

The human impacts of tectonic landforms and hazards

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Even today there are people who do not understand why or where tectonic activity takes place. Tectonic activity does not only take place at plate boundaries - intra-plate earthquakes, e. g. Bam, Iran. This leads people to think it won't happen to them.

The developing world has fewer resources or expertise to study the natural environment (or human environment) - methods to identify areas at risk may not exist (e. g. poorer levels of education), especially if the area is not very active.

Read this [Ch. 22 Respiratory System](#)

Pompeii - a classic case of ignorance to disaster. The lack of an eruption in 'living memory' led many to believe that Vesuvius was dormant. In 79AD there was no expectation of an eruption - people were caught completely unaware. At the time, the science was not understood - many believed the eruption, and preceding earth tremors were the gods' anger.

Choice:

Some people know the risks, but lack financial resources, or have close links to family in the area, and are therefore unable/unwilling to move. Other choose to stay, as the benefits outweigh the costs, e. g. Southern California - well paid jobs and a pleasant climate outweigh concerns over earthquake risk.

The benefits of tectonically active areas:

Minerals and natural resources - volcanoes bring valuable resources to the surface of the earth, e. g. Diamonds, copper, gold. Seafloor volcanoes contribute to the accumulation of metals, e. g. zinc, lead - mining industries.

Fertile soils - volcanic material breaks down through weathering to provide nutrients (minerals) for plant growth.

Geothermal energy.

Tourism and associated employment, e. g. hotels, transport, tour guides.

Heat and pressure turn organic matter into deposits of oil and gas.

Impacts on people and possessions:

The severity of the impacts depends on physical factors (e. g. event profiles, geology, terrain) and human factors (e. g. population density).

Physical impacts on people:

Damage/destruction of property and infrastructure.

Volcanoes - luckily $\frac{3}{4}$ of erupted lava is from underwater volcanoes, much of it along ocean ridges, so the impact is minor. The greatest risk is at destructive plate margins. Most active volcanoes are found in the developing world, e. g. Latin America, the Caribbean, parts of Asia and the south-west Pacific.

Increased urbanisation and population growth concentrates people and infrastructure.

Earthquakes - the worst earthquakes are not necessarily those with the largest magnitude. The worst impacts are felt in densely populated areas and areas with high vulnerability.

Economic impacts on people:

These can be direct or indirect.

Often greater in developed countries than developing countries.

Direct impacts include capital goods and equipment destroyed. They can occur immediately, or later as a result of follow-on damage or deterioration.

Indirect impacts occur as a result of interruption to commercial systems, lost wages, and lost opportunities to do business.

Macroeconomic impacts are felt across the whole economy of the community, region, or in the worst case the whole nation.

The Northridge earthquake (California, 1994) - 60 deaths but US\$30 billion in economic impact, as it hit dense infrastructure in the San Fernando Valley.

Social impacts on people:

Human life is irreplaceable.

Volcanoes - most impact on human life is due to pyroclastic flows or lahars (e. g. Nevado del Ruiz).

Earthquakes - tsunamis are particularly terrifying. The 1883 Krakatau eruption triggered tsunamis that killed 36 000 and destroyed 165 coastal villages.

The impact on human life is usually greater from earthquakes than from volcanic eruptions.

Primary casualties - those killed/injured directly by the event. Usually greater in developing countries than developed.

Secondary casualties - those that survive the event itself but die/are injured due to insufficient resources or lack of medical care. Again, usually greater in developing countries than developed.

Tertiary casualties - those with pre-existing medical conditions that are aggravated by the event. Includes those who become ill/die. For example, through disease contracted in the post-disaster environment. In developing countries, these are often the largest group of casualties.

Poverty reduces the capacity to reduce the impacts, or to recover.

Environmental degradation reduces natural impact buffers, e. g. mangrove removal (Indian Ocean, 2004), and therefore contributes to delaying recovery time.

Note: to more accurately compare the impacts in developed and developing countries, it is better to use damage cost as a % of GDP, as developed countries have more infrastructure, etc., to be damaged. The absolute costs

may be lower in a developing country, but the relative costs (as a % of GDP) are likely to be much higher.