

## Massive Landslide in Papua New Guinea. Draws Attention to the Increasing Worldwide Harm From Landslides

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The recent massive landslide in a once-bustling village of Enga province of Papua New Guinea has been one of the worst tragedies of its kind. While UN officials have estimated about 670 deaths resulting from this disaster, later reports mentioned 2000 people being buried and the possibilities of deaths being higher than earlier estimates.

What is already evident is that when rescue efforts with proper equipment are delayed, the chances of survival of people buried under rubble for over 24 hours start diminishing rapidly (although miracles are known to happen). This emphasizes the need for more decentralized preparations for meeting rescue needs closer to vulnerable areas. By all accounts this was a very vulnerable area, but it appears that adequate rescue preparations including equipment were not available nearby.

This draws attention to another important aspect of the disaster—that it has taken place in a conflict zone where significant incidents of sectarian violence have taken place in the recent past. On the one hand this distracts attention away from priorities such as better preparations for disaster preparedness. On the other hand conditions of conflict make it difficult to rush relief as early as possible. In the present case security had to be arranged for some rescue convoys to avoid the possibility of any harm to them.

This huge disaster has also focused attention on the worldwide increasing harm from landslides and related disasters. The various mountain and hill ranges of India and other parts of South Asia, to give one example, have been suffering increasing harm from landslides.

A landslide in Irshalwadi village of Raigad district, about 65 km from Mumbai, led to the

wiping out of almost the entire settlement as only a few houses out of the nearly 48 were spared.

The remote village is so difficult to approach that even well trained rescue teams had difficulty in reaching the area battered by heavy rains followed by a massive landslide. Taking heavy machines for removing debris and rescuing people was even more challenging.

When rescue work was finally called off after nearly four days of a high-risk operation, nearly 27 bodies had been recovered while about 60 people were still missing, and were feared to have perished. Hence the death toll in a settlement of nearly 230 people was likely to be around 90. This tragedy could have been avoided if people had been able, with government help, to shift to safer locations, or if appropriate steps to protect the crumbling hills and prevent the possibility of a landslide had been taken in time.

Moreover, this was not the only such tragedy in this wider region. In two other such tragedies in recent years in Western Ghats regions of Maharashtra state, in Raigad and Pune districts, about 80 to 110 deaths were reported.

There is a costly lesson that should be learnt at least after such huge tragedies. Many landslides are being caused by man-made factors, and adequate caution can help in avoiding the possibility of several such tragedies.

In many big landslides of Himalayan region carelessness relating to indiscriminate construction activities or mining have been involved. In 2022 in a landslide in Manipur, India, nearly 47 bodies were recovered but several persons still remained missing.

In year 2021 in mid-August a landslide in Nigulsari area of Kinnaur (Himachal Pradesh, India) had resulted in 28 deaths and at least 14 injuries. The last week of July 2021 was particularly worrying as within the span of a few days in Maharashtra, Western Ghats and Himalayan region landslides claimed over a 100 human lives in India.

For neighboring countries the year 2017 turned out to be the most destructive from the point of view of landslides as nearly 152 persons perished in mid-June in the three hilly districts of Chittagong, Rangmati and Bandarban in Bangladesh, while in the previous month nearly 100 persons perished in Sri Lanka in landslides and mudslides.

Smaller landslides can also lead to loss of housing or habitation becoming very dangerous for one or more families and when all of these smaller tragedies are added up then the harm caused by them can be very serious. About 12% of the total land area being hilly is exposed to the threat of landslides in India. However when landslides add to the threat of flash floods, then their destructive impacts can travel much further to the plains below the hills. Landslides also increase the possibility of road accidents in several hilly areas.

There is increasing realization that the total number of landslides is very high and increasing at a fast pace in many hilly areas. According to the Durham Fatal Landslide Database the actual number of landslide related fatalities at world level during 2004-10 was actually roughly five to ten times of the estimates mentioned earlier. The previous estimates for this period ranged between 3000 and 7000 while the new estimate given by this database is 32300. Prof. Dave Petley, who led the efforts to prepare the Durham Fatal Landslide Database at the International Landslide Centre in Durham University, included several research papers and reports from aid agencies and their partner voluntary organization working in remote areas, along with government data to prepare a wider database. Clearly estimates based on government data alone underestimated the fatalities to a very considerable extent.

Two important facts have been emerging from several recent landslide disasters which are related to each other. One aspect is that several disasters have been reported from sites of heavy construction activity. The Manipur disaster was reported from an area where a railway project was being constructed and neglect of safety precautions had been reported. More landslides have been reported from highway construction and dam construction areas where blasting takes places despite advisory against blasting at several places.

The second and related aspect is that workers employed in construction projects in hilly areas are more exposed to landslides, particularly migrant workers from plains who are not used to living and working in landslide zones. In a recent such tragedy in Ramban area in Jammu-Srinagar highway in 2022 about 10 workers died while in one of the biggest such tragedies at Tehri Project site in August 2004 in Uttarakhand, a very large number of workers had died. While officially only the death of 29 workers was mentioned, the number of migrant workers who perished is likely to have been much higher as nearly 110 workers were present at the tunnel site where the slide occurred and a large number of them could not be traced for several days.

Hence there is need to be much more consideration regarding improving safety conditions in all big construction projects in hilly areas, particularly the Himalayan region. There are reasons to believe that safety conditions often leave much to be desired. In the case of the Tehri project site of landslide, the micro-silica treatment had not yet taken place and Dr. P.C.Navani, a senior geologist had commented then that work in the unlined area should have been avoided at all costs in the rainy season.

Indiscriminate deforestation and tree-cutting as well as excessive mining and quarrying in fragile zones are other factors responsible for the rise in landslides. In terms of habitations, poor people who cannot afford houses in more secure areas sometimes agree to settle in the more risky, slide-prone areas, increasing their vulnerability to disaster.

Other people are driven more by greed than need, and there are several examples of rich persons indulging in over-construction, adding more burden on fragile hills. This is often true of hotel construction in hill stations, but sometimes even government agencies are at fault in terms of their own buildings. Hence land-use in hills has to be even more carefully regulated than in plains.

Due to all these factors some landslide zones are becoming more active while several new ones are being added. At the same time the number of people likely to be present in several more exposed and vulnerable areas has increased.

On the plus side the technology of protective works has certainly progressed, helped by a lot of useful research. As a result some impressive protection can be seen at some locations, but more often than not protection work fails to get adequate support and funding and the protection walls and other works that are often constructed do not come up to the required standards.

Another important aspect relates to identifying those habitations which have become too unsafe due to the high possibility of destructive landslides and which need to be shifted to a new place. Such rehabilitation should be done at the right time without much delay so that loss of precious human life can be avoided. On the other hand where there is still good chance of saving the habitation by taking up adequate protection works then this option should be preferred, again on the basis of urgency, although even in such a situation shifting for a few days may be necessary.

Landslides need a multi-sided, protective and advance response, and merely reacting to serious situations is certainly not adequate. Hill-people understand well the seriousness of this increasing risk and if a comprehensive program is taken up with their participation to reduce the risk and harm from landslides, then good protective results can be achieved.

The horrible disaster in Papua New Guinea should be a wake-up call to the world to take many-sided steps to check the increasing threat from landslides.

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