

# LANDSLIDING AWAY

## **Landslides are not always a natural calamity**

'Development' work that ignores the fragile ecology of mountains often leads to more pain than gain.

Poorly designed, badly constructed mountain roads, are a case in point.

**By Beena Sarwar**

“My shop has been destroyed. My land, 14 kanals, is buried. My ancestral graveyard is covered with boulders – I can't even visit

my parents' grave,” Ayaz Khan, a retired army sergeant, is one of over 2,000 people in the town of Hazara in Pakistan's northwest, whose homes,



*A new road scars a mountainside.*

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fields, and means of livelihood have been destroyed in 1998 by landslides.

The debris damaged homes, irrigation and drinking water supplies, standing crops, and grazing land. It killed livestock and injured people. The huge landslides and rockfalls that devastated the area were almost entirely caused by 'development' work that ignored the fragile ecology of this already landslide-prone mountainous region.

Ironically, the project that has brought so much misery to the villagers of eight villages here is a farm-to-market road connecting Balakot to Hangaree. This was one of several Asian Development Bank (ADB) funded projects which was meant to make life better for the rural population. But mismanagement and insensitivity to the environment and people has had the opposite effect. Built by the Frontier Works Organisation (FWO) and the Communication & Works (C&W) department, hill slopes were cut indiscriminately and excess material simply pushed downhill. Not only did this weaken the slopes above, it also often irreversibly destroyed vegetation below. The soil was washed away and falling boulders destroyed property.

"Certainly, the road is essential to the area," says Omar Asghar Khan, Pakistan's economist-turned-development activist who heads Sungi Development Foundation. "But it could have been done differently. Damage mitigation was not considered. How the road should be built and where, taking into account proper slopes and

gradients. The width and route could have been different. Its handling shows a total insensitivity to the environment and people."

### **Fight for compensation**

Sungi learnt of the situation after being approached for tents by displaced villagers dreading the approaching winter. The organisation took on their cause, informed them about their legal rights and facilitated their access to government departments. The information galvanised the affected villagers into fighting for compensation.

"Every development project has a provision for compensation," explains Khan, "not just in terms of cash payment but also to repair environmental damage. But what's in the project documents rarely gets to the people — they don't know about it, and there's no monitoring."

Typically, the project managers of the Balakot-Hangaree road refused to disclose their compensation package - until pressurised. But even when the information was given, nothing was done to implement it.

"When the boulders from the road first started raining on their homes, the villagers blockaded the road work. Instead of listening to them, the authorities behaved high-handedly," says Kashif, field in-charge of Sungi's office in nearby Kaghan.

"The villagers filed a writ in the Balakot sessions court against the manner in which the road was being constructed, but the Executive Engineer and Highways Deputy Director,



**Road construction in Pakistan.**

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Ajmal Shah, told the contractor to continue. Their homes continued to be destroyed and many villagers had to take shelter in the local primary school. They filed a report with the police, the local court promised to set up a commission ... it's been almost a year and there's been no progress."

The damage was surveyed and discussions held with the affected people during a joint inspection by representatives of the consultant, contractor and Sungi Foundation. The visit led to the identification of some major issues. The developers agreed to repair or re-build irrigation channels, a graveyard, a mosque, shops and homes, and to arrange alternate shelter for the displaced villagers living in makeshift arrangements like tents and primary schools. The contractor also agreed to plant trees on slopes vulner-

able to landslides.

Dr. Momin Ali Shah of the Ministry of Local Government & Environment and Rural Development admits that the bulldozed material had caused extensive damage, and says that the provincial government is "trying to rectify the fault." In actual fact, no action has been taken so far to help the villagers, either by the contractor or the government, says Kashif. The Balakot-Hangaree road landslides illustrate how careless management can trigger landslides, causing damage that is entirely preventable. Although many mountain areas are landslide-prone, human interference increases this phenomenon many fold.

As Islamabad-based geologist Dr Saif-ul Islam Saif explains: "Nature's way of protecting these delicately balanced slopes from severe erosion and



sliding is thick forest growth and vegetation. Another human factor is our interference with the natural balance of the slopes by thrusting our developmental civil engineering projects on them, particularly road construction."

Both points are illustrated in the Balakot-Hangaree road project, where trees were cleared from the mountainside, and where the new slope created is too steep for anything to grow on it. In addition, the heavy machinery brought in by developers can trigger off landslides in weakened areas because of the weight, the heavy vibrations, and removal of earth.

Combine all these factors, and landslides are inevitable. So inevitable, you'd think that developers would have taken them into account and con-

ducted proper studies to mitigate the damage, even if that meant more time and expense. After all, the long-term benefits of such studies are so obvious, and the damage caused by short term short-cuts is so great. But apparently that's not the way it works.

Dr Momin Ali Shah admits that no proper geological studies or pre-construction analyses are made before starting these projects, "although utmost care is taken in earthquake prone areas". Considering the billions of rupees spent on the construction and maintenance of such roads, proper identification and treatment of areas with potential landslides should be a prerequisite to such road-building, as in other countries where the risks are properly evaluated before implement-



*Waiting while a bulldozer clears a slide in Pakistan.*

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ing civil engineering projects.

The present government's propensity for technology and projects like the Lahore-Islamabad motorway, makes it even more amazing that such studies are not routine. As motorways and road networks spread, landslides are bound to increase. "There is also no analysis, no attempt to link landslides with deforestation," complains Omar Asghar, noting that in the last three or four years alone, 30-40 deaths have been caused by landslides in villages in the northern areas, especially Mansehra district.

The lack of studies and foresight cause another kind of preventable disaster. People build homes on top of landslide mass, says geologist Dr M Hussain Malik, Head of Applied Geosciences Division at Punjab University's Institute of Geology, who co-authored a paper on Landslide Hazard Management and Control in Pakistan for Kathmandu-based International Centre for Integrated Mountain Development (ICIMOD) in 1996.

While surveying the Ayubia area some 30 years ago, he was proudly shown a newly built house by a farmer who had gone to much trouble and expense to build it. "But cracks were already appearing on the walls. When we investigated, we found he'd built the house on rocks and earth that had slid down from the mountain before and looked like part of the ground. It's difficult to recognise old landslide mass, especially after grass and trees start growing on them. But they are obviously less stable than actual ground."

Lack of vision by planners and the government can lead to socio-political disruptions, as Dr Malik explains, giving the example of a landslide in 1988 which damaged about a hundred houses at Riala, near Ayubia. "There were severe rains, and the area's clayey soil (already less permeable than sandy soil), was saturated. When clayey soil is saturated, it tends to retain water and starts sliding under the additional weight. The rocks in that area are nodular, football shaped. When they began hurtling onto the villages below, people thought they were 'bombs' from the heavens. Besides physical damage, there was great loss of morale, and people began migrating to nearby cities." There was no attempt by the authorities to explain what was happening, and ensure that it didn't happen again.

### **Mitigating hazards**

According to a recent survey by a team of Swiss experts in Murree hills, one of the most landslide prone areas in Pakistan, draining out the water and channelising streams could help mitigate such damage. The matter, however, involves more than surveys and engineering solutions. San Francisco-based environmental journalist Pratap Chatterjee, for example, thinks that landslides and floods are a result of human activities, like logging and fossil fuel use, disrupting the global climate.

"I don't think that we need an engineering solution but stronger laws and more enforcement on deforestation coupled with an active reforesta-



tion program and an immediate transition from a fossil fuel economy," he says.

In the absence of such laws and the non-implementation of those that do exist, deforestation in the Hindu Kush Himalaya ranges is adding to the destruction caused by nature's forces. In 1998 landslides in India's Uttar Pradesh state killed more than 400 and washed away roads, bridges, and dams. In 1997 northern Pakistan had a similar catastrophe. What is needed, says Dr Malik, is detailed zonal geological maps specifying seismic history, precipitation patterns, and engineering geological properties (measuring the strength of the soil or rocks).

These geological databases, he says, can go a long way towards helping prepare appropriate control strategies.

Also necessary is watershed management and rigorous afforestation of affected areas. Regional cooperation is vital, since of the 250 sub-watersheds in Pakistan, 30 percent is shared with Afghanistan, China and India. "We need to cooperate with our neighbours, share information and strategies," he says. "If there is deforestation and silting in their areas, it will affect us too."

"These are young mountains and inherently unstable but because of population pressures, people in our part of the world have started settling



*Fragile slopes.*

HIMAL/Bikas Rauniyar

down densely in vulnerable valley floors," he adds. "Downstream, settlements in flood plains get washed away by heavy rains, and upstream, landslides carry off villages." Preventing landslides and floods, or at the very least ensuring that they cause the least possible amount of damage when they do happen, would save money and lives.

"Since the 1960s, great efforts have been made to reduce losses from landslides," says Dr Li Tianchi of Kathmandu-based International Centre for Integrated Mountain Development (ICIMOD). But, Dr Tianchi points out, "a significant reduction of landslide hazards cannot be achieved by landslide control works alone." He believes it is "equally important to adopt non-technical means." He recommends encouraging local people to participate in hazard mitigation activities and distribution of low-cost bio-engineering technologies to them. He also believes they need to be provided with education and training on landslide hazard management and control.

"In landslide-prone areas, people often do not take mitigation action because they do not understand what to do, or lack the training on how to

do it," he explains. "There is need for appropriate information about landslide mitigation to be transferred to people, planners and decision makers through training and workshops."

So how can the loss of life be minimised, and how can engineering solutions mitigate the dangers in a landslide-prone country like Pakistan? As in all other areas, what is needed first of all is political will. Chief Minister Shahbaz Sharif seems to have taken an interest in the matter by commissioning the Swiss team to carry out a geological survey of the Murree hills.

The trick is, once the survey is complete, to take the findings to the people – inform them of the most vulnerable areas and ensure that those areas have a minimum of human population and construction. "We can only do the research. We don't have the time, transport or the funds to convey the information," says Dr Malik.

He suggests the involvement of union councils, tribal chiefs and village elders in awareness programmes, and obtaining their cooperation in watershed management and afforestation activities. But more than anything else, what is needed is political will.

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