, (iv) to establish communication strategies to guarantee that multiple actors in the community would engage in this initiative.

Project Impact was implemented in seven pilot communities located in different states of the United States. These communities were responsible for guaranteeing the adoption and development of multiple programs, practices, and regulations in order to improve their capacity to cope with potential hazard threats. These mitigation programs were financed by

FEMA, but it is noteworthy to underline that these communities actually managed to find alternative sources of funding (Wachtendorf et al., 2002) in order to support their mitigation initiatives.

According to Wachtendorf and colleagues (2002), the implementation of Project Impact was successful (measuring success is very subjective) in many of the pilot communities, since they effectively engaged in the adoption and development of mitigation programs and practices in order to promote their disaster resilience. Effectively, Wachtendorf et al. (2002) identified several elements that highlight the benefits of this bottom-up mitigation approach, namely: the effective development of activities by the individuals and communities, such as capability assessment, vulnerability analysis and adoption of structural and non-structural mitigation measures; the reinforcement and effectiveness of the partnership network established between communities and multiple actors, for instance, private sector and non-profit groups; the communities' recognition of the benefits of their engagement in FEMA's initiative, for example, in terms of the identification of the risk to which they are exposed and how to plan for disasters; and finally, the development of new mitigation strategies unrelated to Project Impact. The authors, however, acknowledge that the communities' continuous engagement in this strategy, and the necessity of finding funds, were major challenges to its future success.

It is crucial to highlight that many of the elements that Wachtendorf et al. (2002) identified as benefits of Project Impact are usually mentioned as arguments for the adoption of a CBDM strategy by both authors and organizations that advocate it (Maskrey, 2011; UNISDR, 2007; Wisner, 2004, 2006). Furthermore, some of these positive effects, such as realizing the benefits of self-assessment of vulnerability and capacities, meet some of the principles of the contextual and proactive approach (mentioned in the previous chapter). This finding suggests that a CBDM approach can be an effective and beneficial tool to reduce communities' vulnerability to natural threats. However, Project Impact was discontinued five years after its implementation as federal policy efforts were refocused on homeland security as a consequence of 9/11.

More recently, CBDM strategies have gained greater emphasis in the United States disaster risk management policy as a result of Hurricane Katrina. One good example is "The Whole Community approach to Emergency Management". This initiative, integrated in the National Preparedness plan, fundamentally proposes a shift of paradigm from a government-centric approach for emergency management to a community-centric approach (FEMA, 2011). The "Whole Community" initiative proposes that multiple actors in a given community, such as residents, emergency managers, land-use planners, community leaders, and politicians, should develop collective efforts in order to identify and evaluate the needs of the community, as well as determine the most adequate and effective strategies to organize and reinforce the communities' "assets, capacities, and interests" (FEMA, 2011). Instead of focusing solely on the mitigation stage, one of the characteristics of Project Impact, this recent initiative aims to engage the communities in all stages of the emergency management cycle.

The guiding principles of the "Whole Community" initiative actually foster the identification and fulfillment of the communities' needs, but also, and this is particularly important, the development of empowerment strategies in the community and the support of the "institutions, assets, and networks" (FEMA, 2011) that work well in the community. We emphasized the last two principles of the "Whole Community" initiative since they are fundamental to the effectiveness of a CBDM strategy (Comfort et al., 1999; Maskrey, 2011; Wisner, 2004, 2006).

For instance, local empowerment strategies constitute a singular opportunity for communities to be primary actors in the disaster management process instead of secondary actors. In this perspective, the communities play a central role in the decision making process. For instance, the communities must identify their needs and/or priorities, propose and implement programs, and evaluate them. All of these actions can potentially keep the communities active and engaged in the disaster management strategy since they are primarily responsible for the process.

With regard to supporting and reinforcing the institutions, assets and networks that work well in the community, this approach is actually optimizing and capitalizing the social, economic and political structures of these communities (FEMA, 2011). The social, economic and political structures are the driving forces of any community, thus improving and supporting these key structures, and relating them to the emergency management policies, strategies and procedures is of added value. Furthermore, the unsafe conditions that frequently lead to a disaster event are highly influenced by the social, economic and political structures of these communities. Therefore, supporting these structures might be potentially useful in decreasing the risk of the communities. Lastly, if local communities realize the benefits of empowering and supporting the critical structures for their daily lives that will probably engage them in the disaster risk reduction efforts. Once again, many of the goals and practices proposed in “Whole Community” agree with the principles that govern the contextual and proactive approach.

Finally, FEMA launched, with the financial support of the Rockefeller Foundation, a program named “Community Resilience Innovative Challenge” that intends to fund initiatives across the United States, promoting and reinforcing community-based partnerships in order to increase communities’ disaster resilience. Some of the program goals and practices include the organization of initiatives, such as partnerships, and leadership activities among small neighborhood groups, faith-based, civic organizations and the business sector; fostering the dialogue across different social sectors in order to share information about risk and vulnerabilities; and also the preparation of small initiatives within communities, for instance, training neighborhoods for emergency situations and/or involving businesses in disaster preparedness. This program actually matches the vision and principles of the “Whole Community” initiative, for instance, the identification of needs and the reinforcement of the partnerships between different community actors. On the other hand, this program also proposes a new principle, namely, the creation of “innovative, motivational, and effective” solutions that allow them to be replicated in different communities (FEMA, 2012). According to FEMA (2012), this initiative is actually funding thirty community-based projects across the United States, involving communities, emergency management agencies, academia, and the private sector.

The recent programs developed by FEMA, such as “Whole Community” and the “Community Resilience Innovative Challenge”, are windows of opportunity to engage local communities in disaster reduction initiatives and efforts. The outcomes of these two programs are not known, however, what these programs clearly demonstrate is a shift of paradigm at the United States federal level, from a government-centered approach to the community-based approach in terms of disaster risk management policies, strategies and initiatives.

Discussion and Conclusion

This paper was originally driven by two major purposes. The first one determined to acknowledge how vulnerability is being theorized in academia, while the second one aimed to understand if and how these conceptualizations are used in practice. The state of the science chapter reviewed two of the theoretical and practical approaches used in the assessment of social vulnerability. Since this paper primarily hypothesizes the contextual and proactive approach as potentially beneficial for an effective and comprehensive assessment of the communities’ vulnerability to natural hazards, the state of practice chapter examined three CBDM strategies developed in the United States since they incorporate the theoretical principles and assumptions of the contextual and proactive approach (Wisner, 2004; 2006). In the following paragraphs, the outputs resulting from the combination of theory (contextual and proactive approach) and practice (CBDM strategies) will be discussed.

Initially, it should be stressed that several elements that characterize the theoretical nature of the contextual and proactive approach are found in the CBDM strategies examined in the last chapter. Project Impact, the Whole Community initiative, and the Community Resilience Innovative Challenge all relied on communities' self-assessment abilities to identify their vulnerability as well as coping capacities. Indeed, these dimensions are among the principles and goals of Project Impact and also the Whole Community approach. Thus, it is reasonable to admit that the underlying principles and ideas that substantiate the contextual and proactive approach can be found in initiatives that were developed, or are being developed, in the United States.

Focusing now on how this contextual and proactive approach is used in practice, and the benefits for improving the community's management of risks, there are multiple aspects to highlight and discuss briefly. First, a community-based approach allows recognizing the multidimensional and differential nature of vulnerability. For example, the identification and analysis of communities' vulnerability and coping capacities developed in Project Impact were not only developed at the community level. It actually involved the assessment of capabilities and vulnerabilities within distinct units, namely, the households, the private sector, as well as the community as a single unit. This represents a multidimensional and differential assessment of the social system's vulnerability. The major advantages to the community are that it identifies who is at risk, instills the importance of being proactive in disaster management, and allows them to recognize their disaster management strengths and weaknesses.

Second, a CBDM strategy allowed to examine the dynamic nature of vulnerability's root causes, such as socioeconomic, politic, cultural, institutional, and physical dimensions. Project Impact was considered relevant and a landmark because it successfully implemented multiple structural and non-structural mitigation measures. These measures can have an influence over the dimensions and factors that shape the vulnerability of the elements exposed to risk. For example, retrofitting a house with state-of-art building codes is likely to decrease the vulnerability of its occupants. Thus, different types of mitigation measures have the potential to reduce the vulnerability of individuals, households and communities. In addition, the Whole Community program aimed to reinforce the institutions, assets, and networks that work well in the community. Since these dimensions are directly related with social, economic and political processes that often determine a communities' vulnerability, reinforcing and optimizing them can interfere with the levels of vulnerability of individuals, households or communities. What we intend to stress with these examples is that a community-based approach allows appreciating the dynamic nature of vulnerability and understanding the evolution of its driving forces.

Third, the practical side of the contextual and proactive approach is useful in capturing the multiple dimensions that are critical to understanding the social system's vulnerability to natural hazards. For instance, vulnerability has been criticized because it fails to recognize the self-knowledge and coping capacities of the communities (Bankoff, 2004). In order to better understand this critique we must provide an example. If we challenge 10 individuals to identify the vulnerability of a community to natural hazards, it is likely that in the end ten distinct models and results will be proposed. Which one of these models is the most accurate representation of the vulnerability of that community? We actually believe that the conceptualization and operationalization depends on the ideals, values and principles of each individual. Thus, if these ideals, values, principles and ideologies are potentially distinct from the ones shared by the community, than it is likely that the vulnerability assessment is not the most accurate or reliable. Therefore, it is critical to give the communities an opportunity to identify and measure their vulnerability and coping capacities. In addition, the CBDM strategies allow the communities to play a primary role in their vulnerability assessment. Project Impact is a good example of the benefits of these strategies, since the pilot communities testified to the benefits of implementing mitigation policies and actions. The Whole Community program also engages in the self-assessment and decision-making capacities of the communities.

As stressed in the last paragraphs, there are particular benefits of implementing a contextual and proactive approach in the assessment of communities' vulnerability. These benefits also address the weaknesses of the taxonomic approach, which may highlight the utility of the contextual and proactive approach. These conclusions, however, must consider that independently of the vulnerability theoretical and practical formulations, the concept of vulnerability is inherently multifaceted and complex to identify and measure. In addition, it is also interrelated with multiple conditions and processes that are in permanent transformation. Thus, the combination of all these elements makes it almost impossible to formulate the ideal approach to measure and identify vulnerability. A final element to be considered is that the paper's findings result from the examination of a single program, Project Impact (the other programs mentioned are still in the developmental stage), which does not allow for a generalization.

Some challenges of the community-based approach were also identified. First, it is important to consider that linking local, scientific and policy-makers' knowledge is not an easy task. All these actors have their own "language", principles and objectives, and it is necessary to guarantee that the partnerships established between them will overcome their differences. Second, there is a chronic conflict of interest between disaster risk reduction and social and economic development. The solution, we believe, is to demonstrate to the communities that disaster risk reduction strategies are windows of opportunity for the communities themselves.

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