

**Forum:** United Nations Development Programme

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## Introduction

As defined by the International Federation of Red Cross and Red Crescent Societies (IFRC), natural disasters can be defined as “naturally occurring physical phenomena caused either by rapid or slow onset events which can be geophysical, hydrological, climatological, meteorological, or biological.” Despite the fact that most types of natural disasters come in different scales, the majority tend to have serious repercussions. From a macro-perspective, repercussions can take the form of an economic slowdown. When seen from a micro-perspective, the lives of hundreds of individuals are put at risk, and in some scenarios, most of their belongings are completely lost. Similar to the risks posed towards private belongings, infrastructure like schools or public hospitals is also at risk of being destroyed. These nearly inevitable disasters can range between earthquakes, tsunamis, wildfires, volcanic eruptions, floods, hurricanes, extreme heat conditions and landslides.

An example of a large-scale natural disaster was the aggressive, 7.0 magnitude earthquake, that struck the already impoverished nation of Haiti near its capital, Port Au Prince. According to statistics provided by the Disasters Emergency Committee, 3.5 million individuals were affected by this earthquake, 220,000 died, and over 300,000 were injured. From a total of 293,383 houses, 105,000 were destroyed and another 188,383 were damaged. This example clearly demonstrates the significant levels of repercussion that natural disasters are capable of bringing to a community. Furthermore, it poses the importance of natural disaster preparedness as a measure of decreasing the consequences caused by natural disasters.

As posed by the previous earthquake example, natural disaster preparedness is essential for the potential saving of lives and assets of a community. Preparedness is not only intended for the important

job of saving lives, but also for the mitigation of long-term repercussions that may affect the country such as disease or economic slowdown. Non-prepared countries that experience a natural disaster can suffer from higher repair costs which can lead to a slower overall economic growth rate. Due to this, it is highly important to establish a well-built preparedness program in countries to both save lives and assets as well as reduce overall costs. Several countries have implemented different types of preparedness measures such as early-warning systems, educational programs, and further research.

A good example of a well-prepared country is Japan. This country is not only a role model for a strong preparedness program but is also a demonstration of the complexities that can show up within the success of an established program. According to Professor Andrew Moore, “Japan is arguably the most disaster-aware nation in the world”. Japan has spent time on the development of “mitigation strategies” for different types of natural hazard and their early-warning system is said to “outrun” earthquakes. The complexity of the whole preparedness process comes in along the questioning of why so much damage was inflicted in Japan after the 2011 earthquake and tsunami despite their well-established preparedness program. According to successful economist Warren Buffett, disasters like the one experienced by Japan in 2011, inflict greater economic damage than terrorism. Despite Japan’s strong levels of preparedness, it was estimated by The World Bank that the costs of the disaster sum up to around \$235 billion along with 28,000 deaths and 500,000 displacements. Other countries like Chile, where earthquakes occur often, have invested in education programs and warning systems to give citizens the time and knowledge of how to act in the case of an earthquake.

Among the different strategies that can be used by countries to prepare for natural disasters are the implementation of education programs, smart infrastructure, and effective alert systems. However, the process of preparing countries and communities for natural catastrophes does have certain roadblocks that require attention. One of the major obstacles for the prevention of natural disaster repercussions is the concept known as climate change. Even though climate change does not hold responsibility for the escalating costs of natural disaster aftermaths, they are progressively becoming a more significant factor for the creation of these disasters. According to the Intergovernmental Panel on Climate change, an increase in greenhouse gases in the atmosphere will be rising temperature over land. An increase in temperature increases the risk of natural disasters such as drought and intense storms.

Secondly, the process of delivering and executing education is another one of the main roadblocks preventing the preparedness for natural disasters. It is essential for exposed countries or communities to know what to do and where to go in the case of a natural disaster. For example, the United Nations

Educational, Scientific, and Cultural Organization has carried out a program in Chile, a country with high earthquake activity, that aims to increase the levels of Natural Disaster Education in schools as a means of making citizens more prepared and aware in the case of a Natural Disaster. Things that can get in the way of education establishment depends on the area affected. Some of the problems can include low levels of volunteering, facilities, and funding. The multiple efforts having to be carried out in communities after a natural disaster require heavy funding, but have proven difficult to attain. Funding and volunteering will always be necessary for the alleviation of post-natural disaster consequences. In terms of funding, there are several organizations like the Disaster Relief Fund that aim to fund needed resources and processes required for the alleviation of a Natural Disaster aftermath. There are organizations like the American Red Cross that have the intention of quickly acting upon disasters with the hope of saving as many lives as possible. This organization also demonstrates a significant level of volunteering, as 95% of its faculty are volunteers. Nevertheless, there have not been enough volunteers or funding to reach the ideal amounts of preventative natural disaster preparation.

## Definition of Key Terms

### Natural Disaster

As defined by the International Federation of Red Cross and Red Crescent Societies (IFRC), a natural disaster can be defined as a “naturally occurring physical phenomena caused either by rapid or slow onset events which can be geophysical, hydrological, climatological, meteorological, or biological.”

### Climate Change

As described by NASA, climate change is both “a change in usual weather found in a place” as well as “a change in Earth’s climate”, which includes temperature and rain and snowfall locations. This concept is significant to the issue of natural disasters because of its connection to the increasing costs of natural disasters.

### Green-House Gases

According to the United States Environmental Protection Agency, Greenhouse gases are gases that trap heat in the atmosphere. These are majorly composed of Carbon Dioxide but do include three other gases. Most scientists agree that the excessive release of these gases is one of the major causes of climate change.

## **Geophysical Disaster**

The International Disaster Database defines this type of disaster as “a hazard that originates from solid earth”. These include earthquakes, mass movement, and volcanic activity. Safety protocols for earthquakes in specific include staying away from windows and covering oneself with tables or if outside, moving away to open areas.

## **Meteorological Disaster**

A hazard caused by extreme weather and atmospheric conditions. These include extreme temperature, fog, and strong storms. Preventive measures for these types of disasters include climate change regulation.

## **Hydrological Disaster**

The International Disaster Database defines this type of disasters as “A hazard caused by the occurrence, movement, and distribution of surface and subsurface freshwater and saltwater.” Hydrological Disasters include floods and landslides. Apart from other disaster-specific preventive measures, overall, the regulation of climate change is one of the most important preventive measures for this type of disasters.

## **Climatological Disasters**

A hazard caused by atmospheric processes coming from climate variability. These include droughts, wildfires, and glacial lake outbursts. Apart from other disaster-specific preventive measures, overall, the regulation of climate change is one of the most important preventive measures for this type of disasters.

## **General Overview**

As previously described, there are multiple important tasks to fulfill in order to act as rapidly as possible during and in the aftermath of a natural disaster. In terms of natural disaster preparedness, there are multiple measures that have to be taken for countries to mitigate the impact from a natural phenomenon. In past years, there have been several natural disasters of all scales and it is important to know more about what some of these can cause within a country or community. The following examples show how the absence of preparation prior to a natural disaster can affect a country or community and also serve as something from which other countries can learn from.

## **Indian Ocean Earthquake and Tsunami**

On December 26, 2004, a 9.1-magnitude earthquake struck off the coast of Sumatra. A very high amount of energy produced by this powerful earthquake violently moved Earth's tectonic plates, which later caused the formation of a tsunami that led to catastrophic results.

These negative results mostly come from the slow communication from one location to the other. Countries' governments along the Indian Ocean were warned by the Pacific Tsunami Warning System that a tsunami would be hitting the coast effectively, but the government failed to warn the whole country in time. The success of this task varies along country and is dependent upon the country's preparedness regarding natural disaster warnings and communication. Despite the fact that the warning reached the government, the message was not rapidly spread around communities, which increased the death count by a significant amount seeing as citizens did not have time to prepare. Brian Carlson, an IT director at World Vision reports how, in his trip to the affected areas of the tsunami, he had seen a village full of survivors and another one full of deaths. Carlson explains how the survivor village simply survived due to a quick phone call of an individual who knew someone in Singapore and had seen the news on TV. This village managed to survive because of an early warning, but the other village didn't due to a lack of communication. This example in Sumatra clearly poses the importance of an early-warning system in a country.

The unwarned tsunami, which traveled about 3,000 miles, caused between 225,000 and 275,000 fatalities and about 1.7 million people were left homeless. Economically, Indonesia and Sri Lanka combined suffered a loss of 1 million jobs, however, Indonesia's GDP growth seemed barely affected in this case. On the more positive side, Sumatra, one of the more heavily affected countries whose infrastructure was ravaged, has been able to resiliently recover from this occasion. An Indian Ocean Tsunami Warning and Mitigation System has been established since the terrible experience that thousands of people went through with the tsunami. However, scientists and UN Officials still consider this system to have certain weaknesses regarding the communication of warnings at a local level. This whole scenario is a good example of the challenges that certain countries face in the process of preparing for the arrival of a large scale natural disaster and the importance of it.

### **1998 Hurricane Mitch**

A strong hurricane identified as Hurricane Mitch struck the Central American countries of Honduras and Nicaragua in October 1998. Due to a combination of unpreparedness and low levels of development, heavy damage and high costs were inflicted in both countries.

Honduras and Nicaragua faced this natural disaster in an unprepared manner, similar to Indonesia. Both countries began emergency action procedures only two days before the hurricane hit. Despite the warnings issued by the government, which might have minimized the overall death toll, the infrastructure of these two countries were not prepared for this kind of stress. Both countries received significant international help both in the form of financing and volunteering for the recuperation of the damage done to both citizens and infrastructure.

Regarding individual citizens and their knowledge of how to act, it can be stated that citizens were not mentally prepared for the scenario. Some people in Honduras, after having received the warning from the government and request for them to leave their houses, did not want to leave them as they were scared of losing their belongings. As previously mentioned, the overall unpreparedness of both countries led to significantly negative results.

The death toll caused by this hurricane reached a count of 11,000. Taking into consideration that these two countries are ones that are not well developed, the levels of infrastructural damage were devastating. Honduras experienced heavy damage from the hurricane, especially in the areas of homes and transportation. An estimated 70 to 80 percent of the country's infrastructure was destroyed. The country also experienced an estimated \$900 million loss in crops or agricultural production. Honduras' GDP growth rates also lowered from 5.1 percent to 2.7 percent. Nicaragua went through a similar scenario with several villages buried in mud and a reported \$1 billion in damages. Half a million homes were damaged and 750,000 people were lost their homes or possessions. GDP growth forecasts at the time for the year 1999 lowered from 5.7 per cent to 5.1 percent after Hurricane Mitch struck the country. Overall, this hurricane left about 2.5 million people homeless, which is a devastating amount. This is a good example of the high levels of vulnerability that unprepared countries are under. In the long term, this terrible occasion is a developmental drawback for both countries seeing as most of their daily processes and advances are interrupted.

### **1984 Drought in Ethiopia**

Starting in 1981, Ethiopia suffered a severe drought. This natural phenomenon affected millions of lives and caused a high number of deaths. It eliminated a significant amount of crops belonging to the Ethiopian communities.

Regarding the overall preparedness of the country for a drought, the country was not prepared. Being a country with multiple poor communities, its vulnerability towards the natural phenomenon was of

an increased amount. The Ethiopian government itself used inadequate decision making to control the known levels of risk that the country had. Unfortunately and despite previous notification, Western countries took a long time to aid in the occurrences caused by the natural phenomenon.

All these factors caused Ethiopia's famine, which then resulted in more than a million deaths. It is important to draw attention to the fact that the main cause of this high fatality count was the presence of a draught. Not only does this event cause short term effects like high fatality rates, but it also decreases the economic state of Ethiopians in the long term. People, having to deal with low amounts of rain, struggle to find alternatives to the absence of crop-growing and harvesting, which starts sending their economic state in a downwards direction. This event greatly poses the importance of natural disaster preparedness by demonstrating what can happen when a country is unprepared. It also makes emphasis on the influence of not only government funding, but also international aid for the alleviation of the effects coming from the drought.

### **The Great Chilean Earthquake**

On May 22, 1960, a 9.5-magnitude earthquake hit the Southern part of Chile near a city called Valdivia. This earthquake, being the world's strongest earthquake, left a significant amount of damage in the cities of Chile. However, deaths and overall damage were both minimized by Chile's high level of preparedness for Earthquakes.

Chile is a country with a frequent presence of earthquakes, which has made them very familiarized and prepared with multiple logistics of preparing for earthquakes. Unlike the previous examples, the country was able to minimize the levels of repercussion left by the earthquake by making sure citizens know what to do and by investing in smart and strong infrastructure. This earthquake, without Chile's preparation, could have been closely similar in repercussions to the one of Haiti. The Chilean government has established very strict building regulations for buildings to withstand the force of earthquakes. Furthermore, every workplace and school in Chile are subjected to an emergency procedure drill about three times a year. Citizens also know which parts of the house are the stronger ones capable of withstanding earthquakes, which are the ones they refuge in.

As a result of good preparedness, the fatalities caused by this earthquake were minimized to 1,600 and only 3,000 reported injuries in the whole country. Even though this is a significant amount, it could have been easily been worse had the country not been prepared. Furthermore, despite a significant amount of debris left by the earthquake, there were other buildings that had the infrastructural potential to

withstand the forces of the earthquake. Once again, this difference in the amount of debris due to Chile's preparation is what stopped this disaster from being a rival to Haiti's earthquake and its deadly repercussions.

## **Major Parties Involved and Their Views**

### **United States of America**

The United States is a well-prepared country for Natural Disasters and this is due to the seriousness they take towards preparing for these. There are agencies such as the Federal Emergency Management Agency (FEMA) and the American Red Cross that aim to fund and deliver aid to locations where a Natural Disaster has struck. Back in March, when the state of California experienced a high-risk drought, the United States considered it as a national security issue. Regarding climate, the military also considers climate change a national security issue.

### **Chile**

Chile is a country with high activity of earthquakes. The country being aware of the risk that earthquakes impose, have elaborate preparedness programs to reduce the levels of vulnerability that earthquakes pose on Chile. For example, Chile's Disaster Relief Agency perform several mock evacuations of entire regions to model what citizens should do in the case of real Natural Disaster. One of the most recent and strongest earthquakes that Chile has experienced is the one that happened back in 2010; an 8.8 magnitude earthquake.

### **Japan**

In terms of natural disasters, Japan is famous for the 9-magnitude earthquake that hit their land on March 11, 2011, and triggered a forceful tsunami that ravaged a significant portion of Japan's land. Due to this terrible experience, Japan has installed an upgraded tsunami warning system. Japan has also established school drills for children to be prepared in the case of an earthquake. Most of these establishments for the preparedness of large-scale natural disasters resulted from what the Japanese learned from the Kobe earthquake in 1995.

### **Haiti**

Haiti is a country that is highly vulnerable to natural disasters due to the levels of poverty found in



the country. This is a country in need of a heavy increment in disaster preparedness to lower the risk that natural disasters pose to its communities. One of the most recognized natural disasters in Haiti was the 7.0 magnitude earthquake that affected 3.5 million individuals and ravaged a significant portion of Port Au Prince's infrastructure.

## NASA

The National Aeronautics and Space Administration is involved in the Natural Disaster preparedness mostly in the research sector. NASA states that they “can support organizations with the information they need to successfully improve efforts” in the areas of vulnerability assessments, early warning systems, and access to data used to inform disaster response.

## American Red Cross

This is an American organization that, as one of its focuses, aims to aid disaster relief. The organization focuses its attention on Natural Disasters that occur within the United States. However, they also have parts of their program that aim for international aid. They respond to Natural Disasters outside the United States by providing financial aid, relief supplies, and trained emergency personnel.

## Timeline of Events

This is a timeline of some of the most destructive or impacting natural disasters. However, it is important to know that apart from these disasters, there are multiple others that are not included in this timeline but have also affected the lives of people.

Date	Description of event
1959-1961	The Chinese Famine (inadequate political policies led to lack of food, which caused an estimated 20-40 million deaths)
1965-1967	Drought in India (1.5 million deaths from starvation and disease)
November 13, 1970	Bhola Cyclone in the Ganges Delta (underestimation led to lack of preparedness, which caused an estimated 500,000 deaths in Bangladesh)
July 28, 1976	7.8-magnitude Earthquake hits Tangshan in northeast China (low levels of

preparedness caused 242,000 deaths)

1984-1985	Famine in Ethiopia (lack of global attention and preparation caused more than 1 million deaths)
November 13, 1985	Nevado del Ruiz Volcano Eruption near Armero, Colombia (25,000 deaths)
December 26, 2004	9.0-magnitude earthquake hits off Sumatra's coast triggering a Tsunami (lack of communication caused between an estimated 225,000 and 275,000 fatalities.
October 8, 2005	Earthquake strikes Kashmir, Pakistan (very low levels of preparation caused 80,000 deaths and 3.5 million left homeless)
May 3, 2008	Cyclone Nargis caused 6-meter high waves that struck Burma (lack of communication caused 100,000 deaths)
May 12, 2008	7.9-magnitude earthquake struck Sichuan, China (unprepared and weak infrastructure caused more than 70,000 deaths)
January 12, 2010	7.0-magnitude earthquake struck Haiti (low levels of preparedness caused more than 230,000 deaths)
March 11, 2011	9.1-magnitude earthquake forms a Tsunami that struck Japan (significant levels of experience and preparedness limited the death count to about 20,000 deaths)
October 23, 2012	Hurricane Sandy hits the U.S inflicting \$62 billion dollars in damage.
October 12, 2013	Typhoon Phailin struck India and affected the lives of 13 million people (despite the amount of people affected, India's experience and preparation diminished the amount of deaths)
May 2015	Indian Heat Wave (330 million people affected)

Late 2015	El Niño climate changes affect more than 60 million people around 40 countries.
October 4, 2016	Haiti is heavily affected by Hurricane Matthew (preparation limited death count to 1,000 deaths)

## UN involvement, Relevant Resolutions, Treaties and Events

The UN is involved in both the preventive and recovery sections of natural disasters. In terms of prevention, the UN has a strong stance towards dealing with climate change. Their involvement in this sector includes the establishment of educational programs and the integration of climate change measures into national policies. Regarding climate change, several countries have also signed the Paris Agreement on December 12, 2015, at the COP21 conference. In this agreement, countries have agreed to limit global temperature rise to well under 2 degrees Celsius. In terms of taking action towards the resilient recovery of a community after a natural disaster, the UNDP does take action in multiple scenarios and to do this, they follow a 10 step protocol that includes the following: assessing and analyzing the situation, planning and mobilizing resources, providing experts to aid governments with recovery knowledge, acting for early recovery, establishing early, mid, and long-term recovery programs, helping coordinate and manage information, strengthening disaster risk reduction systems, inciting community participation within recovery programs, monitoring and evaluating results, and facilitating the transfer of knowledge and results to other countries. A specific example of UNDP's involvement in natural disaster recovery is their actions towards El Niño climate change patterns that have affected millions of people in different countries. The UNDP has been responding to El Niño with a long-term resilient developmental approach by utilizing the recovery phase of the natural disaster to establish long-term improvements within communities. The following is a list of several UNDP's forms of involvement and resolutions regarding natural disasters.

- Resolution 63/217 (A/RES/63/217): This resolution recognizes the levels of risk imposed by rising temperatures due to climate change that further incite the formation of natural hazards. It encourages the international community, individual governments, and organizations to develop preparedness strategies and perform risk assessments to mitigate the repercussions that natural disasters can instill in a society.
- The Hyogo Framework For Action: This plan for action came up in the World Conference

on Disaster Reduction held in Kobe, Hyogo, Japan and its goal and purpose was to mitigate disaster losses by 2015 by building upon the resilience of nations and communities. This plan recognizes the risks and challenges posed by natural disasters and develops different forms of strategies as a measure of achieving their goals.

- The Paris Agreement (FCCC/CP/2015/L.9): This agreement between multiple countries has several aims for the long term. One of them is to limit the rise of global temperature to 2 degrees Celsius and if possible to 1.5 degrees Celsius. It also aims to limit the levels of greenhouse gas emissions to an amount that nature can absorb naturally. It also looks at the possibility of wealthy countries providing financial aid to poorer countries for their transition towards renewable energy. Finally, it states that every country's contribution will be reviewed every five years.
- Sendai Framework (A/RES/69/283): This is a plan of action that follows the end of the Hyogo Framework and starts in 2015 with an end date of 2030. The main goal of this plan is to reduce levels of disaster risk and the repercussions that come with it like death, destruction, and long term economic impacts. The plan aims to do this by understanding disaster risk and developing better risk management strategies, investing in disaster risk reduction and future resilience, and further developing disaster preparedness for more effective responses.

## Evaluation of Previous Attempts to Resolve the Issue

As previously explained, the United Nations have demonstrated deep involvement in the process of limiting temperature rise due to climate change and in the resilient recovery processes involved in the aftermath of a natural disaster. However, the overall issue remains unsolved and studies show increasing amounts of vulnerability from natural disasters in the future that not only have to do with increasing levels of climate change but also with population growth and the inadequate establishment of communities. Estimates show that about 75 percent of the population will be living along coastlines in the next three decades, which exposes a significant amount of people to certain types of natural disasters like typhoons, floods, and tsunamis.

Regarding the recovery of natural disasters, the UNDP, along its years of experience, has come up with observations about reasons as to why recovery programs might fail. Some of these reasons include the absence of an assessment prior to the establishment of the recovery program, not taking into account vulnerabilities, and the favoring of rebuilding infrastructure over social recovery needs. Adequate funding

is also of significant importance for recovery programs. When countries do not receive the needed amounts of funding, suffering will proceed for a longer time after the incident.

## Possible Solutions

In terms of possible solutions for the decrease of the levels of consequences that natural disasters bring with them, there are three paths that can be taken. One of the paths is the adequate building of infrastructure that is strong enough for different scenarios of natural disasters. The intention of this solution would be to decrease the amounts of infrastructural debris left after a natural disaster. An educational stance can also be taken towards this issue. This would consist of the implementation of educational programs either as external ones or integrated into schools. The intention of the use of education would be to make sure that individuals know what to do in the case of a natural disaster. Educational programs could also include practice drills as a measure of having people better prepared for the actual occasion. For example, in the case of a tsunami, people should know that as soon as they hear the warning, they should rapidly move to higher ground. Another important solution that can be used to tackle this issue is to ensure the implementation of anticipated alert systems with the intention of given citizens enough time to prepare for the natural disaster.

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## Appendix

- I. Detailed analysis and plan of action by the UNDP towards the natural disaster known as El Niño  
[http://www.undp.org/content/undp/en/home/librarypage/climate-and-disaster-resilience-/undp\\_s-r\\_esponse-to-el-nino-and-la-nina--from-recurring-crisis-to.html](http://www.undp.org/content/undp/en/home/librarypage/climate-and-disaster-resilience-/undp_s-r_esponse-to-el-nino-and-la-nina--from-recurring-crisis-to.html)
- II. Short and informative summary of the challenges and lessons learned from natural disasters and preparedness.  
[http://www.undp.org/content/undp/en/home/librarypage/climate-and-disaster-resilience-/disaster-r\\_ecovery--challenges-and-lessons.html](http://www.undp.org/content/undp/en/home/librarypage/climate-and-disaster-resilience-/disaster-r_ecovery--challenges-and-lessons.html)
- III. A list of 10 things that the UNDP does in the recovery process of a natural disaster.  
[http://www.undp.org/content/undp/en/home/librarypage/climate-and-disaster-resilience-/10-things\\_-undp-does-in-recovery.html](http://www.undp.org/content/undp/en/home/librarypage/climate-and-disaster-resilience-/10-things_-undp-does-in-recovery.html)
- IV. Information about the role of climate change on natural disasters.  
[https://earthobservatory.nasa.gov/Features/RisingCost/rising\\_cost5.php](https://earthobservatory.nasa.gov/Features/RisingCost/rising_cost5.php)
- V. General classification of natural disasters.  
<http://www.emdat.be/classification#Climatological>
- VI. American Red Cross Page  
<http://www.redcross.org/>
- VII. Information on Climate Action in general and the Paris Agreement  
<http://www.un.org/sustainabledevelopment/climate-change-2/>