

# **Humanitarian Operations in Brazil - A review of natural disasters in the last decade**

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## **Abstract**

This research used documentary analysis to identify the main natural disasters in Brazil in the last decade (2003 to 2013). Results provided evidence that operations and impacts differ in sudden-onset and slow-onset disasters and that Government is the main player in the Humanitarian Operations in Brazil.

**Keywords:** Humanitarian Operations, Brazil, documentary analysis.

## **Introduction**

The interest and research on Humanitarian Operations and Natural Disasters have grown in the last decade with the increase of number of events (Leiras et al. 2014). According to the Centre for Research on Epidemiology of Disasters (CRED), despite the decrease of worldwide disasters in 2013, natural disasters still affected 96,5 millions of people and caused economic damages of U\$ 156,7 billion (Annual Disaster Statistical Review – ADSR; 2013).

According to CRED's definition, a disaster is a situation or event (sudden or unforeseen) that affects a local, causing economic and social damages, destructions, impacts to human being and requires external assistance to offer relief to the affected society (ADSR 2013). Disasters can be classified according to its origins in natural or man-made and can be sudden or unexpected or can last for longer times and are called slow-onset disasters (Wassenhove 2006).

Despite some similarities to the business context, Humanitarian Operations and Logistics differ from the Operations and Logistics in the private sector, in many aspects such as: i) the final goal of the humanitarian logistics is to provide relief to the affected people; ii) the environmental conditions are normally complex, volatile and uncertain (Balcik and Beamon, 2008; Van Wassenhove, 2006).

Leiras et al (2014) identified some important gaps in the Humanitarian Operations research. The main studies were conducted by American and Europeans, focused on Sudden-onset disasters and used analytical methodologies. There are also more studies on the proactive and immediate-reaction stages of the disaster life-cycle than on the recovery stage. These authors have also identified a predominance of researches focusing on the strategic decision level. Another gap that is not highlighted in the previous paper is the lack of researches on emergent countries with recurring events, but that are not between the top-ten countries in terms of

disasters mortality, such as Brazil, the 8<sup>th</sup> country in terms of number of events reported in 2013. Although Brazil was not listed in the top-ten countries in terms of mortality or victims, the country is often affected by serious floods and storms as well as droughts.

Bearing this in mind, this research aimed to identify the main natural disasters that affected Brazil during the last decade and how humanitarian operations were performed. Using a documentary analysis, the study brings two important contributions to the field. First, it analyzed both sudden and slow-onset disasters in the same country to establish similarities and differences. Second, by using a documentary analysis, we could evaluate the humanitarian operations during different phases of the same event.

The present paper is structured as follows. In the next section, we provide a brief literature review about disasters and humanitarian operations. Then, we present our methodology and data collection. We conclude the paper discussing the results and providing new opportunities for research.

## **Literature review**

The term disaster is usually reserved for "a serious disruption in the functioning of society, causing widespread human, material or environmental losses, exceeding the ability of those affected to deal with the situation using only their own resources" (United Nations, 1992, p. 21). The Center Research on the Epidemiology of Disasters, define disaster as a situation or event that prevents the continuity of operations in a region, requires external assistance and causes great destruction, damage and suffering (ADSR 2013).

Disasters can be classified by their origin as natural (ie, are reflections of geographic, weather, climate, hydrological and biological conditions such as case of epidemics) or unnatural, which are disasters caused by technologies or human action (ADSR, 2013; Van Wassenhove, 2006). Van Wassenhove (2006) classifies disasters in four types: (i) natural sudden-onset, such as earthquakes, tornadoes, hurricanes; (ii) natural slow-onset, as famine, drought and poverty; (iii) man-made sudden-onset, such as terrorist attacks and chemical leak; and (iv) man-made slow-onset, such as political and refugee crises.

During the past two decades, the number of natural disasters, including floods, cyclones, and droughts, has quadrupled (Oxfam, 2007). Worldwide, an average of 400 - 500 natural disasters strikes per year, up from a yearly average of 125 in the early 1980s. The number of people affected by such disasters has risen from some 174 million to more than 250 million per year (United Nations, 2007). Not infrequently, these types of events result in the forced removal of humans, homelessness, hunger, unsafe relocation or return to the affected areas, post-disaster epidemics and even sexual violence (Burn-Brookings Project on Internal Displacement, 2008). Tsunamis, hurricanes, earthquakes and floods that struck Asia and the Americas in 2004-2005 highlighted the need for international assistance to victims of natural disasters (Graves et al 2007). In times of emergency, the provision of humanitarian aid from the UN, NGOs and governments reveals valuable. Predictions suggest that the number of natural and human-made disasters will increase five-fold in the next 50 years (Thomas and Kopczac, 2005); hence, the need for efficient disaster relief operations is clear (McEntire, 1999). As a result, disaster relief operations now rank high on political agendas (Kovács and Spens 2007).

Although in 2013, there was a small decrease in the number of global natural disasters comparing to 2012 (330 against 357), the economic impacts of these events amounted to losses of US \$ 118.6 billion (ADSR, 2013). A disaster can have a negative impact upon the economy of

a location. It may have both direct effect, such as damages and destruction of infrastructure and buildings, and indirect effect, such as revenue losses and unemployment (ADSR, 2013).

According to Van Wassenhove (2006), there are four important stages in crisis management: mitigation, preparedness, response and recovery. Activities related to these four stages have been termed as Operations or Humanitarian Logistics. Thomas and Kopczak (2005, p. 2) defines Humanitarian Logistics as “The process of planning, implementation and control efficiently, focus on low cost flow and storage of goods and materials, as well as related information, from point of origin to point of consumption for the purpose of relieving the suffering of vulnerable people. Its role encompasses a range of activities, including the planning, preparation, transportation, and acquisition, storage, monitoring and tracking.

Humanitarian logistics face different challenges related to disaster relief: different types of disasters, phases of disaster relief, and humanitarian organizations involved. The first challenge is related to the type of disaster. Sudden disasters are more difficult to predict, while the slow-onset, as drought and famine, are subject to planning. The second barrier refers to the different disasters relief phases, whose focus and governance may vary. The collaboration and the involvement of different types of organizations, with different cultures and contexts, represent a third barrier (Kovács and Spens 2009; Tatham and Pettitt, 2010). Kovács and Spens (2009) state that the greatest challenges for humanitarian logistics are related to the coordination of the various logistics activities. According to Leiras et al (2014), in humanitarian logistic coordination occurs among different types of actors. There are a large number and variety of stakeholders that may be engaged in humanitarian aid, such as government, military, NGOs, private sector and donors. And these multiple stakeholders may act at different stages of a disaster and also present different type of relationship.

Additionally, four features add complexity and difficulty during the event: a) unpredictability of disaster for its occurrence (where, when, which intensity); b) the emergence of an unexpected product demand and shorter lead times for supply; c) high risks involved with deliveries; and d) lack of human resources, physical and financial (Balcik and Beamon, 2008).

Seminal studies on humanitarian logistic were based on the business logistic theory and on research optimization solutions and distribution fleets (Sheu 2007; Scarpin and Silva, 2014). However, an increasing number of articles have expanded its scope to include all the processes of management in the supply chain. Overstreet et al (2011) found that most studies are focused on planning activities. A recent literature review of humanitarian logistics research (Leiras et al, 2014), indicates that academic studies on disasters operations and humanitarian logistic has grown in quantity and relevance. However there are still some gaps and research opportunities in this field: most academic research focuses on accelerated response to sudden-onset disasters, on the proactive and immediate-reaction stages of the disaster life-cycle, on the strategic decision level, are conducted by American and Europeans, and use analytical methodologies.

## **Methodology**

This study aimed to analyze the humanitarian operations in Brazil. The research was conducted in two phases. In the first stage, an exploratory research was conducted to identify major disasters happened in Brazil in the last 10 years (2003-2013) and its impacts to population and economic activities. To accomplish with this goal, a qualitative study was performed using documentary analysis.

The documentary analysis can be used to identify facts in documents, written or not, as laws and regulations, newspapers and magazines, which may ratify and validate information

obtained by other data collection techniques (Ludke and Meda, 1986). The documentary analysis allows to produce new knowledge and create new ways of understanding a phenomena (Sa-Silva et. al; 2009). In this study, we collected articles published in Folha de São Paulo (regarded as the most important newspaper in the country) in the last decade. We also analyzed other documental sources such as Brazilian Civil Defense annuals and the IBGE<sup>1</sup>'s report about self-reported information at the municipality level. The use of different sources allowed us to triangulate sources of evidences.

Using keywords such as flood, storm and drought, we collected 1325 articles from Folha de São Paulo. Each document was then analyzed in two rounds. First students trained involved in this research read each document to confirm if it was related to the topic of the research and grouped it by date. In a second phase, two independents researchers did the qualitative analysis. In total, 534 valid documents were deeply analyzed.

The Brazilian Civil Defense annuals allowed identifying the major natural disasters that overrun the country, the regions affected and the impacts to population and to economic activities.

The IBGE report provided data about the frequency of storms/floods and impacts at the municipality level in the last five years and were used as a second source to confirm data obtained in the other documents. It was also interesting as it provided information and data about disasters risk management at the government level.

## Results

To identify the major disasters that affected Brazil in the last decade, we used all three different sources presented in the methodology. From the Brazilian Civil Defense annuals we identified that the most common disasters in the country were storms, floods and droughts and therefore, the data collection in the newspapers on those disasters.

A quantitative analysis identified the occurrence of disasters by region and year as shown in tables 1 and 2. It is important to highlight that the country was affected by minor events in different regions. For example, every Summer there are many floods and storms reported in the Southeast region (States of Rio de Janeiro, Minas Gerais and São Paulo). Their consequences are not catastrophic as in the two major disasters (Santa Catarina in 2008 and Rio de Janeiro in 2011), but they are recurrent events, that can be forecasted.

*Table 1 – Major droughts in Brazil*

Year	Region	% of documents about the event
2007/2008	North, Northeast and Southeast	18%
2008/2009	South	11%
2010	North (Amazonas)	6%
2012/2013	Northeast and North of Minas Gerais	36%
Minor events	Various	26%

Source: Authors (2014)

Table 1 provides evidence that the three major droughts that affected Brazil in the last three years were: 2007/2008 in the Northeast region, that happened again in 2012 and 2013 and the drought in the South region in 2008/2009. The drought in the Northeast was the worst in the

<sup>1</sup> INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA (Brazilian Institute of Geography and Statistics)

century due to its extension and length and it affected both population and economic activities, such as agribusiness supply chains (soy, corn, beans).

Notwithstanding the length and the impact of droughts in Brazil, the only player acting in the Humanitarian Operations in Brazil is the government. It is responsible for all phases of the disaster activities: mitigation, preparedness, response and rehabilitation.

Despite this, our data analysis also provided evidence that the efforts of the government are mainly focused in the response phases (92% of the articles reported facts during the crisis). In terms of mitigation, there were plenty of announcements of new infrastructure to collect and supply water for the regions affected. However, many of those announcements were done during the crisis and some of them were not concluded afterwards.

During the disaster, there were many actions undertaken by the government, such as financial assistance for both individuals (especially through the program Bolsa Família that assure a minimum income to a family), municipalities and for farmers and other private sectors affected by the drought. The Bolsa Família is a program designed to assist the poorest communities in the country and it was key to avoid social impacts such as migration of the population to other regions that were common in this kind of natural disaster. Other main activities identified in the research were: assurance of water flow from other regions and assurance of food and medicine supply as well as support to hospitals and health systems due to the risk of diseases. Few documents provided evidence of humanitarian operations in the preparedness and rehabilitation phases.

**Table 2 – Floods and storms: Number of articles per year and State/Region**

Year	São Paulo	Minas Gerais	Rio de Janeiro	Southeast General	Santa Catarina	South General	Northeast General	Others
2003	5	1					1	1
2004	18						9	10
2005	17	1				1	1	1
2006	17		1			2	1	2
2007	3						0	0
2008	3	14	12	2	40	2	5	6
2009	24	20	9	1	2	1	1	7
2010	33	1	14		1	1	6	8
2011	28	6	52	1	15	7	2	14
2012	5	9	7	1			1	2
2013	12	1	3	3			0	0
Total	165	53	98	8	58	14	27	51

Source: Authors (2014)

In terms of floods and storms, the nature of the disaster is totally different from the droughts. Many of the documents studied were related to sudden-onset situations that affected regions, cities or districts. Normally, those disasters were caused by strong and abrupt rains that submerge buildings and damage roads and logistics infrastructures resulting in deaths and people dislodgement.

The number of articles about floods and storms is higher than the ones related to droughts (428 valid documents vs. 132 valid documents). This finding is not surprisingly as, in the last 5 years, 40% of the cities in Brazil claimed to be affected by overflows and almost 28% reported at least one flood (IBGE, 2014). From table 2, two events should be highlighted: the Santa Catarina region flood in 2008 and the Rio de Janeiro flood in 2011. According to the sources studied those

two events were the only ones that attracted international players to the Humanitarian aid in Brazil (corresponding to 1% of the documents analyzed). This could be explained by the number of deaths and people affected in those two events.

Another interesting finding in our research is related to the recurrence of events. Although the disaster literature stated that natural disasters are difficult to forecast (Balcik and Beamon, 2008), the regions in the South east region are constantly affected by such phenomenon. This data could have been used for mitigation and preparedness in yearly disasters.

In terms of different humanitarian operations phases, in the sudden-onset disasters, news were distributed between the four phases: 20% of the documents referred to mitigation activities, 6% were related to preparedness, 38% reported activities during the crisis and 4% regarded as rehabilitation. Once again, when discussing mitigation efforts, several delays in infrastructure and projects that could avoid impacts to people and economic sectors were reported.

Main impacts of storms and floods were related to people deaths and dislodgments and to damages to logistics infrastructure, affecting not only roads, but highways, ports and airports. The consequences are longer lead-times and increased costs to economic sectors.

Comparing droughts and storms there is higher awareness of people affected by storms. This happens because in the sudden-onset disaster the impact to individuals and economic sectors are catastrophic. In such disasters both individuals and communities are mobilized to help in the donations flow. However, because such initiatives are not well coordinated, many materials and medicines are wasted.

## Conclusions, research opportunities and limitations

This study aimed to map the natural disasters in Brazil in the last 10 years and its implications for the Brazilian humanitarian supply chain adopting documentary analysis as research strategy. The main contributions are the investigation of humanitarian operations in the same context, but comparing different types of natural disasters: sudden-onset and slow-onset. Another contribution is the identification of the government as an almost exclusive actor during the events.

The current research was exploratory and identified future opportunities for the field. Regarding the Humanitarian Operations, we suggest further research to explore various topics of interest in the area such as the absence of other agents acting during the events, the coordinating role of the government and the comparison of performance with international disasters.

At this time, it is important to highlight the limitations of the study. Despite having made triangulation of data with other documents, the present study may present bias because articles were selected from only one newspaper. Research should be expanded to cover other media located in other regions to bring a broader view. Furthermore, the study is limited to the period of 2003 to 2013. However, 2014 is marked by one of the worst droughts in decades in the Southeast and new impacts can be identified.

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