

Report on Field Visit of Sunkoshi/Bhotekosh Landslide Affected Area

A report produced by DPNepal Nepal

Background

A massive landslide occurred at around 02.30am, local time on Saturday, 2 August 2014 at Jure village in Sindhupalchowk district in the boarder of Mankha and Ramche VDC. The landslide killed 156 people, injuring 27 and displacing 436 people. However 33 dead bodies including those of 7 children have been pulled from the debris but 123 missing people buried in the debris were also presumed to be killed in the landslide. The local government provided immediate relief in cash to the affected family declaring the dead for remaining bodies buried in the debris. The landslide blocked Sunkoshi River creating a high dam across the river. The landslide-dammed lake has created havoc amongst the local residents and people living in the downstream and upstream riverside areas.

The landslide has completely obstructed the Arniko Highway and it is not possible to pass through the landslide further to the north. It has created further severity to the people living in the northern side of the landslide area. It requires at around two hours trekking from Barhabise to reach to Khadichaur bazaar to catch bus/taxi services.

The incident has posed threat to supply of regular consumable goods, and has also put risk to the lives of sick, injured and people requiring special medical attention including pregnant women, children and elderly from the worst affected area. Road service leading to Dolakha and eastern districts has resumed and getting in to normal. There is no electricity in the worst affected area, and phone services are irregular. Majority of people living within 200 meters both sides of the river below the landslide-dam area who were advised to vacate the area till further notice from their homes have already returned back to their places though roadside economic activities have yet not been back to normal.



Closed shops in Khadichaur bazaar – downstream (photo: Hari Darshan Shrestha)

However the search and rescue continues in the rubble created by the landslide and risk is still not over due to potential flood risk in the downstream. According to the experts involved in the



study, about seven million cubic meters of water extend around 3 km upstream in the lake created by the dam which is estimated to be around 46 m high.

DPNet Initiation

Immediately after this deadliest disaster in Mankha, Sindhupalchowk district, an Executive Committee emergency meeting was held by DPNet Nepal on the Chairmanship of Prof. Dr. Bishal Nath Upreti, Chairperson, DPNet on 3rd August, which was also attended by its advisors and ex-presidents. The meeting decided to convene an urgent meeting with its members/partners to discuss on the disaster issues the next day. On 4th August 2014 afternoon, a brief meeting was held on the Chairmanship of Prof. Dr. Bishal Nath Upreti, Chairperson, DPNet Nepal and the meeting suggested forming a joint Assessment Team of experts and dispatching immediately to the site. The team was constituted consisting of experts including from both technical and humanitarian fields. On 5th August 2014 early morning the team left for the field and conducted initial rapid assessment and field observation. In the field the team held a meeting with local government authorities including the Nepal Army and APF, rescuers and the representatives of Nepal Red Cross Society. Interviews were also taken with the local community and a few displaced people living in the camps.

Objectives of the field visit

- General observation of the condition of the landslide-dam and the lake formed, and the overall stability condition of the surrounding slopes. Evaluate the consequences in the downstream side due to the possible dam burst.
- Observation of ongoing response and relief interventions.
- Identify the gaps in the rescue/relief distribution and to recommend to the Government of Nepal, humanitarian agencies and other stakeholders.
- To make recommendation if there is any need of further technical study in the area on both the actual landslide as well as the Dam to reduce the possible impact on the downstream side of the Sunkoshi River.

Assessment Team

The joint Assessment team led by DPNet Nepal moved towards the landslide affected area and collected the first hand information on the landslide affected community. The team members were as under:

1. Mr. Hari Darshan Shrestha, DPNet (Team Leader)
2. Mr. Deepak Paudel, DPNet
3. Mr. Ram Prasad Bhattarai, DPNet
4. Dr. Hari Krishna Shrestha, Nepal Engineering College
5. Ms. Madhavi Pradhan, Act Alliance
6. Mr. Bimal Khatiwada, Oxfam
7. Mr. Narendra Khanal, ICIMOD
8. Mr. Deo Raj Gurung, ICIMOD

Loss and damage assessment

The impacts mentioned in the report as of 5th August 2014 are mainly from the worst affected areas near the landslide-dam. The impact data and information is based on the interviews by the DPNet Team members with the locals at the site as well as the triangulation with the situation reports received from UNDP and NRCS.

The landslide claimed 156 lives and many more livestock. The event has displaced about 436 people. The highly affected 4 VDCs are Ramche, Mankha, Dhuskun, and Tekanpur. About 165 houses were damaged completely (Ramche 60; Mankha 79; Tekanpur 17; Dhuskun and 9) whereas about 37 households were partially damaged. Approximately 27 people have been injured and are under treatment in Kathamndu.



Damages and collapsed building (photo: Hari Darshan Shrestha)

Based on the initial preliminary observation at the site, the followings are the losses of physical properties:

- School building-RCC Building (Ban Sanghu Secondary School): Rs. 10 Million
- Primary Schools at Dawi and Jure (1 in each location): Rs 2 Million
- Bridge and Road at Jure: Rs. 40 Million
- Math and Temple 2 Nos: Rs 2 Million
- Paddy field (300 Ropany): Rs 15 M
- Small shops (25): Rs. 12.5 Million
- Fish Pond (1): Rs. 1.5 Million
- Poultry firm (6): Rs. 2.4 Million
- Vehicle (10): 45 Million

Total: Rs. 130.4 Million

Power transmission from five hydropower projects—Bhotekoshi (45 MW), Sunkoshi (10 MW), Sanima Sunkoshi (2.5 MW), Chaku (6 MW) and Bhairabkunda (3 MW) has been damaged and

halted temporarily. Landslide has also swept away two gates of the Sunkoshi Power House headwork (NEA).

The impact and economic loss due to blockage of road, disturbance on livelihood and economic activities on downstream, damages in transmission line, damages in Sanima hydropower and closing of Sunkoshi hydropower is tremendous and yet to be assessed.

Observation of landslide area and Dam

The following are the observation of technical team on the landslide incident and present scenarios, based on visual observation, inference of physical evidences and discussion with local residents;

- The landslide resulted from seepage of water through cracks in the rock at the upper and middle portions of the landslide mass.
- One of the sources of water which seeped through the cracks is the ongoing practice of flood irrigation in the agricultural fields located above slip surface in steep topography.
- There are clear evidences of other land cracks in the immediate vicinity of the landslide, and the farmers are still practicing flood irrigation in their fields just a few meters away from the landslide. As such, similar landslide can occur in the same general area at any time in the future.
- The landslide suddenly displaced the Sunkoshi River flow with debris which resulted in a massive wave of about 100 meter towards the left bank of the river. The wave resulted in destruction of the forest area on the left bank of Sunkoshi River up to a height of 100 m.
- The debris deposit across the river created a massive landslide-dam which was completely filled in about 12 hours, after which the river started overflowing.
- The volume of impounded water due to damming is estimated to be around 7.4 million cu.m, creating a lake of about 2.5 km long and submerged an area of about 400 hectare in the upstream. It is estimated that the depth of water in the dam is about 46.7 m (technical team NEA/DPNET).



*The landslide-Dam and the part of the lower end of the lake . Viewed from the downstream side.
(photo: Hari Darshan Shrestha)*

- The river flow in the upstream and downstream of the dam is almost equal on the day of the field visit. Nepal Army is putting great effort to increase the discharge of water from the lake.
- The DHM staff is monitoring the flow at upstream and downstream of the river which seems to show a balance between inflow and outflow, considering gradual lowering of water impoundment in the reservoir created by the landslide dam.
- No leakage of water from the visible portion of the landslide dam was observed even after 72 hours of impoundment and overtopping flow. The overburden pressure of the rocks has been withholding the upstream water pressure.
- The risk of a dam break is still there, but expected to be low due to mass of debris deposit, type of material and width of the landslide dam.



Khadichaur Bazar at risk – downstream (photo: Hari Darshan Shrestha)

Ongoing Response

- In general the DDRC is working in an organized way
- Roles and responsibilities on relief, search and rescue are well articulated and assigned; LDO taking leadership of the relief works and Assistant CDO leading search and rescue.
- Well coordinated mobilization of security forces and government officials, e.g. effective mobilization of VDC secretary



Beneficiaries in Shelters (photo: Hari Darshan Shrestha)

- DEOC is working 24 hours
- Stakeholders engaged in relief work other than the Government are mainly Nepal Red Cross; some of district based NGOs and Save the Children.

Recommendations

The assessment team discussed with local government authorities, rescuers, Red Cross and affected people in the field and has come up with the following recommendations to reduce the risk of further damages, saving life and effective response. DPNet also held a debrief meeting with its members /partners on 5th August afternoon and provided the information from field observation.

Some humanitarian agencies e.g.; Nepal Red Cross and Save the Children have been distributing some relief items to the affected people in coordination with government and other humanitarian agencies have expressed that they are also ready to provide any kind of relief support to the affected community.

Immediate Response

- Assistance on relief material such as; staple food items (Rice, Dal, Salt, Oil, Potato etc.), drinking water, Piyus, sanitation & hygiene kits; cooking fuels, torch lights, folding bed, emergency and transitional shelter kit and mattresses
- Establishment of Information, medical service and counseling desks at the camps
- Establishment of ECD and temporary school
- Early Recovery strategy

Preparedness on the consequences due to probable outburst of the landslide-dam

- Early warning system in downstream – 24 hour monitoring of the reservoir water level & dam, and installation of a series of sirens and vehicles fitted with siren ready to move in different location for the safety of the people living close to the river in the downstream stretch.
- Gradual controlled increase in the reservoir outflow.
- Evacuation strategy, emergency escape route and camps – A study on dam break scenario or flood hazard to map potential damage and inundation area, in case of a dam break

Technical study on the Dams and landslide

- Study of material and nature of Dam
- Study on landslide to see possibilities of further landslide
- Survey and define the area, depth and actual volume of water
- After study of nature of dam, decide to strengthen or lowering the dam and discharge water in controlled manner
- Immediate construction of bypass alternate road to Kodari, if feasible
- Recovery and Reconstruction strategy