

The **Positive** and **Negative** Effects of Volcanic Activity



By Sam McCormack

The **Positive** Effects of Volcanic Activity

- **Fertile Soils**: Volcanic soils are very fertile. These rich soils are called laterite soils and are rich in minerals. They are common in many countries such as **Brazil**, where **coffee** is grown, and parts of **Southern Italy**, where **fruit** and **vegetables** are grown.



Coffee beans & powder



Lemons growing

The **Positive** Effects of Volcanic Activity

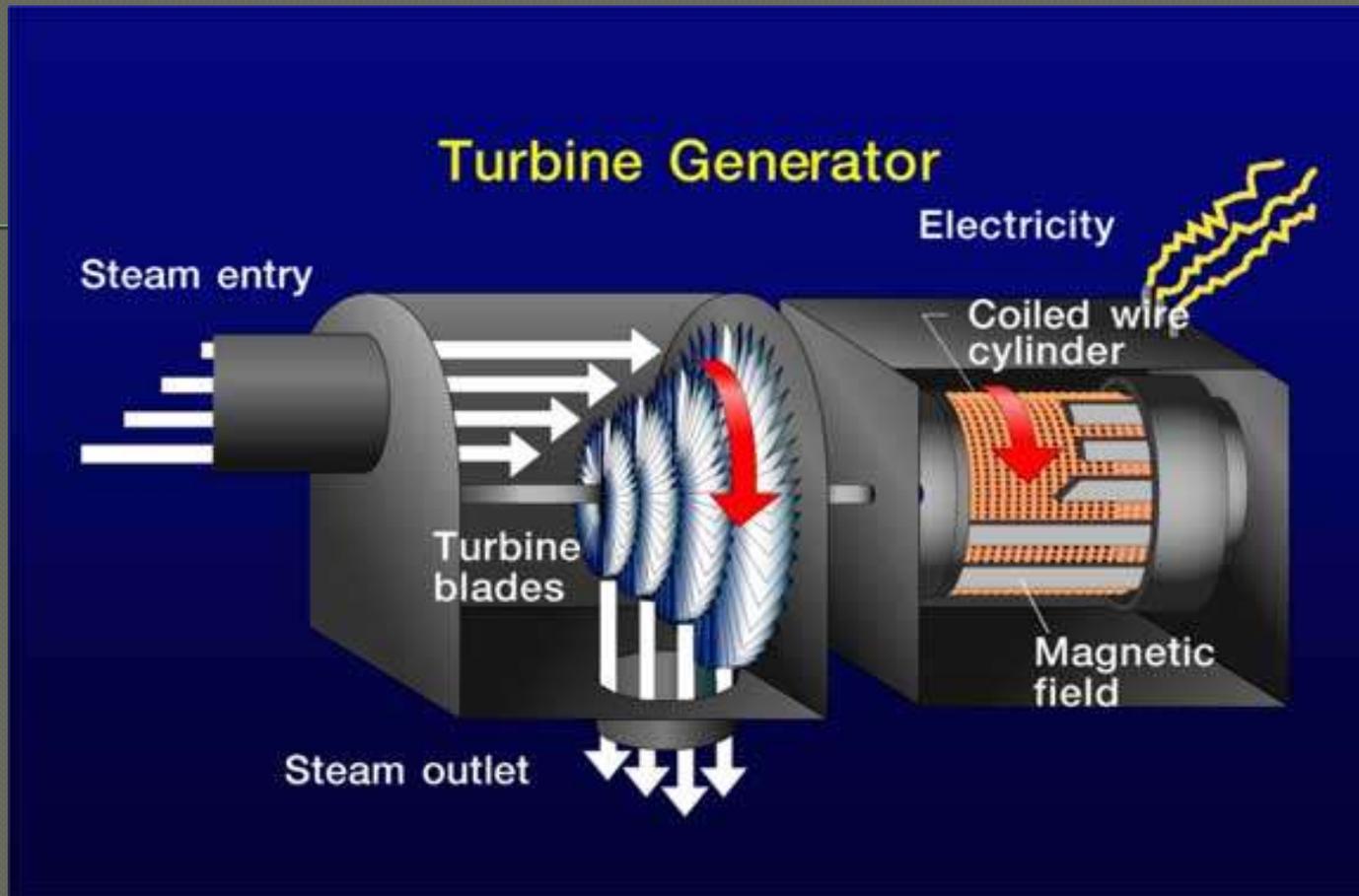
- **Tourism**: Many dormant and active volcanoes attract hundreds of thousands of tourists each year. Mount Vesuvius in Southern Italy and Mount Etna in Sicily are very popular. Tourists flock to these to climb the sides and to experience the landscape. This leads to many spin-off industries such as **bus companies, restaurants, shops and hotels**. This generates a lot of **employment**. In the case of Mount Vesuvius, nearby locations such as Pompeii, destroyed in 79 AD by the violent eruption of Vesuvius, also attract tourists.



The 'Old Faithful Geyser' at
Yellowstone National Park

The **Positive** Effects of Volcanic Activity

- **Geothermal Energy**: is responsible for providing approximately 80% of homes in Iceland with **electricity**. Energy is **harnessed** in areas where water is superheated to temperatures often over **1000°C** due to rocks being **heated below** them. The water does not evaporate but instead the steam and hot water are **pushed to the surface** where turbines harness the energy produced. This energy is then turned into electricity, as is done in Iceland.



A Geothermal Energy Turbine Generator

The **Positive** Effects of Volcanic Activity

- Creation of new land: Volcanoes can create new land for **human habitation**, for example, Iceland.
- Building materials: Granite, which is used in the **construction industry**, is formed by volcanic activity.



A map of **Iceland**, which is an example of a country which **volcanoes have helped form land** for humans to live on. (Human habitation)

The **Negative** Effects of Volcanic Activity

- **Lahars**: are formed where **ice and snow** on top of a volcanic cone **melt** when an eruption occurs. These lahars create **mudflows**, which can **travel down the slopes** of the volcanic cone into the **surrounding region**. This can have **devastating effects** for towns and villages.

Mount Pinatubo in the Philippines exploded in 1991. The eruption resulted in **volcanic ash** and **rock fragments** being **deposited on the volcano's slopes**. Within hours, heavy rains began to **wash this material down** into the surrounding **lowlands** in **giant, fast-moving lahars**. Over the next four rainy seasons, lahars carried about half of the deposits off the volcano, causing even more destruction.

The **Negative** Effects of Volcanic Activity

- **Nuée ardentes**: These are clouds of **hot ash** and **poisonous gases** that are **ejected** from a **volcano**. They create what are sometimes called **glowing avalanches**. These clouds **travel down the volcanic cone sides** at huge speeds of up to **200km per hour** and can travel great distances.

À nuée ardente →



The **Negative** Effects of Volcanic Activity

- **Loss of Life:** The eruption of Mount Vesuvius in 79AD caused death and destruction. More than 20,000 people died and the towns of Pompeii and Herculaneum were destroyed.
- **Damage to property:** Lava from volcanoes can also burn everything in its path.

Mount Vesuvius →



The **Negative** Effects of Volcanic Activity

- **Effect on the environment:** Clouds of ash, dust and gas may reduce global temperatures by several degrees. This occurred in 1816 when the eruption of Tambora, near Indonesia, caused global summer temperatures to drop by 5 to 10°C. The emission of sulfur dioxide into the atmosphere may lead to acid rain. Other toxic, poisonous gases such as carbon monoxide and sulfur can also be harmful to humans. In addition, pyroclastic material ejected from a volcano can damage the environment. For example, if CO₂ is emitted from a volcano it adds to the natural greenhouse effect. Sulfur dioxide causes environmental problems because it is converted to sulfuric acid in the stratosphere. This is a major cause of acid rain. The 1991 Mount Pinatubo eruption in the Philippines caused substantial environmental damage.

Case Study: Mount St Helens

- On the morning of 18 May, 1980 at 8.32 am, an earthquake measuring 5.1 on the Richter scale occurred directly below the northern slope of Mount St Helens. This triggered a landslide, the largest in recorded history. It travelled at speeds of 175 to 250 km per hour. Most of Mount St Helens' north side turned to rubble. Thousands of trees were destroyed and the water of Spirit Lake was temporarily displaced by this landslide. The eruption of Mount St Helens could be heard 1120 km away. The magma was exposed to lower pressure and this led to molten rock and steam exploding just a few moments after the landslide started. The blasting of rock debris and the pyroclastic flow of extremely hot volcanic gases, ash and rocks overtook the initial landslide. Approximately 600km of forest was knocked down and other parts of the forest were destroyed by the extreme heat.

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The heart of the mountain had blasted upwards and gigantic clouds of ash hovered some 25km above it. Fifty-seven people were killed. The Washington State Department of Game estimated that approximately 7000 deer, elk and bears died, as well as birds and other small mammals. Frogs, crawfish and burrowing rodents survived because they were either below ground level or under the surface of the water when the volcanic eruption occurred. The Washington Department of Fisheries estimated that 12 million salmon were killed and approximately 40,000 young salmon destroyed.

The elevation of the summit before the eruption was 2950m. This was reduced by 401m to its post-eruption elevation of 2549m.