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# Ground Water of Himalayan Region, Due to Landslides Impact on Himalayan Folk Life

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**Abstract**

Looking at the life of the Himalayan people, the ground water level there is continuously decreasing. The problem of landslides is affecting the life of the people there. The speed with which the perennial streams are drying up, the Himalayan people life is in danger due to disasters, due to which the solution is very important. Geologists are conducting surveys from time to time to clarify the cause of landslides and drying up of streams. There are indications of a serious accident. Due to the rivers originating from the Himalayas, the pressure of water and sediment increases, due to which the pressure on the slopes also increases, whereas the rivers of the Western Ghats have less sediment as compared to the Himalayan rivers. The Himalayan region is more sensitive from earthquake point of view while the Western Ghats are relatively located. Which is the main factor of landslides. Geologists have laid emphasis on the use of warning devices to predict landslides and it was emphasized that by improving the condition of groundwater and people's life in sensitive areas, they can be protected from disasters.

## 1. Preface:

The groundwater of the Himalayan region of India is rich. The Himalayan people have left an indelible mark in the world of Himalayan literature and art. The great Sanskrit poet Kalidas was also a son of Himalaya. Big names like Chhayavadi poet Sumitranandan Pant, Chandra Kunwar Bartwal, Shivani are associated with the mountain. Now it is our utmost duty to make Himalayan literature reach the people through a message. Our India, especially the part of Uttarakhand, says "Nadi- Matrikam", which means India is a country of rivers. In this also, the concentration of Himalayan origin rivers and its streams in the area of Eastern Uttar Pradesh and North Bihar is even more remarkable, which is the pride of India. These rivers are a boon on human life due to which India is rich. Various rivers originating from the Himalayas Rivers are the basis of our life. Because of the Himalayan Mountains, there are rivers in North India like Ganga, Kosi, Gandak, Saryu, Ghaghra, Bagmati, Kamla, Mahananda which are motherly for us. We consider these rivers as mothers and give them the same reverence. But at present these rivers are in bad condition. Unscientific construction of dams, roads, railways, our tendency to dump all kinds of chemicals and other filth in the rivers and the way of obstructing the river flow during development work have made these rivers dying. The increasing population and Various pollutions have taken place which are raising a question mark on the purity of Himalayan water. The salvation of rivers is possible only with our awareness and our activism. Geologists believe that the Himalayan groundwater depends on the rocks and landforms there. This has been emphasized on the rapid increase in the population in the hilly areas, the cutting of trees, the availability of groundwater and the continuous increase in landslide disasters.

**Impact on common life:**

**1. Drying up of perennial streams**

The life stream is in danger. The drying up of Himalayan streams is an alarm bell for crores of people in the hilly and plain areas. There are 50 lakh streams all over India, out of which 30 lakh are in the Indian Himalayan region alone. Half of the 30 lakh perennial streams have dried up. In the last 150 years, 300 out of 360 streams in Almora have dried up. There are 50 lakh streams across India, of which 30 lakh are in the Indian Himalayan region alone.

According to the "Report of Working Group 1 Inventory and Revival of Springs in the Himalayas for Water Security", published in collaboration with various organizations working on the Himalayas and water conservation, there are 50 lakh streams across India, of which 30 lakh are in the Indian Himalayan region alone. (IHR).Assam and West Bengal also partially come under it. About 60 percent of the population here is dependent on streams for water related needs. In most of Uttarakhand, only stream based water is supplied whereas in all the villages of Meghalaya, stream water is used for drinking water, irrigation and animals. In such a situation, drying up of streams is being seen as a threat to life in the mountains. The problem of streams in the mountains is mainly due to unexpected rains, earthquakes and damage to the environment. Environmental degradation is a combined result of land-use change and so-called development activities that have affected the aquifer, the source of water in the mountains.

BRO (Border Road Organization) had to build a road by cutting this iceberg. This iceberg has disappeared in the last three years." Now the water sources in most of the villages of Uttarkashi have dried up. Despite the flow of three major rivers in Uttarkashi – Bhagirathi, Yamuna and Tons, water supply is dependent on pumping schemes and tube wells. The main reason for the drying up of the stream is indiscriminate cutting of forests. Roads, dams, townships and tunnels being built in the name of development schemes in the entire hilly areas including Himachal Pradesh are depleting water sources. Due to the explosions caused by dynamite, the mountains are cracking and the streams present in the mountains are disappearing.

**2. Groundwater of Himalayas**

The geological structure of the Himalayas controls the landscape of groundwater origin and flow. A large part of the Himalayan region is rich in crystalline, igneous, and metamorphic rocks. It is of Mesozoic to Precambrian age, which is covered with volcanic rocks. Ground water is abundant only in rocks having porosity but that porosity is negligible. In the area where the population is mainly spread, the development of groundwater is less and limited. The semi-compressed structures of the Tertiary age are mainly found in the western Himalayas and the western-eastern geosyncline line of the entire Himalayas and the Arunachal Himalayas and the entire Himalayas. Shivalik is present in the area, here groundwater is found in weathered areas and secondary porosity. Potential groundwater areas are formed by fault zones, which are developed by installing hand pumps through borewells. The water producing capacity here is approximately 1.25 LPS. The formations here are in the form of large/small valley fills, sediments, moraines, glacial and lacustrine deposits are also found. The discharge capacity of tube wells in glacial and moraine deposits is between 10 to 28 MPS.

Glacier is the main source of groundwater in the Himalayan region, which acts as a recharger. The high rainfall here also contributes to the groundwater recharge, but due to the high rocky slopes, the water ratio

there becomes very low, due to which the groundwater recharge is hampered. There is a decrease in. Recharge is not suitable due to hilly terrain in most parts of Nagaland, Manipur and Meghalaya. Ground water availability for all uses and gross ground water draft for all North Eastern States are 2883810 and 620668 HAM respectively and the overall stage of ground water development is 19%. Due to the presence of the entire hilly population of the Himalayan states in their settlements in the hills and mountain slopes, the problem of water supply remains constant and most of the population is settled on the high tops of the hills due to which there is a lot of problem in water supply due to climate change in the glaciers. Water availability in rivers decreases due to melting of snow. Due to high iron content in Jammu and Kashmir, drinking water in Assam and Manipur is iron rich, which is affecting the life of the people there.

### 3. Cause of landslide:

Landslide is a natural phenomenon that occurs due to combined factors like gravitational force, steepness of slope, flow, heavy snowfall, due to which a huge amount of soil, stones, debris etc. breaks down from the mountain slopes and falls down. According to the Geological Survey of India, 15% of India's land is affected by landslides. But landslide incidents are more frequent in the Himalayas as compared to the Western Ghats.

Due to landslides, streams are also being completely affected, cutting of countless trees is completely affecting the environment, which is affecting the ground water. The risk of landslides in the Himalayas is very high, but efforts are being made to deal with this disaster. The preparedness of various governments is worrying. In the opinion of geologists, “Landslide is a natural phenomenon which occurs due to the sliding of rocks, soil etc. downwards from its place due to the effect of gravity.” Erosion of rocks by rivers and continuous rain weakens the soil layer. This increases the risk of landslides in these areas. Such disasters usually occur during monsoon (between June and September). The earth's surface, which has become weak due to deforestation and rampant construction work, becomes further weak due to excessive rainfall.

According to geologists, the risk of landslides is highest in the Himalayan regions, especially in the areas with delightful natural beauty. The Himalayas have been formed due to the powerful collision of the Indian and Eurasian plates. Due to the rise of the Indian Plate, there is continuous heavy pressure on the rocks, due to which they become brittle and weak and the possibility of landslides and earthquakes increases significantly. Mountain slopes with rough surface, areas with strong possibility of earthquakes and heavy rains on it, these All factors together increase the risk of landslides in the Himalayan region. T. Nandakumar, a geologist associated with NDMA, says, “The recent Malin accident on July 30, 2014 and the landslide in Uttaranchal show that there is a need for special vigilance in the hilly areas. These areas are extremely sensitive from ecological point of view, hence the construction work here has to be restricted and deforestation has to be stopped. Road construction in the Komal area is especially harmful because for this the rocks have to be blasted, which causes the gap between the rocks and the soil. The balance gets shattered. The damage can be reduced with an early warning system.

Geologists believe that India lacks the sophisticated warning systems needed to predict landslides, which further complicates the problem. There is an urgent need for a proper warning system to protect human life and property. Experts say that take any part of the country considered vulnerable to landslides, drainage

arrangements everywhere are in poor condition, which can lead to loss of life and property. The risk of damage further increases.

Due to unplanned development in the last few decades, the problem of soil erosion and landslides is continuously increasing in the mountains. Unplanned development, ruthless exploitation of natural resources and increasing urbanization have disturbed the environmental balance here. Due to this, natural disasters are increasing. Due to reasons like high population pressure, lack of public awareness, lack of proper arrangements for advance information and means of communication, the loss of life and property due to natural disasters is increasing on a large scale. In Uttarakhand, in the year 1998, the Malpa earthquake occurred. This was also considered to be the main reason behind the untimely death of more than 250 pilgrims in landslides and the death of thousands of people in the Kedarnath disaster that occurred in June 2013.

According to statistics, if we look at the natural disasters that have occurred in the last ten years, we find that natural disasters have had a very adverse impact on the life of the people of Uttarakhand. Moderate or torrential rains from mid-June to September (during monsoon) become a problem for the people here. During monsoon, the life of the people of the hilly state gets completely disrupted due to landslides and floods. In which people and cattle often lose their lives and along with houses, agricultural lands and public properties like roads, gullies, canals, bridges, houses and school buildings are damaged. Due to this people have to face huge difficulties.

**Fact Collection-1**

If monsoon rains are a boon for crops in South Asian countries, they also prove to be a curse. Heavy rains cause floods and landslides and their chances increase significantly due to anthropogenic construction activities. Incessant rains are just the initial reason, but the heavy machinery used to level the hill surface for farming or any other purpose makes the possibility of rockslides quite high." The Government of India has identified such areas. Where landslides occur frequently. Its map has been drawn which has been named Landslide Hazard Zonation. Experts are of the opinion that a society that is aware and alert to the warning signs of impending landslide crisis, can overcome this challenge. NDMA's website states that the early warning system should be based on scientific and technical expertise, it should have the flow of information and the ability to take quick and effective action as soon as warning information is received. Apart from this, more Measures like planting more trees whose roots strengthen the soil, identifying areas most likely to fall and monitoring cracks in rocks also prove to be very effective. Until preparations for new plantations are complete, Trees should not be cut till then.

Due to mining, landslides and river erosion, there has been excessive soil erosion and environmental damage in the sensitive areas of the Himalayas. Central Institute of Soil and Water Conservation, Dehradun, through its experimental projects, developed soil and water conservation measures based on watershed management technology for the restoration of these lands. Is. Due to which not only debris and soil erosion were prevented but these barren and desolate lands were also made fertile with the trees and grasses providing grass, fodder, wood and fibre, the supply of clean water also increased significantly due to conservation measures. Hence, life and property were saved. And to prevent environmental damage, conservation is very important to prevent mining, landslides and river erosion.

**Fact Collection-2**

According to Sridhar Ramamurthy, geologist at the Environics Trust, we have disrupted the source and discharge areas of the streams. Streams release water slowly which is not happening due to construction activities. Due to densely populated cities like Shimla and Mussoorie in the mountains, water is not going underground, on the contrary, such cities are contributing to polluting the streams. There are 50 lakh streams in the whole of India, out of which 30 lakh are in the Indian Himalayan region alone. Are in. Half of the 30 lakh perennial streams have dried up. In summer, 300 out of 360 streams in Almora have dried up in 150 years.

The NITI Aayog report also raises concerns because the drying up of streams is having a widespread impact. The IHR covers an area of 2,500 km long and 250 to 300 km wide and contains 60,000 villages. 5 crore people live in this area. Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland and Tripura are within its scope. Assam and West Bengal also partially come under it. About 60 percent of the population here is dependent on streams for water related needs. In most of Uttarakhand, only stream based water is supplied whereas in all the villages of Meghalaya, stream water is used for drinking water, irrigation and animals. In such a situation, drying up of streams is being seen as a threat to life in the mountains. According to the NITI Aayog report, not only humans but also forests and wildlife have been badly affected by the drying up of streams. The water in the pits provides natural streams for wildlife. Drying of these streams in national parks and forests means water crisis for wildlife. Drying of the stream is not a one-sided issue. Water quality in existing streams is also a concern. According to the report, microorganisms, sulphate, nitrate, fluoride, arsenic and iron pollution are increasing in the streams. Coliform bacteria from septic tanks, household sewage, livestock and fodder are reaching the source of the streams into the aquifer (underground water reservoir in the mountains). Similarly, nitrate is also reaching the streams through septic tanks, domestic dirty water, agricultural fertilizers and animals.

Because the condition of flowing water of Himalayas is deteriorating, the crisis of streams in the mountains is mainly due to unexpected rains, earthquakes and damage to the environment. Environmental degradation is a combined result of land-use change and so-called development activities that have affected the aquifer, the source of water in the mountains. Roads, dams, townships and tunnels being built in the name of development schemes in the entire hilly areas including Himachal Pradesh are depleting water sources. Due to the explosions caused by dynamite, the mountains are cracking and the streams present in the mountains are disappearing.

Environmentalist Anil Joshi, founder of the Himalayan Environmental Studies and Conservation Organization (HESCO), says that the streams are drying up because our construction scientists are not there. Due to these unscientific constructions, aquifers (water layers) get disturbed and streams get disrupted. At the same time, according to Sridhar Ramamurthy, geologist at Environics Trust, we have disrupted the source and discharge area of the streams. Streams release water slowly which is not happening due to construction activities. Due to densely populated cities like Shimla and Mussoorie in the mountains, water is not going underground, on the contrary, such cities are contributing to polluting the streams.

The problem is increasing in Uttarakhand due to “pine” trees, hence we should plant and promote “oak” trees in their place because these trees can store three-fourth of the water and maintain moisture in the soil. These trees also release water into the ground.” He says that pine trees are spreading fire in the forests and this fire is causing damage to water sources. Without removing them, it is not possible to save the forests and when the forests are not safe then it is also impossible to save the streams. The height and intensity of the slope of the Western Ghats is less than the Himalayas, which is considered to be one of the main factors of landslides. is a new folded mountain which is undergoing the process of formation whereas the Western Ghats is an eroded block mountain. Due to the rivers originating from the Himalayas, the pressure of water and sediment increases, due to which the pressure on the slopes also increases whereas the Western Ghats There is less sedimentation in the rivers of Himalayan rivers.
The Himalayan region is more sensitive from earthquake point of view while the Western Ghats are relatively located. Which is the main factor of landslides.

In the Himalayan region, when winter snowfall follows the summer season, it softens the soil, which increases the problem of landslides. If seen, the main cause of landslides in the Western Ghats is heavy rain and not snowfall.

Apart from the above, the increasing human and industrial activities in the Himalayan region are more as compared to the Western Ghats. Due to which the frequency of landslide problems increases from time to time.

**Conclusion:**
SK Barataria, who did his doctorate on Himalayan streams and underground water and was a member of the drafting committee of the NITI Aayog report, says that glaciers do not contribute to the rivers originating from the lower Himalayas. These rivers remain alive with the water of the streams. It is certain that rivers will be affected due to drying up of streams and less water. He says that Himalayan glaciers contribute about 29 percent of the Ganga to Moradabad and the remaining water is underground. All rivers are enriched with underground water during periods of low rainfall. The drying up of streams in the mountains has the worst impact on women. Joshi sees the drying up of streams as a great tragedy for women. According to him, these women already have the responsibility of bringing wood for the stove. A lot of their labor and time is wasted in this. Now they have to fetch water from a distance of 2-3 kilometres. Apart from this, agriculture is also being badly affected.

The impact of drying up of Himalayan streams is not limited to the hill states or people alone. The streams originating from the mountains enrich the waters of rivers like the Sadanira Ganga, Brahmaputra, Indus and Yamuna. These rivers make large areas of India fertile and fulfill their water needs. About 20 crore people in the Himalayas, Western Ghats, Eastern Ghats, Aravalli and other mountain ranges are dependent on streams. This means that the life of about 15 percent of the country's population directly depends on the streams. In such a situation, if the streams dry up, a large part of India will be affected. It is also worth noting that the entire culture in India flourishes around rivers. This culture also suffers due to drying up of streams.

If the problem of stream drying is not addressed then the lives of lakhs of people in the mountains will be

in danger. Although this work is certainly difficult but not impossible. Streams can be revived all that is needed is to identify its catchment area. By running watershed and springshed programs, water can be brought to dried up streams. By running watershed and springshed programs, water can be brought to dry streams." Apart from springshed programs, many other important suggestions have been given in the NITI Aayog report to save streams. For example, in addition to stream mapping, capacity development and inventory, emphasis was placed on a national program for springshed management and if rapid rescue work was done, the life of the people in the Himalayas would have been safe.

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