

## WORLD FACTS

# What Is A Landslide? What Causes Landslides?

Causes of landslides include earthquakes, deforestation, and erosion.



*Landslides can be caused by natural or human events.*



A landslide refers to any form of mass wasting characterized by movement of rocks, soil, or other debris downhill assisted by gravity. The result is wearing off of the earth's surface. Landslide or landslip can happen underwater which results to submarine landslides. Although the majority of landslides experienced around the world are caused by multiple factors, the greatest trigger is excessive water.

## Causes of Landslides

The causes of a landslide can be divided into three categories namely morphology, human activity, and geology.

### Morphology

Morphology is related to the structure of the earth surface. Sloppy land can lose vegetation due to a drought or fire which causes it to become vulnerable to a landslip when the root system that holds soil intact is destroyed. The saturation of the earth by melting snow, glaciers, or even the occurrence of heavy rainfall can cause a landslide.

### Human Activity

The second cause of landslides is human actions on land. **Deforestation**, water leakage, rock blasting, vibrations by machinery, and excavations are major causes.

### Geology

The third cause of landslides is geology which refers to the characteristics of the soil material itself. The earth might be fractured and weak either on the surface or underneath. Different layers of the earth may possess different stiffness, strengths, and water permeability ability. Certain layers may be prone to a landslide in case of an earthquake or heavy rainfall. **Volcanic eruptions** are another risk.

# Types of Landslides

There are six types of landslides namely earthflow, debris slide, shallow landslide, debris flow, rock avalanche, and deep-seated landslide.

## Earthflow Landslides

An earthflow landslide refers to the movement of fine-grained materials down a slope. The materials are fine clay, silt, or pyroclastic. The velocity of the flow depends on water content since higher water content will lead to higher velocity. The shearing strength of the soil is reduced due to wetness making it prone to landslide. Such landslides are more common when precipitation levels are high.

## Debris Slides

Debris slides are characterized by the chaotic movement of debris or rocks mixed with water or ice. The steeper the gradient, the higher the speed. Such slides start at the top carrying huge rocks which break into debris as they slide downwards. The landslide leaves a V-shaped formation down the hill.

## Shallow Landslide

Shallow landslides occur in slopes where higher permeable soils are on top of less permeable soils. The bottom soil by virtue of being less permeable traps water which creates pressure on the high permeable topsoil. The topsoil will gradually absorb water and become heavy and saturated which causes it to easily slide over the lower less permeable soil.

## Debris Flow

Steepness accelerates the flow of debris. There is an accumulation of more debris and mud down the slope. The saturated materials may form a slurry of rock. If the speed and volume increases, it can become a very dangerous slide. Such slides are known to destroy bridges, houses, and railway crossings as well as cause floods after blocking drainage systems.

## Rock Avalanche

Also known as "sturzstrom", a rock avalanche slide is huge and moves at a very high speed even on a slightly uphill terrain. Though rare, the rock avalanche exhibits a long run out and flows over a long distance on a small gradient. Due to their tremendous speed, they sometimes travel beyond the foot of a slope.

## Deep-Seated Landslides

Deep-seated landslides have been reported in Zagros Mountain in **Iran**. They occur in regions with active tectonic rocks or along a line of weakness in a fault or a bedding plane. Such slides move slowly over a number of years. They occur below the depth of roots of trees even up to ten meters below the surface.

**Earthquakes** can trigger deep-seated landslides.

## Historical Landslides Across the World

Landslides can have devastating effects including major loss of human and animal life, environmental damage, and property damage. Some of the **deadliest landslides in recorded history** have caused the deaths of thousands of people at a time. The Haiyuan Flows of Ningxia, China in 1920 were responsible for the deaths of over 100,000 people. The series of almost 700 landslides were caused by an 8.5-magnitude earthquake. More recently in 2013, a cloudburst caused a series of landslides and floods in northern India resulting in the deaths of approximately 5,700 people in what is one of the **deadliest landslides of the 21st century**.

