

# Landslide Scenario in Ri-Bhoi District, Meghalaya: The Cause and Effects

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## ARTICLE DETAILS

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## ABSTRACT

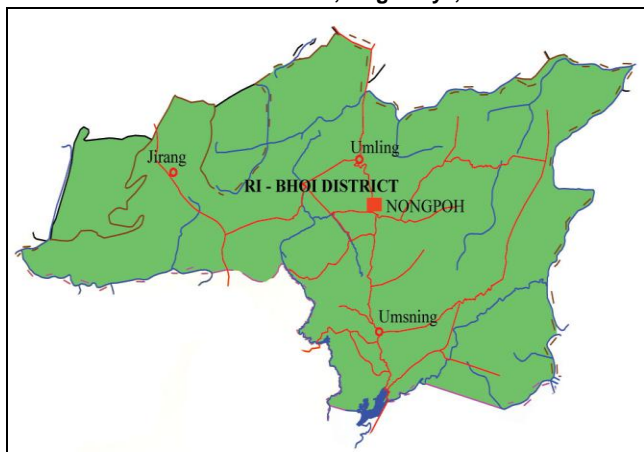
Landslide occurs when the slope changes from a stable to an unstable condition. A change in the stability of a slope can be caused by a number of factors, acting together or alone. The cause of a landslide that has to do with the structural combination of rock, soil and vegetation, is the morphology. If a hillside has lost vegetation because of fire for instance, then the addition of water can cause erosion upping the chances for landslide. It's not only rain that can cause erosion but also the flowing rivers, moving glacier and crashing ocean waves play the role. The geology or structure of the earth materials itself can also be a factor in landslide. Finally, there are human activities that can expose slope to erosion and lead to landslide. Clearing land for agriculture or constructions are some of the human causes of landslide. The District is belongs under the Khasi Hills Division. The undulating land surface, steep slope, deep valley, and many ridges are the physiographic characteristics of the region. Different types of geomorphic process are acting in the region. Unplanned construction, Jhumming practices etc. have been done by local inhabitant in the region. Monsoonal heavy rainfall is the common occurrence in the region. So, the landslide is often occurring in the different parts of the region and it affects the regional development of the study area. The district is still poor in transport and communication facilities.

## 1. Introduction

One of the important Natural Hazard often occurred in the Himalayan Region is Landslide. The word landslide also known as landslip, is a form of mass wasting that include wide range of ground movement such as rock falls, deep failure of slopes and shallow debris flow. The Himalayas, the north-east hill experience considerable land-slides activities of varying intensities. The rock and debris carried by the rivers in the Himalayas cause enormous landslide in the valley. The seismic activity in the Himalayan region also results in considerable landslide movement. The Government of India is collaborating with a wide range of Indian academic Institutions on hill research, the Himalayan Region is considered as very high to high Incidence of landslide zone. The natural hazard, the landslide directly impact economies, agriculture, food security, water, sanitation, the environment and health in the Himalayan Region.

### Location Map Of The Study Area :

The Ri-Bhoi District, Meghalaya, India



The Location of the Study Area is RI-BHOI District of MEGHALAYA. The Latitudinal Extension is from 25 15/ N to 26 15/ N and Longitudinal Extension is from 91 45/ E to 92 15/ E. The RI-BHOI District is one of the youngest district of Meghalaya. The district was carved out from the erstwhile East Khasi Hills District. The RI-BHOI District covers an area of 2448 km<sup>2</sup>. The RI-BHOI District is bounded on the North by the Kamrup, Morigoan and Nagoan district of Assam, on the East by the Karbi Anglong district of Assam, on the South by East Khasi Hills & West Khasi Hills districts and on the West by the West Khasi district. The district is the part of the North-Eastern Mountain Region or Purvachal. The district is characterized by rugged and irregular land surface. It includes a series of Hill Ranges which gradually sloped towards the north and finally join with the Brahmaputra valley. It is a part of the Deccan Plateau. The average height of the region is 600-1500m. The important rivers flowing through this region including Umtrew, Umsiang, Umran and Umiam rivers. All these as well as frequent earthquake of varying intensity give region to believe that the region is still unstable.

## 2. Objectives of the study

Objectives of any study leads the organized, systematic guideline of the theme and provides substantial degree of momentum to attain the reality. The major objectives of the study can be expressed by the following means-

- i. To find out the features of Landslide occurring in the study area.

## 3. Methodology

Methodology of any study is not less important as it contributes the actual stages or consequences of study properly. Generally it is divided into three stages which are as follows-

- i. **Pre-Field work** : Before going to the field work, I have to prepare some hypotheses and according to these, the rule of data collection should be framing and delineated in proper ways. Related maps are to be consulted.
- ii. **Field-work**: Using the Geospatial Technologies (like Remote Sensing, GPS & GIS), different types of data should be collected from the field survey and identification of different characteristics of different zone of the study area are done here.
- iii. **Post- field work**: Collected primary data should be comparison with existing records. Then finally the data are going to process and then these data are represented in proper mapping process for create the final report.

#### 4. hypothesis:

- i. The study area is earth-quake prone area and under the different geomorphic processes..
- ii. Heavy rainfall, .Deforestation, unplanned settlement and construction of roads buildup in the study area.

#### 5. Result and discussion:

A deadening matter has come in the eyes of the researcher when he has seen that in Ri-Bhoi district of Meghalaya, different thousand people are stranding for long hour to see a terrible accident when a car was covered in the debris following a heavy landslide and lots of villagers are lost their lives for this matter. He saw that the spot is present on the Guwahati-Shillong four lane roads at Umling. He observed that hailing people of Nagaland are killed on the spot for the coming of tumbling loose soil and big boulders on top of the cars. Some resident escaped somehow from the spot instantly when seven vehicles, including an oil tanker, were also damaged and the debris pushed them out from the road. The landslide of damaged spot is located over 100 meters length of the road. The accident has not been happened for falling of rain and actually it occurred due to the falling of villagers informed the police that loose soil along with boulders which conceals suddenly the moving vehicles and this information was given by the villagers to the police of locality. The body of Dhon Bahadur hailing from Nagaland was rescued late in the night after it has been identified in this accident spot. The researcher has become able to know about cause of accident which is involved with blasting of the hill and is being resulted for the frequent landslides of the Shillong-Guwahati four lane that is under construction. A landslide also befalls on the national highway at Umsawnongkhrai village in Ri-Bhoi district. When clearing of debris are still going on then there occurred some problems of smooth flow of traffic on the highway which is controlled by the police of Nongpoh.

The researcher has become able to know that five persons including two minors of two families were concealed alive when a major landslide cleaned the staff quarters of a local plywood company at Tharia in the Umiyam industrial area in Ri Bho for the night-long torrential rain on 2017 in this area and a toddler also expired at Mawjrong in East Khasi Hills. The landslide of Ri-Bhoi supervened near about 5am when people were being slept inside the tin-roofed quarters of T.C Veneer cum Sawmill

in the Meghalaya Industrial Development Corporation area. The owner of the factory is Haricson Jain. The researcher has wanted to know that Loba Mahanta and his wife Babbi Mahanta were identified as deceased workers by P.H Khongsngi, Deputy Controller of Civil Defence (Shillong) and Officer in Charge of the State Disaster Response Force (SDRF) .The relics of the houses were being seen clearly after the landslide at Tharia in the Umiyam industrial area in Ri Bhoi on Saturday. Santi Lama was also become part another victim along with age of 12-year-old. Buna lama was identified after being injured at Civil Hospital, Shillong as the fourth victim part of the tragedy of this terrible accident. The body of another woman was rescued near about 6.30pm but it was not identified by person. The landfall of this place was happened for the heavy rainfall in the last few days. The researcher had seen that there were no sign of 10 rooms on the steep slope which were cleaned completely. The presence of the district police team and emergency services tried to maintain the spot being reached on time. According to the researcher, the number of injured person is nine and they are also hospitalized in different hospitals in Shillong. The heavy rain becomes the cause of disturbance for the rescue operation but began again after interruption and continued till late in evening despite stormy weather posing threat to the SDRF team. The researcher saw that there is present a landfill which affects the most of the portion of area below and a stream also flows nearby the spot. The spot was visited by the lots of officials of locality. Within a moment, in East Khasi Hills, a thatched house and the cars like toys were smashed away in that particular landslide where happens. The researcher has also observed a two years and 11 months old child, Larisha Sohtun was later rescued from under the mud and has taken away to PHC Swer but she was declared as a brought dead. The incident of the child occurred at Lad Kyntong in Mawjrong of East Khasi Hills and the body was handed over to the family after a judicial inquiry. Among the different landslides in many places, most of them happened along the Shillong-Sohra-Shella road on Saturday and according to the researcher, the accident of Umtngnga was major one which occurred at Umtngngar near about at 4 am. Lots of vehicles had to be stranded on the road for some hours. But the road was become cleared by the PWD on Saturday evening. According to the researcher, the main incident of landslides happened in three places, among them one is occurred at Umstew village near Laitkynsew in Sohra which leads to traffic snarl for nearly three to four hours. Some minor landslides also appeared at Shella, Khliehshnong, Sohra and even in Khatar Shnong.



**Plate :** The picture of rescued work after progressed of a landslide Tharia village under Umiam Police Station in Meghalaya district due to heavy rains on June 17, 2017.

The researcher had reached at the place where a landslide was triggered for the continuous rainfall on July, 2017 in the past few days ago on the tiol highway at Umsawnongkhrai village in Ri-Bhoi district on Thursday afternoon. The matter was happened near about 4.30 pm where was not present any loss of life or damage of property in the eyes of the researcher till the filing of this incident as a report. But he observed two teen-aged girls and a 25 year old man were killed in a bulky landslide in Ri-Bhoi district of Mehalaya on Saturday. There was also present a landslide which brought injured in the lives of nine people. But two women are found as missing after heavy rainfall at the particular place of landslide. According to the researcher, the occurrence came at a labour camp near Umiam Lake near about 5 in the morning during the time of weighty rainfall and continued up to Friday night. The researched has told that the efforts of different officials or local bodies were not able on to clear the debris and the injured person of this incident have been shifted to NEIGRIHMS, Ganesh Das Hospital and Shillong Civil Hospital for their treatment. According to the researcher, there were also reports of landslides at Umtyngngar, Mawkynrew and other places, but there was not present any casualty. He had invented that the rainfall has happened for coming of the south west monsoon in the north eastern region. He observed that seven people, including a

minor, were killed in the early Saturday morning after heavy rainfall at the place of causeda landslide in Meghalaya's Ri-Bhoi district. The victims in the accidental place were mostly among labourers. The researcher has found that the missing have been declared as dead after a day of searching for their bodies when it proved futile. According to the Researcher, the recovery of the body of a missing woman among the death charged rose of seven persons to the following incident from the debris on Sunday morning in Tharia area in Ri-Bhoi district. The cause of heavy rainfall has taken as the latest disaster of the landslide which is related death impost in the Northeast this week to 17. But the researcher is unable to find out about five others who have either drowned or were electrocuted in flooded area of Assam. The presence of a plywood factory at Tharia village at the distance of near about 20 km from state capital Shillong was the main cause of the incident in eyes of the researcher because it locates at dangerously in sheds by the roadside. Relief and rescue officials said workers of a plywood factory at Tharia village, some 20 km from state capital Shillong. Most of the workers came from Assam. He has become able to find out the bodies of four were rescued from the debris while the searching for two others were as missing and injured people have been taken to hospitals in Shillong. A sunny break has given a chance of relief for the lash large swathes of the Northeast for three days from the Heavy rainfall continuing of heavy rainfall. It has been seen that lots of areas of Imphal valley have been covered with flood as are eight districts of Assam displacing at least 35,000 people.



**Plate :** The images of killed person for the Landslides in Ri-Bhoi district, at Sohra

According to the researcher, major landslides occurred for the continuous rain and killed at least six persons, five were from Ri-Bhoi district among of them and one was from Sohra Civil Sub Division. Among them, five persons were killed, leaving several others were injured, and one person was still missing for a landslide at Tharia village under Umiam police station of in Ri-Bhoi district. The researcher has observed that the incident was struck at Tharia village under Umam Industrial Area, at near about 5 am that day when many residents were still being slept. He has also seen that the staff quarters of a local Plywood Factory of Tahria and nearby houses of local inhabitants swallowed up in the Industrial area. Heavy rain brought levy landslide and soil erosion in many places from the incident in the last few days. The researcher has told that four

bodies were recovered from the place of occurrence, while one among the injured persons, submitted to injuries on the way to hospital and one person is still missing till the date. The researcher has found that in the earlier days, when the rescue operation was still one, two persons, Kristina Lama (60) and Reena Lama (mother and daughter) were declared as missing. However, later, at 6.30 pm, the rescue operation team identified the body of a woman among raising the death charged to five and it was the body of Reena Lama. The researcher has seen the action about the disaster that a rescue operation of the State Disaster Response Force (SDRF) of the Meghalaya Directorate of Civil Defense and Home Guards along with personnel of the Fire and Emergency Services and local inhabitants have engaged to take a rapid work of

recovery. The rescue team of the SDRF was controlled by Deputy Controller of Civil Defence, P.H. Khongsngi. The rescue operation was impeded due to stormy weather for a moment during the day. Though rainfall was being continued in the area, so, it propounded threat to the rescue team. The researcher has observed how the affected areas of landslide were deployed downstream to locate a body which is swept downstream below a landfill, and a stream flows near the place of occurrence by the adding of four members of the SDRF. Due to standard safety protocols of rescue workers, the operations has been suspended at the night and likely to resume on Sunday until the permits of weather. According to the researcher, Home Guards officials also visited the affected area and took stock of the situation of that particular place. He has invented another tragedy, within a moment a girl child was slaughtered after a house which was totally cleaned by landslide at Lumkyntong village near Mawjrong under Sohra police station. A terrible scene was captured by the researcher that a child with the name Rishisha Mary Sohtun (2 years 10 months) was entombed under debris, while her mother and father escaped from the spot with minor injury. The incident came in the lives of all the three (father, mother and daughter) at near about 3.30 am when they were in deep sleep. Major landslides of the locality also brought about in several places under Sohra Civil Sub Division for the following heavy rain. The researcher has told that major landslides were described along with the Umstew-Wahkaba road, Tyrna, as well as Umtyngar area. During the time of the landslide at Umtyngar blocked the Shillong-Sohra road was gathered with many vehicles in this place and they have stranded on the road for nearly four hours. After that the debris was cleared later by some process. The researcher has found that a suspension bridge was built over Umthoin River for the connection of the people of Tyllap village and Mawbang village which has also collapsed. In this moment, visiting of tourists was completely banned for the persons who wish to visit tourist spots in Sohra area for the landslide might be occurred anytime due to the extreme of rain. It has been seen to declare that the authorities have also asked workers for not going to mining sites and general people to be on alert.

The researcher has discovered a major landslide happened yesterday evening around 5.45 along with the Guwahati-Shillong Road in Meghalaya's Ri Bhoi district and it has again rended road communication between the capitals of the two states. He has observed that one vehicle owner was murdered and at least seven people of other vehicles were entirely concealed under the debris for the landslide of the spots which is present on the road of Umling along the Guwahati-Shillong road. He has also seen that the incident brought a jam of hundreds of vehicles which were stranded on both sides of the road for several hours due to the incident and the vehicles were converted by the traffic police which were coming from Guwahati to 20 Mile to pass through Umduh village road to come back to the national highway. The vehicles which were going from Shillong, they have been diverted from Umling to Umduh and then to 20 Mile to take the national highway. Later, the researcher proclaimed that an alternative route has been opened for light vehicles between Guwahati to Shillong via Naarang. He has observed that the rescue and restoration works have been seen since last night and some

attempts are being made to dig out vehicles from mud and rocks. According to the researcher, the road spot was finally cleared up at around 11 AM due to the following non-stop clearing of the debris by at least eight earthmovers. At least 68 lives in Assam and 56 in the neighboring Meghalaya started to fight against the incident with the catastrophic floods at a time when it has come in both the north-east states of Assam and Meghalaya. These devastating floods brought the affects among lakhs of people which triggered by heavy rains and ravaged several districts of both the north-east states have forced tens of thousands of people to leave their homes, left numerous marooned. After some days, although the waters have become less in most the areas from both the states, the number of people still affected is gigantic mood. According to the researcher, near about 3.7 lakh people across three districts are still struggling for the effects of the floods and over 50,000 hectares of crop area are still under water across the state. It has been discovered earlier by the researcher that Over 42 lakh people of the state have been affected during the three waves of floods while 4,446 villages have been hit. It has been seen that a total of 54,088 houses have been fully collapsed while 82,095 houses are partially smashed away. He has observed that the flood has affected on the other hand more than two lakh people of Meghalaya submerging at least 1,172 villages under the victims of waters. He has seen that besides this, both the states have suffered from terrible losses in terms of property, infrastructure, cropped land and dwelling units as well. For the account of the natural disaster, many districts have been severely damaged alongside, a large number of roads and bridges, government infrastructure like schools, health centres and offices in many districts have been severely damaged on. The researcher has seen that Union Home Minister Rajnath Singh on 1st October visited the flood-affected areas of Garo Hills and Assam and he declared that the state authorities will provide all possible help to deal with the crisis. According to theory of the researcher that the Centre has already released an amount of Rs.386 crore for Assam and Rs.123 crore for Meghalaya and an additional amount of Rs.286 crore and Rs.8 crore has also been confirmed by the Union Home Minister for Assam and the worst-hit Garo Hills respectively, in order to deal with the situation and to ensure relief and rehabilitation for the entire people of the surrounding areas. According to the researcher, this is only initial sanction from the governmental side. It has been declared that the state governments have got these helps from the central government which would give all the support for dealing of the disaster. The researcher has got the information about both the flood-affected states and confirmed them for all possible help and assistance from the government. According to him, the states governments have to submit a memorandum as early as possible so that the central government would be able to send an inter-ministerial team to the affected states to maximize their assistance. He has able to know that the Assam government has already submitted the memorandum to the central and the another government of Meghalaya was on the process of preparing the memorandum for the seeking of highlight the damages and rebuilding exercise for the entire people of the surrounding areas of the incident. The researcher has become able to find out the real information about the Meghalaya government who would be capitulated the memo on Oct 10 when the state's Chief Minister

Mukul Sangma is being expected to meet the Home Minister in New Delhi. According to the researcher, different types amount were demanded from the states governments like Rs 2010 crore for damaged infrastructure, Rs 660 crore for rescue and relief operations and Rs 6,700 crore as special assistance that includes Rs 3,500 crore for raising and strengthening embankments and Rs 1,000 crore for mitigating floods in Guwahati. Earlier, Tarun Gogoi had accused the Centre of discriminating against the State in terms of providing flood-assistance, adding that no package has been announced by the government yet despite the 'unprecedented incident of the locality'. The natural incident of the entire locality have become the needful for the development of telecommunication connectivity which happened as raising a dedicated battalion for the tackle of the matter by the Home Minister and to State

Disaster Response Force (SDRF). The researcher has seen the quantum of damages in Meghalaya and Assam. According to the researcher, both the state will get full cooperation from the centre to undertake rebuilding exercise after completing the aerial inquiries of the flood-destroyed areas. On seeing the huge destruction of the floods, the researcher has tried to find out the actual cause of the vast losses and deaths of the people of those particular areas where incidents have been happened. To drive out the all types of natural and artificial distresses of the surrounding places, the researcher has urged to the government and other statutory bodies of the country for all types of helps or assistance. To see the entire incident, the central government has been decided to help the state governments to tide over the crisis".

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