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Why do people choose to live in disaster areas?

By: Luisa Massarani

On 16 April, a powerful earthquake struck Japan and then, later that same day, a separate devastating earthquake hit Ecuador. In Ecuador, the death toll currently exceeds 650, with as-yet incalculable damage to buildings and infrastructure.

While such major quakes are thankfully rare, earthquakes on the whole are common. Last year alone, 801 quakes were registered in Japan and more than 50,000 worldwide.

This photo essay looks at the lives of people who choose to settle in areas vulnerable to earthquakes, volcanoes, hurricanes and tsunamis, and meets some of the scientists who monitor and study the risks in these areas.

Too few quake-proof buildings

Studies show that indigenous people who lived in what is now called Mexico before the Spaniards' arrival already talked about earthquakes.



Morelia Cathedral in Mexico. Credit: Ana Claudia Nepote

Morelia, in modern-day Mexico, is a city of one million people in the Trans-Mexican Volcanic Belt, where geological faults cause regular earthquakes.



Morelia Cathedral is famous for its pink stone. Credit: Ana Claudia Nepote

Every day, 72-year-old Anita Ordoñez is reminded of the geological instability of where she lives. Her house is increasingly lopsided and has a prominent crack in her living room wall.



Anita Ordoñez is well aware of Morelia's seismic activity. Credit: Ana Claudia Nepote

“Researchers from the university came to see what was going on and promised to come back to help, but never did,” she tells *SciDev.Net*.



A wall in Morelia bears the marks of previous shakes. Credit: Ana Claudia Nepote

“Although there are experts on earthquake engineering in Morelia, a very high percentage of housing is not built with the seismic history of the place in mind,” says Víctor Hugo Garduño Monroy, a geologist at the Michoacana University of San Nicolás de Hidalgo, in Morelia.

“It is true that engineering has made great progress in the construction of big and small earthquake-proof buildings, but it is also true that we still don’t build [enough] structures that respond to the geological realities.”

Thirty minutes to evacuate

In Ecuador, scientists from the Geophysical Institute of the National Polytechnic College have been monitoring Cotopaxi, a 5,897-metre-high volcano that lies 50 kilometres from Quito, for decades. Since 1738, it has erupted more than 50 times.



When Cotopaxi erupts, it produces ash, mudflows and rocky debris. Credit: Silvana Hinojosa

“If there are eruptions of any size from Cotopaxi, the main phenomena that occur and can pose threats to the nearby communities are a rain of ash, mudflows and rocky debris. They can also have a significant impact on the economy, as was the case with the eruptions in August-September last year,” Mario Ruiz, director of the Geophysical Institute, explains to *SciDev.Net*.

Silvana Hinojosa, a 27-year-old student who lived in Quito during the eruptions, vividly recalls one episode:



Silvana Hinojosa's family stands in front of the Chilintosa stone, a giant rock near Cotopaxi that is thought to have been deposited by a mudflow. Credit: Silvana Hinojosa

"It was a Saturday, when many people used to come to the market," she says. "The authorities gave the order to evacuate the whole city, saying that we had only 30 minutes. People were running everywhere — it was chaos — showing that clearly nobody was prepared."

In the path of hurricanes

In the Caribbean, hurricanes happen so regularly that they mark a seasonal cycle.

The region's hurricane season runs from June to November, with the most severe storms typically arriving from June to October.

Jamaica is frequently hit by hurricanes.



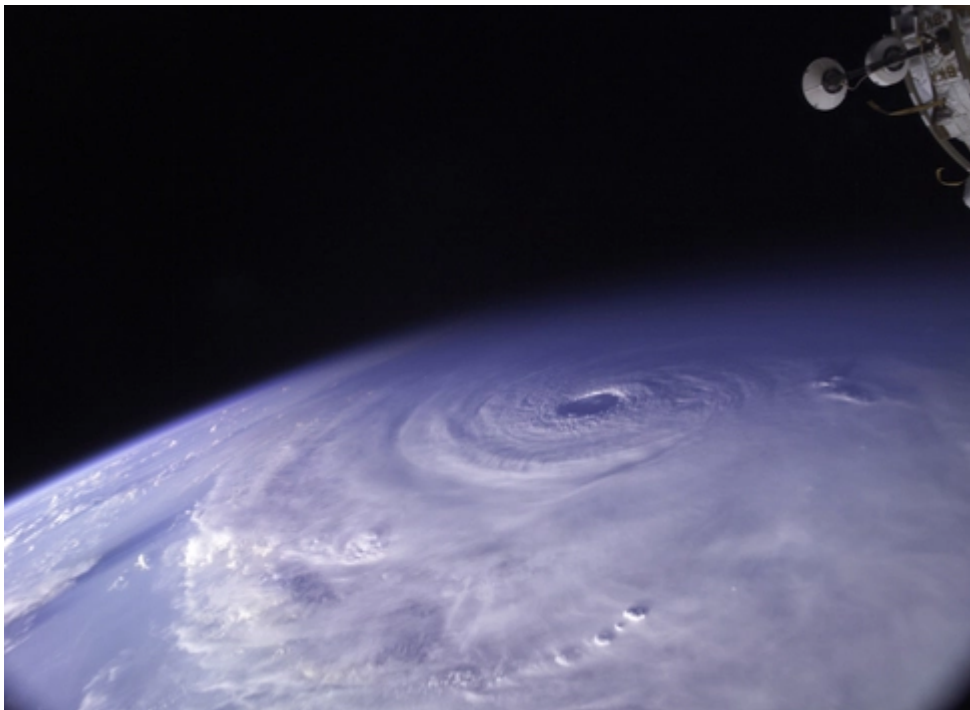
The view from Goldeneye, the former property of James Bond novelist Ian Fleming in Jamaica. Nowadays, holidaymakers can rent the house. Credit: Xavier

“Among the most notable events are the famous 1951 Storm Charlie, Hurricane Gilbert in 1988 and Ivan in 2004, which had an impact on the whole island, whilst other events only affected sections of the island, either along the Southern Corridor or North Eastern Corridor with occasional flooding or landslides in some interior communities,” Ronald Jackson, executive director of the Caribbean Disaster Emergency Management Agency, tells *SciDev.Net*.

He says that Jamaica’s entire population of nearly three million people is at risk from hurricanes, although the extent of the impact would depend on their level of exposure and vulnerability.

“In 1988, Hurricane Gilbert displaced nearly 800,000 people,” he says. “A storm of a similar nature and trajectory would potentially result in much less displacement now, due to better building techniques and improved preparedness.”

Although about 470 vulnerable communities remain across the island, a hurricane would now displace between 100,000 and 200,000, Jackson says.



Hurricane Ivan caused widespread damage in the Caribbean and United States in 2004. Credit: NASA Earth Observatory

According to Jackson, Hurricane Ivan provided a wake-up call in 2004, and preparedness has significantly improved ever since.

“There are nationally driven readiness campaigns conducted by the Office of Disaster Preparedness and Emergency Management, but also private sector-driven activities, advertisements, awareness campaigns,” he says.

Local media broadcasts programmes at the start of the hurricane season to promote awareness and readiness among local people and government agencies.

Every year, the US agency National Oceanic and Atmospheric Administration (NOAA) also invites people who live in areas prone to tropical cyclones, such as hurricanes and typhoons, to take part in Hurricane Preparedness Week, an event aimed at preparing citizens for such storms hitting land.

The dock that crossed the Pacific

The magnitude 9 undersea earthquake that struck off northeastern Japan on 11 March 2011, triggered a devastating tsunami that swept away buildings and pieces of infrastructure, including a large dock.



The US city of Newport, Oregon. Credit: Luisa Massarani

On 5 June the following year, the dock washed up on the west coast of the United States, near Newport, Oregon. The city also hosts a NOAA research station and the Hatfield Marine Science Center of Oregon State University, both of which study tsunamis.

Part of the dock was turned into a monument dedicated to those killed by Japan's earthquake and tsunami.



Part of the Japanese dock was washed away by the 2011 tsunami that landed months later in the United States. It is now displayed in Newport, Oregon, as a reminder of the power of natural disasters. Credit: Luisa Massarani

The dock also acts as a reminder to Newport residents that part of the city is vulnerable to tsunamis.

“But the dock also reinforced the misconception that earthquakes always happen somewhere else,” says Patrick Corcoran, an Oregon State University professor who educates people about coastal hazards.

“When I asked people on the beach what they would do if they felt an earthquake right now, they had no idea,” he says. “They were more aware but not prepared.”

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Newport lies beside the Cascadia subduction zone, a 1,100-kilometre-long offshore zone where a vast dense chunk of the Earth's crust is being forced under a less dense section. For this reason, the city is at risk of earthquakes of around magnitude 9 — megaquakes that can create large tsunamis similar to Japan's in 2011.

“Research now indicates that there have been 41 magnitude 8 and 9 events here in the past 10,000 years. They normally occur once every 250 or 500 years,” Corcoran says, noting that the last event was in 1700 and that there is an estimated 37 per cent chance of a high-magnitude quake within the next 50 years.

Why do people stay?

The people I interviewed for this story shared their own unique experience of living under the looming threat of natural disasters.

Some of them were simply unaware of the risk. But even after having discussed the dangers of living in a certain area, many of them told me that they wouldn't want to move elsewhere.



A tsunami hazard sign in Laguna Beach, California, United States. Credit: Derek E. Baird.

I asked Takako Izumi, a researcher at the International Research Institute of Disaster Science at Tohoku University, Japan, why some people choose to live in areas that are prone to natural disasters even when their lives and assets are at risk.

She says there is no clear-cut answer although the biggest problem remains a lack of awareness: “People don’t know about the potential risks.”

Takako also notes that severe disasters are rare, therefore the notion of danger doesn’t easily sink in. If people cannot learn from experience, they do not know how to protect themselves, especially without appropriate early-warning systems. For example, without taking part in an evacuation exercise, people would not know where to go. And even if they knew, Takako adds, often there are no financial subsidies for relocation or reconstruction.

Ultimately, she says, the scientific and political issue of risk reduction boils down to public perception. A severe disaster may occur once every ten, 50 or 100 years, and most people, including politicians, are unwilling to invest in mitigation and preparedness for such rare events.

The cost of reducing risk can also be cultural and emotional. For many, a disaster-prone area is also where their ancestors have been living for generations, and abandoning the place where they grew up would leave them uprooted. Sometimes, the dangerous life is preferable to a loss of place and culture from which there is no recovery.

Additional reporting by Ana Claudia Nepote.

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