Earthquakes and Volcanoes

Case Study - Mt Merapi: causes, effects and management.

Mt Merapi is a volcano located on the island of Java in Indonesia. It's located in the subduction zone of the indo-Australian and Eurasian plate. It is one of the most active volcanoes in Indonesia and has been active since 1540. It's an active-composite volcano and is made up of alternate layers of magma and ash.

Between 25th - 26th October 2010 Merapi erupted three times.

- Thousands of people were evacuated and columns of smoke rose vertically to 1.5kms.
- 18 people were dead immediately. At the end, the death toll was 30 and by October 30th Merapi exploded again causing fireballs to rise 2kms vertically in the air.
- The magma continued to push its way and the ash fell 30kms away.

Positive impacts:

- The volcanoes create fertile soil that promotes agriculture. This also creates jobs in farming and mining for locals.
- Volcanic areas create beautiful scenery that brings jobs in the form of tourism.
- Medical uses of hot spa water and mud.
- These areas also have a lot of minerals which create jobs in mining.

Negative social impacts:

- 200,000 people were made homeless by the eruption and 320,000 people were displaced.
- Emergency shelters had to be built 15kms away.
- Evacuation centres were overcrowded leading to poor sanitation and risk of serious disease.
- The lava flow closed off many roads and others had to be closed off due to safety reasons.
- Ash, rock and lava deposited on the sides of the volcano were washed down creating a lahar flow.
- Water supplies contaminated by ash and rock.

Responses (Management)

Short Term:

- 210 evacuation centres were set up in schools, churches, and stadiums.
- 1600 people volunteered for the National Aid Response (NAR).
- International aid offered by organisations such as the red cross.

Long Term:

- 2682 people were moved to new, safer houses permanently.
- The government set up a special task force to support people affected by the volcano or by family issues, lost jobs.

Signs to predict volcanic eruptions

- Gas leaks like carbon dioxide and sulphur dioxide through cracks.
- Many small earthquakes due to magma movement.
- Steam eruptions, ground water gets heated up and gets ejected.

Case Study - Bhuj (earthquakes)

26th January 2001, 8:46am, 7.9 on the Richter scale. The epicenter near Bhuj in Gujarat, India.

Cause:
The Indian plate subducts beneath the Eurasian plate. The earthquake was in an intraplate zone and the earthquake was not expected and hence the damages caused were severe.

Description:
The earthquake's epicenter was 20 kms away from Bhuj and the city had a population of 140,000 in 2001. The city is in the region known as the Kutch region. The earthquake was also felt in the north side of Pakistan and 18 people were killed there.

Disaster loss:

- Initial estimate 2200 billion which came down to 2144 billion.
- The earthquake devastated Kutch and practically all buildings and infrastructure was brought down.
- Ahmedabad, Rajkot, Jamnagar and Paran were heavily damaged. Kutch alone had 17,000 deaths and 1.66 lakhs were handicapped for the rest of their lives.
- 7605 children and 9110 women were dead.
- Reconstruction costs are estimated to be between 106 billion and 99 billion rupees.
- 15.9 billion people were affected in areas such as Bhuj, Anjar, Gandhidham.
- There was a high demand for food, water, and medical care for survivors.
- Besides immediate medical attention the area required attention.
- 80% of the food and water sources were destroyed and 2 million people were homeless.
- Looting, violence occured after the quake which affected the people.
- The earthquake resulted in millions of USD in aid and that caused the Bhuj region to rebuild itself in a way it wouldn't have done otherwise.
- Large number of fatalities affected women and affected the dependency ratio of families.
- Farming suffered due to lack of labour.

Economic Impacts:

- Total damage was 7 billion dollars however, 18 billion dollars of aid was invested.
- Over 15 km of tarmac road network was completely destroyed.
- In Ahmedabad 58 multistorey buildings were destroyed which contained many of the businesses that generated the wealth of the region.

- Many schools were destroyed and the literacy rate of the Gujarat region is now the lowest outside South India.

Notes provided by Diya Vakada