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A Theoretical Study on Landslide in India: It's Causes & Preventions

by **Kishore Kumar Baraik**, *Resource Person,*
Department of Geography,
M.G. Govt. College, Mayabunder - 744 204, India

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Abstract:

Landslides stem from the failure of materials making up the hill slopes and are beefed up by the force of gravity. When the ground becomes saturated, it can become unstable, losing its equilibrium in the long run. That's when a landslide breaks loose. When people are living down these hills or mountains, it's usually just a matter of time before disaster happens. Landslides are a natural phenomenon, but it involves many human activities which lead to the mass movement of landmass.

1. Introduction:

A landslide, sometimes known as landslip, slope failure or slump, is an uncontrollable downhill flow of rock, earth, debris or the combination of the three. Landslides stem from the failure of materials making up the hill slopes and are beefed up by the force of gravity. When the ground becomes saturated, it can become unstable, losing its equilibrium in the long run. That's when a landslide breaks loose. When

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people are living down these hills or mountains, it's usually just a matter of time before disaster happens. Landslides are a natural phenomenon, but it involves many human activities which lead to the mass movement of landmass. In recent times we find the causes of landslides increasing day by day and the primary cause is deforestation. To survive, one needs to keep a check on these human activities.

2. Objectives of the study:

- This study is exclusively focus on the causes and its prevention on Landslide.
- The study is limited upto the vicinity of India.

3. Types of Landslides:

They can occur because of various reasons. We can classify them into four categories which are mentioned below:

➤ Falls Landslides:

It means falling of some material or debris or rocks etc., from a slope or a cliff which leads to a collection of this debris at the base of the slope.

➤ Topple Landslides:

These can occur because of some fractures between the rocks and the tilt of the rocks because of gravity without collapsing. Here, we see the forward rotational movement of the material.

➤ Slides:

It is a kind of landslide when a piece of the rock slides downwards and gets separated from it.

➤ Spread:

It happens on flat terrain and gentle slopes and can occur because of softer material.

4. Landslides in India:

It is one of the natural hazards in India, which affects 15% of the geographical area of our country. Due to several factors, India is divided into the following vulnerability zones, which are shown in the table below:

Very High Vulnerability Zones	Highly unstable areas, High rainfall, areas prone to earthquakes, and intense human activities. Such as the Himalayas, Andaman and Nicobar Islands, North Eastern region, Western Ghats, Nilgiris.
High Vulnerability Zones	The areas of very high Vulnerability Zone are included here as well except the plains of Assam. The difference between the two is their intensity or frequency of various factors.
Moderate - Low Vulnerability Zones	Areas of less precipitation such as Trans Himalayan areas of Ladakh, Spiti of Himachal Pradesh, Aravalli mountains, rain shadow areas of western and eastern ghats, Deccan plateau, etc. Areas of mining activities such as Jharkhand, Odisha, Chhattisgarh, Maharashtra, Andhra Pradesh, Karnataka, Goa, etc.
Other Areas	It includes the remaining parts of India which are safe from landslides.

5. Causes of Landslides:

Landslides are caused by various factors, which are mentioned below:

- It can be caused because of heavy rain.
- Deforestation is also one of the main reasons for landslides because trees, plants, etc., keep the soil particles compact and due to deforestation, the mountain slopes lose their protective layers because of which the water of the rain flows with unimpeded speed on these slopes.

- It can be caused by earthquakes as well. For example, in the Himalayas, the tremor occurred because earthquakes unstabilized the mountains, which led to landslides.
- Volcanic eruptions in specific regions can also cause landslides.
- Landslides often occur in mountain regions while making roads and construction; a large number of rocks have to be removed, which can cause landslides over there.
- In the regions of North East India, landslides occur because of shifting agriculture.
- Due to the increasing population, a large number of houses are being created, which leads to the creation of a large amount of debris which can cause landslides.

6. Prevention from Landslides:

Following are the necessary steps to control landslides in India:

- An increase in forest cover is a must in community lands to reduce the hazard of landslides.
- People must store the excess water in catchment areas. It will reduce the effect of flash floods and also recharge groundwater levels.
- People must restrict the grazing of their animals. Also, reduce the urbanisation activities such as building dams or other commercial projects.
- Implementation of public awareness regarding preventive measures during landslides and other hazard management is necessary.
- Early warning systems and monitoring systems should be there.
- The country should identify the vulnerable areas and actions should be taken in this regard on a priority basis.
- The country should specify codes or standards etc. For the construction of the buildings and other purposes in such areas of risk.

- Terrace farming should be adopted in hilly areas.
- Response teams should be quick to deal with landslides if they occur.

7. Conclusion:

Landslides are a dangerous hazard that can cause serious damages, death, injuries and affect a variety of resources. By understanding the different types and causes of landslides it can help us predict future occurrences and reduce the potential effects. Various studies have also been carried out in India to examine the characteristics and better understand the fundamental aspects of landslides. Together, prevention and avoidance of development of certain areas can be enforced to minimize possibilities of risk.

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