

## Post-disaster housing recovery guidelines for development countries based on experiences in the American continent



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### ABSTRACT

The main purpose of this article is to propose recommendations to the processes of post-disaster recovery in development countries, focusing on housing recovery, based on the analysis of three relevant experiences in the American continent. The methodology adopted is based on the study of real cases of post-disaster recovery and the data was obtained through bibliographic research, documentary collection and also participant observation using the O-P-R (Observation-Participation-Reflection) model. A discussion on key aspects of housing recovery was performed based on the cases and, as a final result, recommendations are presented considering the psychosocial and the social capital recovery, the restoration of livelihoods, the supply of temporary housing and shelters, the selection of beneficiaries for the habitational recovery programs, the provision of permanent housing and the governance in the disaster recovering process.

### 1. Introduction

With the population growth and the migratory movement from the countryside towards the cities, there was a pressure to occupy urban sites, and this occupation, most of the time, happened in a disorderly manner and without taking into consideration the risk assessment of socio-natural disasters, especially in development countries. The inimical effects of the disaster are directly proportional to the vulnerability and the exposure of the elements at risk in its numerous aspects: physical, environmental, political, economic, organizational, institutional, cultural and educational [29].

In the phase of post-disaster recovery, the dynamic is often quite distinct from the assistance phase. The activities of rescue and social assistance are conducted relatively fast in communities and in most part of the world, however, the process changes in the rehabilitation period, when individual interests in private assets are concerned [21].

Beyond the physical reconstruction, the most challenging demands for a real recovery (for example, the restoration of the livelihood and housing provision of affected groups) are frequently left to the interests of the local government staff and the population [28]. According to Leykin et al. [20], there are three aspects that contribute directly to the community resilience (CR) in emergency times: preparedness, leadership and collective efficacy. The engagement of the damaged

population in the recovery process not only gives legitimacy to the solutions that will be put in practice, it can also improve the level of organization and awareness of the affected groups. The rehabilitation must reinforce feelings of solidarity and the bargaining capacity, and also approach issues related to property rights and contribute to the collective growth [16]. However, Davidson et al. [6] show that despite often-good intentions at the participation of users in up-front decision-making (within the project design and planning phases), a satisfactory level of participation is rarely obtained and the capabilities of the users are often significantly wasted.

There is a need of connecting recovering processes with strategies of economic development, cultural preservation and social empowerment and also with the participation of all communities; at the same time, it's essential that the sharing of knowledge, partnerships and cooperation between the stakeholders in the housing sector is encouraged [26].

Considering issues related to post disaster reconstruction, Yi and Yang [32] mention that research efforts in developing countries in Asia and South America are lagging behind the developed world, and Africa is hardly covered. Aiming to contribute to reduce this gap, the present article proposes recommendations to the process of post-disaster recovery in development countries, with an emphasis on restoration of housing, based on the analysis of three relevant experiences that took place in the American continent.

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## Socio-natural disasters in Americas (1900-2015)

### Number of occurrences

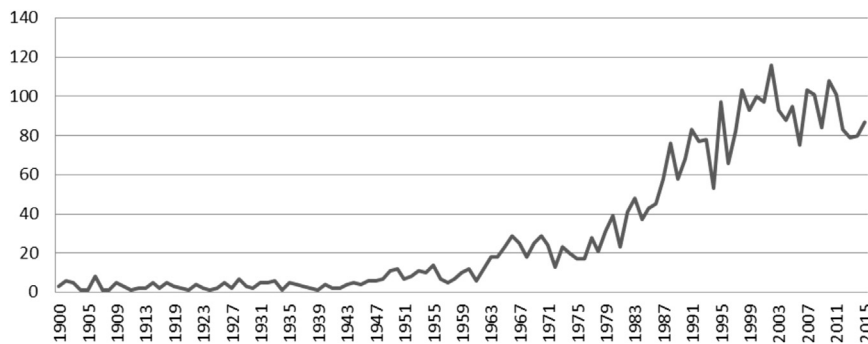


Fig. 1. Number of occurrences of socio-natural disasters in the Americas between 1900–2015.  
Data source: EM-DAT [8].

## 2. Materials and methods

This manuscript is based on real cases of post-disaster recovery, which data were obtained from literature, documentary collection and participant observation. The analysis embraces three cases of post-disaster recovery that happened in the American continent in the recent 20 years: hurricane Mitch (Honduras and Nicaragua, 1998), earthquake in Haiti (2010) and flood/sediment disaster in Serrain Region of Rio de Janeiro (Brasil, 2011). Despite the cases were originated by different kinds of hazards (hurricane, earthquake and floods/mass movements), these disasters were considered the most harmful in their respective countries and their recovery process show similarities concerning pre-existing vulnerabilities (social, economic, environmental, institutional), the impact in low-income groups, disruption of social services, lack of efficient pre-disaster recovery planning and problems in coordinating recovery efforts/governance of the recovery process. Honduras, Nicaragua and Haiti are the respectively the third, second and first poorest countries (based on GDP *per capita*) in Latin America, but their recovery processes, despite the massive international aid directed to them, showed different outcomes five years later. Brazil has the greater GDP in Latin America and did not need international aid after the disaster, but this was not sufficient to avoid the typical problems faced by developing countries in a disaster recovery.

The author's field activities began with an exploratory research through participant observation, in the city of Sao Jose do Vale do Rio Preto, after the disaster occurred in 2011 in the mountainous region of the State of Rio de Janeiro – Brazil (case 3), from where it was possible to monitor the disaster response activities, especially the ones related to rehabilitation, emergency shelter, temporary shelter, provisional housing arrangement and part of the permanent housing provision process.

In the results/discussion section the author brings the affected population view in the early stages of the recovery (1 month after the disaster) through an interview with 55 people that were living in a structured camp. Beyond that, some information was obtained on the participation in technical meetings, congresses and projects composed by important global actors in the scene of natural disaster's integral risk management, particularly during the professional work of the first author as a Researcher of the Brazilian Centre For Monitoring and Warnings of Natural Disasters (CEMADEN) over the years 2012 and 2013, in Brazil.

The participant observation the O-P-R model, Observation, Participation and Reflection [19], was adopted and developed in four phases in the field activities: initial observation, the initial observation with some participation, participation with some observation and reflective observation. The work of Castro [3] is also cited once this author complemented the first author's field work by interviewing 17 affected people in the Municipality of Nova Friburgo (also located in the Serrain Region of Rio de Janeiro), after five years from the disaster.

The disadvantages/risks and advantages/opportunities for benchmarking from each case were discussed in Section 4 and then grouped under six main dimensions of a housing recovery process, which importance were justified in the appropriate group subsection.

In sequence, recommendations were elaborated based on the cases discussion and focusing on three main criteria:

- Opportunity for benchmarking – recommendations were taken directly from the cases in situations that presented good results with potential to be replicated after the necessary adaptation.
- Problems' corrective and predictive approach – the problems (faced in the cases or considered likely to happen) directed the recommendations, which were conceived aiming to prevent or mitigate the real/potential problems.
- Opportunity of improvements – recommendations were made in order that some performance gain would be possible in recovery process related to the cases analyzed.

## 3. International panorama

### 3.1. (Socio)Natural disasters

The expression “natural disaster” refers to the harmful consequences produced by the impact of an event caused by natural agents (i.e. landslides caused by heavy rain) in a sensitive system. In fact, the causes of these harmful events are normally associated with a combination between natural and anthropic agents, in order that the expression “socio-natural disasters” may offer a more accurate meaning to describe this kind of situation.

There are two main factors that compose the risk of a disaster: the hazard and the vulnerability of the exposed system. It is well accepted that man activities are determinant to the vulnerability of the exposed system, but in fact they can also contribute to the hazard component (i.e. the effects of man occupation in a slope will probably influence the amount of rain necessary to trigger landslides, as well as urbanization may worsen floods by increasing the amount of water run-off in the basin). In fact, the number of socio-natural disasters in the Americas has risen significantly, especially after the 60s (Fig. 1).

The conjunction between the dynamics of vulnerable occupations and the growth of extreme natural events in frequency and magnitude (IPCC, 2012) is responsible for a raise in the number of people affected (without considering death cases) and financial damages provoked by natural disasters in the American continent (Figs. 2 and 3). Haddad and Teixeira [12] also highlight that it is important to consider interactions both inside and outside an urban system to assess the consequences of apparently local phenomena.

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