

Environmental impact and historical-bibliographic mapping of emergency events in Cartagena over the last 20 years

Summary

Explain the fundamental concepts of emergency plans and events of this nature in the city of Cartagena, Colombia. From natural events such as earthquakes, floods and landslides to crises caused by human activities such as armed conflicts and industrial accidents, the need for effective and well-structured emergency plans has become an unavoidable priority. Different challenges and particular characteristics in terms of geography, demographics, socioeconomic development and vulnerability to disasters, which is reflected in the diversity of its emergency care and prevention plan. Cartagena de Indias emergency response strategy seeks to respond to emergencies and disasters in this important district.

Keywords: emergency, disaster, technological, social, natural

Volume 9 Issue 3 - 2024

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Received: May 23, 2024 | **Published:** June 03, 2024

Introduction

Risk Management to effectively and efficiently address any risk situation that arises is framed in the District Plan for Risk Management, which seeks to strengthen the district's capabilities to face and recover from adverse events. This plan has been possible thanks to the project "Strengthening capacities for risk management and recovery of livelihoods in Colombia." In essence, it works as a detailed guide that describes the actions to take before, during and after an emergency or disaster, to rebuild the affected infrastructure, restore normality and strengthen the community's resilience in the face of future events.¹ "In the balance of the first emergencies that occurred in the District, an increase of 3.7% was observed compared to the first quarter of 2023. This year, significant progress was achieved in inspection, monitoring and rapid response by the System. District Risk Management.

The Advisory Office for Disaster Risk Management will present to citizens an exhaustive summary of the actions undertaken in terms of risk management so far this year, as well as a detailed report on emergencies that have occurred since January 1, 2024" (Alcaldía distrital de cartagena, 2024).

Methodology

Using a descriptive, documentary and transversal research, information searches were applied in different sources, with the purpose of showing the related concepts in a graphical way, the findings related to the different emergencies that occurred in the district of Cartagena, Colombia. We sought to detail the process of historical mapping of the city in Cartagena, significant changes and the appearance of adverse events of a historical nature, related to disasters with natural, technological and social threats.

Results

Concepts

According to Law 1523 of 2012, the Threat in safety and health at work is considered as a danger that can cause a physical event

of natural origin, caused, or induced by human action or decision accidentally, this is created by a severity to cause loss to workers and others, injuries or other health impacts that may impact people, as well as damage and loss to property, infrastructure, livelihoods, service delivery and resources environmental.²

Vulnerability in the field of safety for workers in the economic, social, environmental or institutional sector has the concept of suffering adverse effects in the event that a dangerous physical event occurs. This refers to suffering loss or damage to human beings and their livelihoods, as well as their physical, social, economic and support systems that may be affected by dangerous events and/or occurrences.²

A group of Brigade Members refers to the group of people or organized workers adequately trained and qualified to be able to act efficiently before, during and after an emergency inside or outside the facilities. These must be made up of people who can take care of the logistical support of an emergency plan, in this way, they must know all the company's facilities, the routes and facilities.³

A security emergency is a situation that generates collective risk in an event that puts people and property in imminent danger and that requires immediate attention from public agents to address them and mitigate damage. Also these, you must try to prevent this from becoming more aggravating events or in the worst case, a catastrophe.⁴

An Evacuation Route is a clearly marked and designated path so that people can exit a building or area safely and quickly in the event of an emergency.⁵

Meeting point is a specific and safe area where people must gather after evacuating a building or area to ensure that everyone is safe and accounted for.⁶

This historical-bibliographic mapping of emergency events in Cartagena during the last 20 years allows:

- 1) Identification of emergency events that occurred in Cartagena during the last two decades.

- 2) Analysis of the response and risk management to these events by local authorities and other entities involved.
- 3) Formulate some lessons learned from each emergency event in Cartagena, to improve future preparation and response.
- 4) Compilation of detailed information on the impacts of emergency events on the population, infrastructure and environment of Cartagena.

These results would provide a vision of emergency management in Cartagena and its authorities that can be useful as input to improve preparation and response to future emergency events in the city, such as those detailed below.

Emergencies that occurred in the district of Cartagena

Natural Origin

Gethsemane market fire 1965.

In Cartagena, on October 30, 1965, one of the greatest tragedies in modern history occurred. A loud explosion heard around 5:30 in the morning caused the fire in the old Gethsemane market, which included what is now Arsenal Street and the Convention Center. According to testimonies from the time, the fire occurred due to the involuntary combustion of dynamite that was used for fishing and that was purchased there. As a result, they caused at least 50 deaths and more than 100 injuries, according to records. The situation caused a great impact on the city and motivated the relocation of the market to what is now Bazurto. In addition, it allowed the construction of the Julio César Turbay Ayala International Convention Center. The tragedy led to the cancellation of that year's Independence festivities. (Gestion de riesgos y desastres, 2021) (Figure 1).



Figure 1 Gethsemane market fire 1965.

This incident occurred at a time when the market had already exceeded its capacity and had expanded in a disorderly manner, clogging the surrounding streets. This had led to mobility and public order issues, leading to proposals to move the market to a new location.

After this incident, the process of moving the Getsemaní public market to the current Bazurto Market, in an area further away from the historic center of the city, was accelerated. This change brought with it the loss of an emblematic space and the migration of many of the former vendors and residents of the Getsemaní neighborhood. Today this stage is used as a convention and events center, in a new modern and attractive location.

Last 20 years

Rainy season 2004

According to data from the public environmental establishment (EPA), about 1,500mm of rain fell in the city, causing floods and landslides. At that time, the National Government and the Mayor's Office were advancing in the construction of social housing, in the Colombiatón and Flor del Campo urbanizations were aimed mainly at people affected by this natural phenomenon. In total, 586 families suffered the loss of everything, and the District Administration

provided four shelters. The tragic situation, especially in the vicinity of the Ciénaga de la Virgen, led to the cancellation of the Independence festivities for the first time in 39 years (Gestion de riesgos y desastres, 2021).

This natural disaster was characterized by floods that affected two thousand people. The government had already provided aid to these people, including 1,500 markets, 200 hygiene kits and other resources, conjectural measures that required more extensive humanitarian aid and that generated the construction of developments of priority interest such as Flor del Campo and Colombiatón in an area depressed area on the outskirts of the city, which today exists, as a social conglomerate, with a population that has tripled in population and social problems (Figure 2).



Figure 2 Rainy season 2004.

San Francisco geological fault 2011

According to data provided by the Colombian Institute of Geology and Mining (INGEOMINAS), several earthquakes have been recorded with its operations center in the Caribbean Sea between 1998 and 2000 (Figure 3).



Figure 3 San Francisco geological fault 2011.

After the heavy rain season of 2010, Cartagena faced one of the most serious emergency situations ever recorded. The geological fault in the San Francisco neighborhood left 2,190 families homeless, but thanks to the continuous efforts of the District Administration and the community itself, there were no victims. After the rains of November 2010, hundreds of homes began to suffer cracks, and after the floods, according to studies, this community located in the foothills of La Popa hill had to be completely relocated. The National Government provided help for the relocation of more than 1,600 families, while the Mayor's Office of Cartagena continues working on the relocation process of more than 500 families that lost everything due to the failure (Gestion de riesgos y desastres, 2021).

After the tragedy, the victims faced a long struggle to receive aid and housing solutions from the State. Many were deleted from the initial lists of those affected, while other people who did not live there slipped into the lists. In 2016, a court ruling ordered the Colombian State to compensate the victims with 172,000 million pesos, but this decision was received with frustration by those affected, who felt that they had not been given a dignified solution to their situation. To date, the victims of the San Francisco geological fault continue to fight to receive the aid and housing solutions promised by the authorities.

Eruption of the mud volcano in the Bayunca district 2012

The Cartagena region and northern Bolívar the Colombian Geological Survey has identified 33 mud volcanoes in this area. The Bajo Grande volcano is located in a rural area of the town of Bayunca and is one of them. More than two hectares of crops were affected by the eruption of the volcano in 2012. Livestock farming in the region was also affected by this event. In 1996, Bajo Grande had already issued a warning to farmers after an eruption forced the relocation of at least 50 ranches that were in its area of influence. The locals take advantage of the volcano's mud for its healing properties, which is why it is still active and activates periodically, although not as strongly as in 2012 (Figure 4).



Figure 4 Eruption of the mud volcano in the Bayunca district 2012.

The eruption caused farmers and authorities in the area to become alarmed, since this natural phenomenon represents a danger to nearby homes and agricultural activities. According to the Colombian Geological Service, the eruptive activity was characterized by the expulsion of mud, gas and small stones. Despite the risks, no fatalities or significant property damage were reported during this particular eruption. Local authorities kept the population on alert and constantly monitored the mud volcano to prevent possible emergencies. To date, a phenomenon of this level has not been repeated in this area, however, the alert remains as the lower level volcanoes remain active, even with geological activity.

Tropical Storm IOTA 2020

In Cartagena, November 14, 2020, he woke up under an intense downpour. The rainfall was adjusted to the passage of the well-known Tropical Storm Iota is another cyclonic phenomenon of the most active hurricane season of all time. It rained in the city for almost 12 hours, according to IDEAM records, which normally should rain for eight months.

The result was catastrophic, collapses were recorded in the mountains of Albornoz, La Popa and the Nearly 60% of the city declared two temporary shelters that ultimately housed 567 people after the emergency situation (Gestion de riesgos y desastres, 2021).

The presidency of the Republic, ordered the deployment of the Public Force to facilitate care for the victims and requested financial aid to meet the needs of the victims. The storm also affected the local economy, as losses of between 50 and 100 hectares of crops were reported in the rural area of Cartagena. This tropical storm caused serious damage in Cartagena, affecting thousands of people and generating an emergency that required urgent relief and recovery measures (Figure 5).



Figure 5 Tropical Storm IOTA 2020.

Technological origin

Explosion at the fertilizer plant 1977

December 8 marked a difficult day for the industrial zone of Cartagena. An explosion occurred in a reactor that generated a cloud of ammonia that covered part of Mamonal and Pasacaballos, resulting in the death of 21 people and the injury of more than four dozen. A urea reactor newly installed on December 6, according to versions of the time, exploded around 9:30 p.m. on the day of the candles, an ammonia cloud that devastated areas near the fertilizer plant. A urea reactor had been installed at that location. On December 3, near a titanium reactor, and a test was conducted two days later. The 21 workers died instantly, and signs of asphyxiation reached the city's clinics. Some 37 individuals, many of whom reside in the Pasacaballos correctional facility, according to civil defense records from that time (Gestion de riesgos y desastres, 2021) (Figure 6).



Figure 6 Explosion at the fertilizer plant 1977.

The fertilizer plant explosion left a tragic mark on the history of Cartagena, reminding us of the importance of prioritizing safety and compliance in work environments to prevent tragedies like this. The explosion was caused because management decided to repair an old reactor instead of buying a new one, without following proper safety standards. There is no mention that the results of the investigations into the causes of the accident have been published or that specific measures have been established to prevent this type of tragedies in the future. Unfortunately, this has not been the only tragedy of this type in Cartagena, citing the collapse of a building in 2017 that left 10 workers dead, which reflects the lack of priority for the safety and lives of workers, at that time.

Last 20 years

Fire at Cartagena container terminal

The emergency in Cartagena after the strong fire in a container warehouse in 2024 where, due to a rapid response and coordination between the entities involved, fatalities and significant injuries were avoided. The fire occurred in one of the imported cargo warehouses, a port facility in Cartagena, on March 8, 2024. The organization's alarm system allowed immediate action, allowing people to evacuate

to a safe place. As a consequence of the fire, an uncontrolled outbreak in the warehouse area with imported cargo, including pallets, various materials and spare parts, which were consumed by the flames, is mentioned (WRadio, 2024) (Figure 7).



Figure 7 Fire at Cartagena container terminal.

Although the economic damages have not been calculated, work was done to evaluate the damage and guarantee efficient management of the situation, which was controlled, preventing the fire from spreading to urban areas surrounding the area of the incident.

Explosion of barges in shipyard companies in 2017

Two strong explosions shook the Mamonal industrial zone on May 17, 2017. Two thick columns of smoke could be observed from different places in the city, which came from two shipyard companies. Emergency services arrived quickly, but unfortunately the intensity of the explosion and the intense burns caused the death of 7 people and injured at least 15 more. The explosions occurred almost at the same time on two paint barges, but were separated by around 800 linear meters; the accumulation of gases is one of the hypotheses currently under debate about the origin of the explosion (Gestion de riesgos y desastres, 2021) (Figure 8).

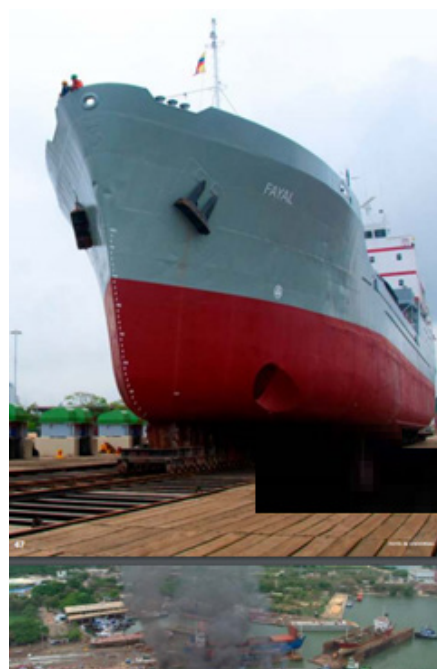


Figure 8 Explosion of barges in shipyard companies in 2017.

Initially there was speculation about the possibility of an attack, but the competent authority quickly ruled out this hypothesis due to lack of evidence. Other theories pointed to defects in pipes, gas accumulation or malfunctioning welding lines, but the company president stated that the available evidence was not clear enough to give a definitive answer. Two years later, in 2019, the cause of the explosions continued to be a matter of investigation. Despite the investigations carried out, it has not been possible to determine with certainty the specific causes that caused the explosions in the shipyards in 2017. The investigation remains open without a conclusive result so far.

Social origin

Attack on smart building 2002

Cartagena was also a victim of the terrorist violence that plagued Colombia during the 1990s and early 21st century. On April 19, 2002, two people lost their lives in the Chambacú Intelligent Building due to the explosion of an explosive device hidden in a pot that three men left minutes before. The detonation occurred at 5:30 pm, just when the building was evacuated after verifying that no office had requested said pots. Shortly after, another explosive device was identified in the Manga sector. This device detonated while three uniformed officers were trying to deactivate it, leaving one of them seriously injured. The uniformed man died hours later in a city clinic. This was the only large-scale terrorist attack with fatalities that Cartagena suffered. (Gestion de riesgos y desastres, 2021) (Figure 9).



Figure 9 Attack on smart building 2002.

As a result of this event, a suspect was detained for his alleged participation in this attack. But there is no evidence of a specific attack on the intelligent building in 2002; terrorist acts did occur in Cartagena that year, as confirmed by the Navy's report on the retention of an accused.

Millionaire robbery in Cartagena jewelry store 2023

The authorities captured the alleged members of a gang of thieves who tried to carry out a million-dollar robbery in a jewelry store in the Historic Center of Cartagena. The men posed as tourists to enter the premises and subsequently intimidate customers and sellers who were there to steal jewelry valued at \$1,000 million. The events occurred on April 16 and were captured on a security camera at the site. Four men and a woman arrived at the location in a high-end van that was parked in front of the jewelry store for about 10 minutes. Four subjects got out of the vehicle and entered the jewelry store, while the fifth made sure there were no police officers nearby before entering the store. Inside the place, the woman and one of her accomplices posed as a couple in order to subdue the security guard, then they intimidated the other customers and vendors who were there. At 12:03 pm at least ten motorcyclists positioned themselves in front of the jewelry store, waiting for the thieves to leave; The criminals came out with bags full of jewelry, got on the motorcycles and fled the scene (Figure 10).



Figure 10 Millionaire robbery in Cartagena jewelry store 2023.

“Once the headquarters reported the case, we immediately went to the scene in order to support the capture process of these citizens. Thanks to the timely collaboration of citizens and the new quadrant surveillance model, which carried out the closure of roads, the perpetrators of the criminal act were intercepted,” said one of the uniformed officers who participated in the operation.

According to the information provided by the Police, a criminal gang that operates from the city of Barranquilla could be behind the robbery. The five thieves who participated in the robbery were sent to jail. It is known that they have been deprived of their liberty in different years and some have been released on conditional release and others due to expiration of terms,” the Police concluded.⁷

Securities cart attacked in Cartagena: criminals took \$1.6 billion

A million-dollar robbery of more than \$1.6 billion was recorded in the morning in an exclusive area where a securities car was robbed. According to the authorities, the vehicle would have left the company with more than 3.8 billion pesos. The commander of the Cartagena Metropolitan Police said that this fact is being investigated because the theft from the securities cart is recorded at the time when officials are supplying money to several electronic ATMs in the sector in question (Figure 11).



Figure 11 Securities cart attacked in Cartagena: criminals took \$1.6 billion.

The theft, according to the officer, occurred at the time when they were in the parking lot of a chain store and two people armed with short weapons intimidated him and made off with the million-dollar loot. The criminals fled in a vehicle and investigations are being carried out to capture the subjects as soon as possible. “It is very strange how this criminal activity occurs,” said the officer, who also pointed out that they are working hand in hand with the management of the company that owns the securities car.⁸⁻¹¹

Conclusion

Historical hazard maps are valuable tools that not only help you better understand the past, but also provide a solid foundation for responding to future threats. By learning from past experiences, communities and governments can develop more effective strategies to save lives, protect resources, and reduce the impact of natural and human disasters.

Cartagena remains exposed to the threat of hurricanes, which can cause significant damage to the city's infrastructure and economic activities. According to reliable information, the people of Cartagena consider that hurricanes are the main natural risk for the city.

Developing an emergency plan is essential for any organization, as it provides a structured and detailed framework to deal with disaster or emergency situations. This plan not only involves the identification of possible threats, both internal and external, but also the assessment of the organization's vulnerability and the implementation of preventive and response measures. The plan must cover the three phases of an emergency: before, during and after. During the planning stage, the procedures to be followed should be clearly defined and specific responsibilities assigned to key personnel. Additionally, it is crucial to conduct drills or training and analysis of procedures to ensure their effectiveness and make adjustments as necessary.

Implementing an emergency plan not only helps protect employees and company facilities, but can also minimize material losses, environmental impacts, and disruption to business operations. Likewise, it fosters safety awareness among employees and promotes a quick and efficient response in the event of an emergency. The main threats facing Cartagena are the rise in sea level, floods and hurricanes, which represent serious threats to the infrastructure, economy and population of the city, about which little has been done, exposing the population and its infrastructure to the debacle of a disaster that is likely to materialize in the near future. Regarding the technological threat in Cartagena, there are several tragic events that have affected the recent history of Cartagena, including explosions in industrial plants, fires that have not been conveniently documented, structural collapses and fires in different buildings, with fatal results. Last but not least, the Cartagena population faces serious threats from illegal armed groups, common crime along with a very high perception of insecurity among its inhabitants, which due to lack of attention and guarantees from local authorities to effectively protect to their communities. To mitigate these risks, measures have been taken such as updating business technological risk plans and implementing preventive practices. In addition, a District Technical Advisory Commission on Technological Risks has been formed to establish

guidelines for emergency response that, in addition to increasing police force, seeks to improve the current panorama of insecurity in the population.

Acknowledgments

None.

Funding

None.

Conflicts of interest

The authors declared no potential conflicts of interest of this article.

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