XXIV ENGEMA

ISSN: 2359-1048
Novembro 2022

HUMANITARIAN LOGISTICS: HOW CAN A SMALL CITY RECOVER FROM A DISASTER?

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Introdução
Humanitarian Logistics consists of promoting the distribution of supplies and relocation of people in emergency situations to alleviate the victims of the emergency situation. The focus of this logistical process goes beyond the assistance to population directly affected by such disasters, including the planning before the occurrence of the disaster, support and assistance during the occurred and the subsequent restructuring. At the same time, this type of logistics intends in its foundations to carry out the immediate implementation of measures to reduce the extent of impacts.
Problema de Pesquisa e Objetivo
At the beginning of 2022, a small city in Rio de Janeiro, Petropolis, suffered from a great storm that caused mudslides and flooding destroying central essential parts of the city. Several help initiatives from different organizations and individuals were observed just after the event. This study aims to understand how humanitarian logistics can help a city recuperate from a significant natural disaster.
Fundamentação Teórica
When analyzing Humanitarian Logistics, Jilani et al. (2018) mention that conventional responses to natural disasters disturb the environment and all beings that surround it. When examining humanitarian operations in critical areas, it can be said that the environment is further damaged as the carbon emissions linked to logistical activities add to the already fragile environmental health of the place. This happens while abrupt responses to natural disasters are never simple, involving several variables to be considered, such as the emissions of pollutants from transport inputs.
Metodologia
As a methodological approach, the authors relied on humanitarian logistics literature to draw a different perspective where the citizen allied directly with political powers could provide immediate help for those who need it. The study inverviewed 10 people involved in aiding victims of the tragedy, after the software MaxQda was used to create codification. Three categories emerged: actions during the disaster; recuperating and prevention. The categories were illustrated by parts of the speech, indicating essential actiosn that should be taken by individuals.
Análise dos Resultados
A strong relationship was built between Recuperating and Relieving/Prevention. This happened during the interview when the subject talked about relieving actions that were strongly connected with recuperating, such as urban planning. In all interviews, they mentioned the difficulty of evacuating the areas, partly because people were still looking for survivors. One month after the first flood, there was a big storm that caused several mudslides with fewer victims, but there were 7 casualties in the second storm.
Conclusão
A study was conducted with several participants in aiding victims, among them members of the city hall, NGO's and Volunteer's, they also pointed into the direction of a co-joint action among the institutions to restore and recuperate the city. There were at least two implications of the study: first it was a contribution of a practical case that proved the theory to be correct. The second contribution was understanding the dynamics of the actions made after and during the disaster by social actors, such as individuals, NGO's and city hall.
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Palavras Chave
Humanitarian Logistics , Disaster , Recover

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1 - INTRODUCTION

The concept of Humanitarian Logistics is almost identical to corporate logistics and supply chain management (Shafiq & Soratana, 2019), however, does not involve manufacturing goods. Humanitarian supply chain management coordinates and integrates various internal and external stakeholders (Cozzolino, 2012). Supply chain management is focused on relationships among the stakeholders that make logistics movement possible and is recognized as crucial to properly carrying out any disaster response (Cooper, Lambert, Pagh 1997; Cozzolino 2012). Humanitarian Logistics involves many functions, including preparedness, planning, procurement, transport, warehousing, tracking, tracing, and customs clearance from the origin point to the consumption point. Also known as a process or system which involves applying knowledge and skill to mobilize resources and people to help vulnerable and affected communities (Van Wassenhove, 2006).

Humanitarian Logistics consists of promoting the distribution of supplies and relocation of people in emergency situations to alleviate the victims of the emergency situation. The focus of this logistical process goes beyond the assistance to population directly affected by such disasters, including the planning before the occurrence of the disaster, support and assistance during the occurred and the subsequent restructuring. At the same time, this type of logistics intends in its foundations to carry out the immediate implementation of measures to reduce the extent of impacts in a geographic context." (Zago & Leandro, 2013). As a challenge, the Humanitarian Logistics needs to deal with the fact that there is great diversity and a high number of active organizations (governmental, non-governmental, military, civil Society and humanitarian organizations) (Tomasini & Van Wassenhove, 2009). In addition to operating with a high flow of supplies circulating through the chain until reaching those affected (Day et al., 2012). According to Bui et al. (2000), none of these different organizations can serve the contingent of victims affected, which requires collaborative actions between organizations. These actions allow the facilitation and integration of assistance and rescue operations, which enhances the organization's total service capacity.

Collaborative action is considered one of the significant challenges of humanitarian logistics, given the constant risk situations and the diversity of forms of action by organizations. According to Charles et al.. (2010), the increasing occurrence of disasters tests the reactivity of humanitarian systems, especially the ability of different agents to work together. Humanitarian action, therefore, depends on how the humanitarian agent decides to carry out his operations, which can be individually (decentralized), in which this agent makes decisions in his supply chain, or collaboratively (centralized), in which he makes decisions that jointly influence the operations of the partners involved (Akhtar et al., 2012; Balcik et al., 2010; Kovács et al., 2010).

However, none of them discuss indicators and relations between actors, so this paper aims to understand how the interaction between Society, NGO's and government occurs when facing a disaster. To do so, we use humanitarian logistics literature regarding indicators to understand how these actors should relate. We are using the disaster that occurred in Petropolis, Rio de Janeiro, as a case study to understand how these relations unfold. In order to do so, we are basing our study on Humanitarian Logistics theories and frameworks to create a simplified, coordinated system to overcome the challenges of recovery.

Another valid way to understand the interaction between actors is Social Network Analysis (SNA) because it helps to study and understand how communication is conducted among actors involved in disaster management (Alvarez & Serrato, 2013). The notion of SNA is based on relationships among social entities and the patterns and implications of these relationships (Wasserman & Faust, 1994). The social environment can be expressed as patterns or regularities in relationships among interacting units. These patterns are called structures, and the variables and quantities that measure these structures are called structural variables.

We can mention two contributions that this study can provide to the area of Disaster or Humanitarian Logistics. Firstly, there is a lack of studies that relate the dynamics of government, NGO, and civil society actors when facing natural or man-made disasters. Second, evaluating objective indicators can lead to understanding how organizations behaved in past tragedies contributing to future problems. The contribution is significant since the study will augment the knowledge of the organizations and individuals in humanitarian logistics and help in the decision-making process.

The paper is divided in five sections containing the introduction presenting the main aspects of our problem; a section about Humanitarian Logistics presenting the state of the art of the field, and how this theory can help us to create a better understanding of our problem; a section about recovery of disaster indicating theories and examples of actions that can be perceived as ideal for recovery; a methodology section exploring the method applied to our research; the results section presenting the results of our interviews in the field; Conclusion section presenting our main finds on the subject.

2 – THEORETICAL BACKGROUND

When analyzing Humanitarian Logistics, Jilani et al. (2018) mention that conventional responses to natural disasters disturb the environment and all beings that surround it. When examining humanitarian operations in critical areas, it can be said that the environment is further damaged as the carbon emissions linked to logistical activities add to the already fragile environmental health of the place. This happens while abrupt responses to natural disasters are never simple, involving several variables to be considered, such as the emissions of pollutants from transport inputs (medicines, food, and drink to the different affected locations), and the control of their total cost. According to Gonçalves &Lima (2018), there is a gap in the literature regarding the capabilities and resources that organizations should develop in order to deal with different types and intensities of disasters, indicators data obtained from past tragedies, in order to take the best measures in case of a future disaster. According to Rao (2009), indicators, or metrics, help in the determination of priorities and objectives of organizations in the environment in which they are inserted. In our case, an organization should be replaced by the designated actors, such as government or NGO's. They have the role of indicating how the organization is in its current state, providing an overview of operations, in addition to providing means to achieve the strategic objective outlined for where the organization wants to be in the future. Another important gap is regarding the relationship between Society, government and non-governmental organizations (NGO's) specializing in disaster, and how these three actors interact when facing a natural or man-made disaster (Gonçalvez & Lima, 2018).

The indicators make it possible to understand that value can be created to execute the management and, in addition to establishing a structure for the implementation of organizational strategies (Santana-Medina et al., 2012). As highlighted, studying environmentally humane aspects of performance is fundamental, a success measured by the organization's critical factors. As a challenge, Abidi and Klump (2013), Larrea (2013), Lu, Goh & de Souza (2016), Bardhan & Dangi (2016), Toklu (2017) related performance indicators to help the humanitarian supply chain.

To assess the performance of humanitarian supply chain management, dimensions related to resources can be used to manage the total logistical cost (Beamon & Balcik, 2008; Beamon & Kotleba, 2006; Schulz & Heigh, 2009); to exits, to manage the coverage of care provided to beneficiaries (Beamon & Balcik, 2008 ; Davidson, 2006); and flexibility, to manage the capacity to serve beneficiaries (Beamon & Balcik, 2008). Of these, the service coverage indicator is the one with the greatest humanitarian character. The use of performance indicators makes it possible to evaluate the decision-making of humanitarian organizations, which can occur autonomously, in which each humanitarian organization makes decisions on how to allocate its resources between acquisition, transport, storage and administrative operations in its supply chains (Balcik et al., 2010); or it can occur centrally, when a company or one of the actors assumes the main control of the decisions of the organizations with which it is associated. Balcik et al. (2010) understand that partnerships can occur vertically (between partners from different layers of the chain), horizontally (between links in the same layer) and laterally (combining and sharing resources with competitors and partners).

Major research challenges are pointed out towards the implementation of processes systematized logistics with a focus on humanitarian logistics, with emphasis on: related to infrastructure, location of assistance centers, distribution of resources, process coordination (people, supplies, information, materials). Pettit and Beresford (2005) and Tatham and Pettit (2010) point out similarities between humanitarian logistics and military logistics: both have uncertain demands, face difficulties given by the degradation of the physical infrastructure of the place and the absence of certain State functions, tend to injured and traumatized individuals, and are under observation media constant. On the other hand, for Ertem et al. (2010) business logistics are 15 years ahead of humanitarian logistics. According to Nogueira et al. (2008), the conditions faced by companies are different faced in a disaster, so there are specific characteristics of logistics humanitarian issues that differ from the traditional business approach, such as life-related issues human resources, unreliable, incomplete or non-existent information systems and random effects generate the demand. Humanitarian operations take place in environments where the infrastructure is precarious, and there is a high turnover of human resources.

According to Daud (2016), humanitarian logistics involves mobilizing people, resources, skills and knowledge to help the disaster's victim. In the humanitarian process, logistics is central to all mobilization activity as it served as the bridge between disaster preparedness and response, procurement and distribution, headquarters and the field. Apta (2009, p.2) debates that "humanitarian logistics is a critical element of effective disaster relief process and is described as a special branch of logistics with challenges such as demands surge, uncertain supplies, critical time window in face of infrastructure Vulnerabilities and vast scope and size of the operations".

A disaster is a test of reactivity of a system, especially the capacity of different actors to work together as a team (Raillani et al., 2020). The situation demands solutions that include governments, military, civil Society and humanitarian organizations. When a disaster (natural

or man-made) occurs, an efficient disaster relief supply chain plays a critical role in quickly distributing relief supplies to the population affected areas for rapid recovery. An insurance risk management framework for decision makers to quantify the risks and benefits associated with stocking decisions for disaster relief efforts or supply chain disruption were proposed by Londree and Taskin (2008). We can say that a disaster is an unexpected event that disrupts the system's normal functioning due to natural or technological causes and leads to human, economic, material, and environmental losses. This requires the intervention of various actors of the community in order to regain initial balance, and humanitarian logistics bases can help to regain the balance, primarily due to frameworks that help us see the risk management process. "Disaster logistics, also known as humanitarian aid logistics, is designed to cover the needs of damaged and vulnerable individuals and to alleviate their suffering" (Adiguzel, 2019, p.213). Humanitarian Logistics consists of processes and systems involved in mobilizing people, resources, and knowledge to help vulnerable communities affected by natural disasters or complex emergencies (IFRC, 2020). It seeks a rapid response, aiming to serve the most significant number of people, avoid shortages and waste, organize various donations and operate on a limited budget.

It can be said that a disaster is an unexpected event that disrupts the normal functioning of the system, due to natural or technological causes and leads to human, economic, material and environmental losses. It requires the intervention of actors of the community in order to restore the balance. According to (Raillani et al., 2020), disasters have many classifications. However, the author chooses one to better classification: natural or man-made disaster, slow or sudden onset disaster, localized and slow-onset disasters, dispersed and slow-onset disasters, localized and sudden onset disasters or dispersed and sudden onset disasters. Disaster logistics, also known as humanitarian aid logistics, is made to cover the needs of damaged and vulnerable individuals and to alleviate their suffering (Adiguzel, 2019). According to the International Federation of Red Cross and Red Crescent Societies in 2015: "Humanitarian logistics consists of processes and systems involved in mobilizing people, resources and knowledge to help vulnerable communities affected by natural disasters or complex emergencies. It seeks a prompt response, aiming to serve the largest number of people, avoid shortages and waste, organize various donations and, above all, operate within a limited budget".

Disasters recovery can be understood as disaster relief actions to restore prior order. Wood et al (1995) relief can be described as a foreign intervention into Society to help local citizens. Disaster relief operations is designed to transport first aid material, food, equipment and rescue personnel from supply points to a large number of destination nodes, spread over the disaster region, besides evacuation and transfer of people affected by the disaster. The humanitarian supply chain starts from suppliers and donors to the recipients or people in need, differently from the commercial one where there is just two types of operation: supplying and distribution; the financial flow in the humanitarian supply chain is intended to suppliers and recipients and come from donors and organizations, the goods flow come from suppliers to the distribution units to finally recipients.

Tomasini & Van Wassenhove (2009) define five flows that must be managed in the humanitarian supply chain, which they called 5 B's: boxes, bytes, bucks, bodies and business. They also point to difficulties inherent in the management of the supply chain:

1. Difficulty in carrying out its operations with limited resources;
2. Difficulty in reconciling ambiguous objectives;
3. Difficulty in making decisions due to the high degree of uncertainty;
4. Difficulty in carrying out actions in a politicized environment;

5. Difficulty in dealing with urgent problems.

To promote success in response actions it is necessary to include a link between preparedness and response strategies. This element is called Triple-A Supply Chain, where A's correspond to agility, adaptability and alignment.
The disaster relief supply chain is composed of three primary operations: supply acquisition and procurement, pre-positioning and warehousing, and transportation (Lodree & Taskin, 2008).
Social Network Analysis (SNA) is a branch of mathematical sociology that analyzes relationships between entities applying network topology (Alba, 1973). The main objectives of SNA are:

• To visualize the communications and relationships between individuals and groups using graph theory.

• To study the factors affecting the relationships shown in the graph and the correlation between these relationships.

• To generate conclusions about relational data, including but not limiting them to bottlenecks where information is retained.

• To recommend better communication policies and procedures.

The founder of this approach is the German sociologist Georg Simmel in the first decade of the twentieth century (Dekker, 2001). He said for the first time in sociology that social reality is fundamentally relational. In other words, relationships are interactions with interdependence or reciprocity effect. As a quantitative tool, it was applied by Alba in the early '70s (Alba, 1973). It is a multidisciplinary tool that includes areas of mathematics, statistics, sociology, and organizational sciences, among others. Multiple applications can be found in the literature, although only the fundamental concepts are presented in this document. Although there is nothing unusual about social network data, social scientists use a specialized language to describe the structure and contents of the sets of observations used in the network analysis (Hanneman, 2005). Data sets used in network analysis present a structure quite different from the conventional rectangular data array traditionally used in statistical analysis.

3 – METHODOLOGY

This study aims to understand how humanitarian logistics can help a city recuperate from a significant natural disaster**.** From this perspective, we describe the methodology applied to understand the disaster scenario and its implications in the recuperation of the city

3.1 Selecting the Population and Sample

The selection of the sample was made by accessibility. The population selected were those directly or indirectly involved in the disaster scenario. The research sample was composed of 10 interviews made during the 1st and 10th of September, 2022. Among the interviewed: were members of NGO's and city hall, a representative from impacted communities, specialists in city recuperation, members of the community directly affected, and participants in the reconstruction.

3.2 Using Instruments and Tools

For the development of the interview protocol, we analyzed the literature in humanitarian logistics to add question that can help us understand how a city can recuperate from a disaster. The interview protocol had many open questions regarding the disaster and let the interviewer speak freely on what kind of actions helped recuperate the area affected. There were 11 questions regarding actions made on the spot and post-disaster. The questions could be categorized as such: Actions during the disaster (5 questions); Recuperating (2 questions); Relieving actions and prevention against disaster (4 questions).

3.3 Data Collection

Scientific data was obtained from in-depth literature research. Information obtained from the literature research was combined in other to understand the problem. The respondent could be identified as shown in the table 1.

Table 1 – Sample of the research

Identification	Function during the disaster	Previous Experience
Volunteer in a NGO 1	Separating supplies for the victims	Participation in other floods in Petrópolis.
Volunteer in a NGO 2	Delivering supplies for the victims	None experience.
Volunteer in a NGO 3	Psychological support for the victims	No experience in attending to victims of a disaster.
Volunteer in a Church 2	Separating and Delivering supplies for the victims, especially food delivery.	No experience in attending to victims of a disaster.
Volunteer in a Church 2	Attending victims who were staying in the church until finding other houses.	Previous experience in other floods in the city.
Member of NGO 1	Delivering supplies for the victims	Attending victims of other floods in the city.
Member of NGO 2	Organization of delivery of food and supplies to the community affected by the flood or mudslides.	None experience
Member of NGO 3	Delivering supplies for the affected communities	Attending victims in other floods in the city.
Member of the city hall 1	Planning and Coordination of Action of Assistance.	No experience in attending disasters.
Member of the city hall 2	Coordination of volunteers attending the victims, among doctors, psychologists, nurses.	Experience in attending victims during other floods in Petrópolis.

Source: elaborated by the authors.

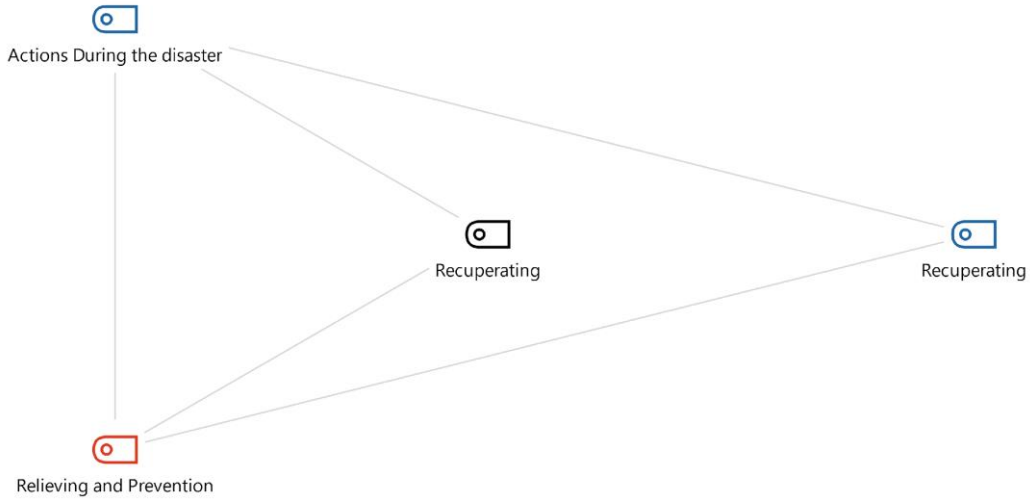
3.4 Data Analysis & Actions

An in-depth literature review on Humanitarian Logistics and disaster was conducted to identify critical factors in how humanitarian logistics can help a city recuperate from a significant natural disaster
After the interviews' transcription, all our data was inserted in the MaxQDA software to analyze and code our data. The results can be seen in the next section. A different number of analyses were run to understand the tragedy's steps and how each interviewer contributed by helping the victims.

4 – RESULTS AND DISCUSSION

In the literature presented (Tomasini & Van Wassenhove, 2009; Adiguzel, 2019), there are different moments when dealing with a tragedy like the one that happened in February in Petrópolis. We can talk about actions that were taken during the event, actions to relieve and prevent disaster, and actions regarding the recuperation of the city. Based on these categories, the interviews were analyzed. The software identified the categories and indicated their relation in a map.

Figure 1 Map of codification



Source: elaborated by the author with MaxQda.

Also, the software produced a table showing the relations among the codes.

Table 2 – Interconnection of codes

isto f codes	Recuperating	Relieving and Prevention	Actions During the disaster
Recuperating	0	12	1
Relieving and Prevention	12	0	0
Actions During the disaster	1	0	0

Source: elaborated by the author with MaxQda

A strong relationship was built between Recuperating and Relieving/Prevention. This happened during the interview when the subject talked about relieving actions that were strongly connected with recuperating, such as urban planning. Table 3 shows the interviews, codification, and parts of speech the interviewees gave. Only a percentage of the answers are shown to illustrate what was developed in the Literature Review section, and categories or codes are present in the table.

Table 3 – Actions During the disaster

Name of the document	Codes	Parts of the speech
Interviews 2 Interview 3 Interview 4 Interview 5	Actions During the disaster	1. Separating and delivering supplies for the victims. 2. Fireworks and a city hall department called Civil defense* were activated to attend the victims. These was recognized by most of the interviewers.
Interview 1 Interview 6	Actions during the disaster	3. Official members of the city hall helped evacuate the victims, besides separating and delivering supplies.
Interview 7 Interview 8 Interview 9	Actions during the disaster	4. Volunteer coordination in NGO. NGO was responsible for collecting and distributing supplies, including helping official members of the city hall and all the workers necessary to remove trash accumulated by the flood and mudslides.
Interview 10	Actions during the disaster	5. Coordination of volunteer kitchen responsible for providing meals for workers of all sorts, including individuals Volunteer, NGO volunteers, and workers responsible for removing trash from mudslides and floods. Also helped in collecting and distributing different sorts of supplies.

*Civil defense is city hall department responsible for attending areas classified as in danger (mudslides, demolition sites)

Source: Elaborated by the authors.

In this category, most of the interviews had similar responses, although the respondents were from different backgrounds, NGO, Church, and City hall members, they all contributed by collecting and distributing supplies. The areas affected were challenging to access, so there was a considerable contribution from individuals with motorcycles, who volunteered to deliver what was needed. Tons of supplies came from all over the city and from other cities, and these usually comes through churches and NGO's. The city hall participated in collecting supplies, but there was a delay in action. Out of 10 interviews in 8, these problems were mentioned. Also, in 2 interviews, it was mentioned because there was disorganization at the beginning that, a lot of supplies were robbed by victims who pretended to be affected.

In all interviews, they mentioned the difficulty of evacuating the areas, partly because people were still looking for survivors. One month after the first flood, there was a big storm that caused several mudslides with fewer victims, but there were 7 casualties in the second storm. In the first storm the numbers were 233 casualties, and after one month of the tragedy, there was still 600 people without houses. The city hall, as mentioned in interviews 1 and 6, created a social lease to help people rent new places to live, these actions were classified in the category of relieving and prevention, but it was also mentioned as a recuperating action. In table 3, we can see the results from the category Recuperating.

Table 4 – Recuperating

Name of the document	Codes	Segmento
Interview 1 Interview 7 Interview 8 Interview 9	Recuperating	1. Joint actions with city hall and federal sphere to recuperate the rivers. A lot of trash and sand accumulated could cause other floods.
Interview 2 Interview 3 Interview 6	Recuperating	2. There were workers from different institutions to recuperate the city, the bridges over the rivers were severally damaged, and the city hall helped repair. 3. It was mentioned many risk slopes that were repaired by the city hall. 4.The city hall had a special lease to help victims to rent places to live.
Interview 1 Interview 4 Interview 5 Interview 10	Recuperating	5.A repair of a river gallery constructed years ago, the flood impacted that. 6. The flood invaded many shops in downtown. The owners and volunteers of NGOs helped clean and reconstruct.

Source: elaborated by the authors.

In order to recuperate, a conjoint action of city hall and other institutions is needed. In interviews 1 and 10, the need to remove all the population of risky areas was mentioned, and the fiscalization should occur for this to happen. The underline notion is urban planning, the importance of planning the construction of new houses on these risky slopes. Also, as interview 10, the city hall must still attend to several risky slopes before the storm season strikes again. These actions were aiming recuperation but also preventing for future disasters. The last category analyzed, Relieving and Prevention, have strong interconnections with recuperation.

Table 5 – Relieving and Prevention

Name of the document	Codes	Segment
Interview 1 Interview 7 Interview 8 Interview 9 Interview 10	Relieving and Prevention	1. Removing the trash from the rivers; 2. Make the population aware of the importance of recycling the trash for a better destination. 3. Make the population aware of the importance of not constructing on risky slopes.
Interview 2 Interview 3 Interview 4	Relieving and Prevention	4. Training of public transportation drivers in order to know how to act in case of floods.
Interview 5 Interview 6		5. Avoid deforestation when constructing houses. 6. A more strict fiscalization concerning houses in risky areas.

Source: Elaborated by the author.

The category Recuperating and Relieving/Prevention had a lot of similar answers indicating that the respondent understood these 2 actions as combined actions. The recuperating actions would also help to prevent future disasters. Once again almost in every interview a delay of action from city hall was also observed specially when different cities and states have sent workers to clean the city, the first action of the city hall was denied their passage, and after a few days the help sent arrived.

The literature review, according to (Raillani et al., 2020), it requires the intervention of actors of the community in order to restore the balance. Also SNA can be a different way to look the

interconnection of the actors. The respondents all had in common the notion that there is a conjoint work the recuperation and prevention of other disasters.

5 - CONCLUSION

This study aims to understand how humanitarian logistics can help a city recuperate from a significant natural disaster**.** The literature review indicates that humanitarian logistics actions can be divided basically into three steps: actions during the disaster, recuperating, relieving and prevention actions. Actions should be taken first to restore things in order than recuperating, and prevention must be an essential issue to discuss. The literature also indicates that a group of actors needs to make things go right.

The components of Humanitarian Logistics involve people, equipment and infrastructure, transport, inventory management, information and communication technology, planning, policies and procedures. This system's primary input is the need for humanitarian aid, while the main product is humanitarian aid itself. The secondary entries are the resources needed to respond to these requests. These inputs are the material, financial and human requirements necessary to the system's functioning. Secondary outcomes may include, but not limited to planning for future disasters, relationships with other humanitarian organizations, experience and lessons learned

A study was conducted with several participants in aiding victims, among them members of the city hall, NGO's and Volunteer's, they also pointed into the direction of a co-joint action among the institutions to restore and recuperate the city. There were at least two implications of the study: first it was a contribution of a practical case that proved the theory to be correct. The second contribution was understanding the dynamics of the actions made after and during the disaster by social actors, such as individuals, NGO's and city hall. Moreover, these interconnected actions ended up helping more than the isolated ones.

Important future research should amplify the interviews with other actors to understand more how the interaction between the actors happened.

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