

**Forum: EC**  
**Issue: Promoting short and long-term measures against earthquakes**



**Forum:** Environmental Committee

**Issue:** Promoting short and long-term measures against earthquakes

**Name:** Karolina Stec

**Position:** President

## **Introduction:**

Encyclopedia Britannica defines an earthquake as “any sudden shaking of the ground caused by the passage of seismic waves through Earth’s rocks.” (Bolt). These seismic waves can be both natural as well as human induced, with many underlying causes as to their origin, and a variety of impacts (usually negative) that they cause (Gibbens); said impacts can be both direct and indirect, depending on the nature of the earthquake and the geographic/geological location. This can be seen in examples of natural earthquakes (the focus of this research report), as they can further prompt the occurrence of other natural disasters, such as tsunamis, avalanches, landslides, etc. Such event can have detrimental effects on both the physical aspects of our environment, and further society as a whole, as such disaster’s effects are evident in the economy, ecosystems, and psychological state of the population. This is why many nations establish emergency programs and trainings for those most vulnerable to the effects of earthquakes, as well as being the reason many non-governmental or non-profit organizations get involved in such issues. These include organizations such as the “World Health Organization”, or the “United Nations” themselves. It is important to note that although in many cases such natural disaster is simply unpredictable due to its nature, there are many ways to be explored of how we can prepare and protect ourselves from their extensive effects.

## Definition of Key terms:

**Seismology:** The scientific study of earthquakes, in regard to their causes and effects (Bolt).

**Tectonic plates:** The outer surface of the Earth, split into pieces, or plates.

**Tectonic earthquakes:** Produced through the abrupt releases in energy stored within the Earth's crust, in many cases during collisions or movement of tectonic plates (Bolt).

**Fault zones:** "Fracture or zone of fractures between two blocks of rock." (USGS).

**Intraplate earthquakes:** Earthquakes that occur not due to tectonic plate movement but inter-crust pressure, not in close proximity of a plate boundary.

**Mercalli scale:** Scale used to measure the intensity of an earthquake, with the range of 1-12 (Bolt).

**Richter scale:** Scale used to measure the magnitude of an earthquake by the use of the data generated by seismographs, with the range of 1-8 (and above) (Bolt).

## Background:

The closest layer of Earth's crust to the surface is called the lithosphere; it is the lithosphere that is split into tectonic plates. There is approximately 7 major tectonic plates, however ones of lesser size exist as well. Earthquakes occur due to any sort of movement such as shift or friction in the fault zones of two (or possibly more) tectonic plate boundaries (National Geographic). The most common - and one of the most threatening in terms of earthquake's - zone is known as the "Pacific Ring of Fire", which is the boundary running all across the border of the Pacific Ocean. Although earthquakes are considered a major *natural* disaster, not all of the seismic activity is

nature generated; there are circumstances in which earthquakes can be human induced, with the industrial economy heavily responsible for its cause.

Many technological advancements have been developed in order to better protect the society from earthquakes, however it is not yet entirely possible to predict such event. Per year, there are nearly 500,000 earthquakes identified/observed, of those at least one with a measured magnitude of 8 (National Geographic). Estimations can be made on the probability of earthquake's occurrence, however no direct predictions can be stated, being the reason why this natural hazard is so threatening, and moreover deadly. This further reflects on the statistics; approximately 50,000 people die due to earthquakes per year (National Geographic). Although satellites, tiltmeters and creepmeters have been used to study earthquakes, science is utilized more in the direction of developing safer infrastructure and architecture, rather than ways of prevention (National Geographic).

### **Major parties involved:**

**Japan:** Japan is one of the nations at the top of the list of earthquake threats. Due to such circumstances, the Japanese developed technology to observe and identify any seismic activity, especially of a threatening magnitude (WorldAtlas), as well as more technological advancements in aspects such as infrastructure, transport, or media. They pioneer in both preventative and protective measures and educate from the youngest ages. An example of such measure would be the "Water Discharge Tunnel", which is an underground water storage with a connection to the Edo River that collects the water

during natural disasters like tsunamis, which protects the general population from flooding and other water induced damages (Dayman).

**Indonesia:** Indonesia is a country heavily affected by seismic activity and the consequences it bears and is a state that is further vulnerable to other natural disasters such as tsunamis. This impacts not only the lives and environments of the Indonesian population but had effects on factors such as tourism. This is what prompted establishment of projects such as the Australian database of “Inasafe” or the US “Inaware”, which specific targets the preparations for natural disasters for Indonesia (Lassa). Although there is legislation regarding the proper building of structures exist, the government and population do not act in full accordance to it, which further worsen the issue (Lassa).

**Iran:** Iran is a country located at tectonic plate boundaries and fault zones, which puts it at direct threat of earthquakes (WorldAtlas). The specific threat for Iran comes from its location in the area of the Alpine-Himalayan mountains belt, which is prone to dangerous seismic activity (Ibrion). Iran is a state that previously held an “Earthquake Preparedness Exercise” event, organized and supported by the United Nations, in order to inform and find solutions on this issue (United Nations in I.R. Iran).

**USA:** The United States is a country with fault lines which run all throughout and cause many earthquakes annually (WorldAtlas). The most known US fault zone is the “San Andreas Fault” (WorldAtlas). Due to frequent earthquake occurrence, and the

consequently following natural disasters of landslides, mudslides, etc., USA establishes government led programs such as “The USGS Earthquake Hazards Program” (Earthquake Hazards Program).

**“Ring of Fire” inhabitants:** As mentioned previously, the “Pacific Ring of Fire” is an area that is especially prone to earthquakes and volcanic activity, and its catastrophic consequences. It is the land that borders the Pacific Ocean, in a horseshoe pattern of line. Nations that are located on the “Ring of Fire” include ones such as Japan, Indonesia, Philippines, and Peru.

**Other stakeholders:** The following link shows further locations where earthquakes occur, and any correlated data on their magnitude, impact, etc.:

<https://www.nationalgeographic.org/forces-nature/earth-locations.html>

### **Relevant UN treaties, resolutions, and reports:**

**World Health Organization:** Resolution on the topic of “Strengthening national health emergency and disaster management capacities and resilience of health systems” (Executive Board).

**United Nations:** General Assembly Resolution (57/150, 2002) on the topic of “Strengthening the effectiveness and coordination of international urban search and rescue assistance” (“UNITED NATIONS GENERAL ASSEMBLY RESOLUTION – INSARAG.”).

## Previous attempts to solve the issue:

**International Search and Rescue Advisory Group (INSARAG):** Created as a group working under the United Nations, and in collaboration with the “Urban Search and Rescue (USAR)” in order to allow organizations such as USAR to communicate and work more efficiently in areas of disasters (“BACKGROUND – INSARAG.”).

**Risk Information Exchange (RIX):** An international database which lists and sorts risk based on multiple factors, in order to assess their gravity (“Risk Information Exchange.”).

**Global Crisis Databank:** Database of prior disasters, in order to assess future risks and implement preventative measures or offer any form of physical or psychological preparation for areas of threat exposure (“Global Risk Analysis and Reporting.”).  
Partnership between the UNDRR and other international organizations.

**WHO Health Emergencies Program:** Which the World Health Organization established regarding those at risk or in risk areas, and in position of threatening health conditions. The World Health Organization works in collaboration with its many partners, works on both causes and effects of earthquakes worldwide, with solutions such as: “strengthening health emergency risk management systems” as well as the medical institutions of first response after disasters (hospitals), developing inhabited environments in order to improve safety of buildings and infrastructure, providing training of medical and emergency procedures to medical staff, as well as local residents, etc. (World Health Organization).

**United Nations Office for Disaster Risk Reduction:** Its mission is trying to reorganize from “managing disasters to managing risk”, and introducing preventative measures to possible damages, or simply results of natural disasters (UNDRR).

### **Possible Solutions:**

Possible solutions to this issue should focus on both the causes and effects of this specific natural disaster. Such solutions should include investing in prevention measures, like seismic detection technology or developments of stabler and more earthquake resistant infrastructure/architecture. Furthermore, it is crucial for all member states or stakeholders to establish national emergency procedures, mirroring those of for example Japanese systems of preparation for possible earthquakes, or Peruvian drills. Those procedures could entail medical trainings, national notifications, or any procedures relating to evacuation, which would benefit all of the different stakeholder groups. Funding of such projects is also essential, especially on international level.



## Bibliography:

- “BACKGROUND – INSARAG.” *INSARAG Preparedness Response | 30 Years*,  
www.insarag.org/about/background/. Accessed 14 Apr. 2023.
- Bolt, Bruce A. “Earthquake | Definition, Causes, Effects, & Facts.” *Encyclopædia Britannica*, 28 Dec. 2018, www.britannica.com/science/earthquake-geology.  
Accessed 14 Apr. 2023.
- Dayman, Lucy. “8 Ways Japan Prepares for Earthquakes.” *Culture Trip*, The Culture Trip, 10 Jan. 2018, theculturetrip.com/asia/japan/articles/8-ways-japan-prepares-for-earthquakes/. Accessed 9 Apr. 2023.
- Earthquake Hazards Program. “What We Do - Earthquake Hazards Program | U.S. Geological Survey.” *Www.usgs.gov*, www.usgs.gov/programs/earthquake-hazards/what-we-do-earthquake-hazards-program. Accessed 14 Apr. 2023.
- Executive Board. *Strengthening National Health Emergency and Disaster Management Capacities and Resilience of Health Systems*. 2011.
- Gibbens, Sarah. “How Humans Are Causing Deadly Earthquakes.” *Science*, 2 Oct. 2017, [www.nationalgeographic.com/science/article/human-induced-earthquakes-fracking-mining-video-spd](http://www.nationalgeographic.com/science/article/human-induced-earthquakes-fracking-mining-video-spd).
- “Global Risk Analysis and Reporting.” *Www.undrr.org*, www.undrr.org/building-risk-knowledge/global-risk-analysis-and-reporting#collapse-accordion-26129-7.  
Accessed 7 Apr. 2023.
- Ibrion, Michaela, and Nicola Paltrinieri. *The Earthquake Disaster Risk in Japan and Iran and the Necessity of Dynamic Learning from Large Earthquake Disasters over*

*Time*. *Www.intechopen.com*, IntechOpen, 31 Oct. 2018,  
*www.intechopen.com/chapters/60778*. Accessed 14 Apr. 2023.

Lassa, Jonatan. "How Can Indonesia Address Its Vulnerability to Earthquakes?"  
*Charles Darwin University*, *www.cdu.edu.au/launchpad/research-impact/how-can-indonesia-address-its-vulnerability-earthquakes*. Accessed 9 Apr. 2023.

National Geographic. "Forces of Nature." *Www.nationalgeographic.org*,  
*www.nationalgeographic.org/forces-nature/earthquakes.html*. Accessed 9 Apr.  
2023.

"Risk Information Exchange." *Rix.undrr.org*, *rix.undrr.org/*. Accessed 7 Apr. 2023.

UNDRR. "Our Work." *Www.undrr.org*, *www.undrr.org/about-undrr/our-work*.

USGS. "What Is a Fault and What Are the Different Types? | U.S. Geological Survey."  
*Www.usgs.gov*, [www.usgs.gov/faqs/what-fault-and-what-are-different-types](http://www.usgs.gov/faqs/what-fault-and-what-are-different-types).

"UN Iran Holds an Earthquake Preparedness Exercise to Support National Efforts |  
United Nations in I.R. Iran." *Iran.un.org*, 20 June 2022, *iran.un.org/en/188317-un-iran-holds-earthquake-preparedness-exercise-support-national-efforts*. Accessed  
14 Apr. 2023.

"UNITED NATIONS GENERAL ASSEMBLY RESOLUTION – INSARAG." *INSARAG  
Preparedness Response | 30 Years*, *www.insarag.org/about/ga-resolution/*.  
Accessed 14 Apr. 2023.

WorldAtlas. "The World's 10 Most Earthquake Prone Countries." *WorldAtlas*, 11 Apr.  
2019, [www.worldatlas.com/articles/the-world-s-10-most-earthquake-prone-countries.html](http://www.worldatlas.com/articles/the-world-s-10-most-earthquake-prone-countries.html).

World Health Organization. "Health Emergencies." *Www.who.int*, [www.who.int/our-work/health-emergencies](http://www.who.int/our-work/health-emergencies).

Xie, Echo, and Zhao Ziwen. "What Living on the Fault Line Means for China's Sichuan Province." *South China Morning Post*, 7 Sept. 2022, [www.scmp.com/news/china/science/article/3191580/heres-what-you-need-know-about-deadly-earthquakes-chinas-sichuan](http://www.scmp.com/news/china/science/article/3191580/heres-what-you-need-know-about-deadly-earthquakes-chinas-sichuan). Accessed 14 Apr. 2023.