Role of trees and forests in disaster risk reduction and mitigation

Disaster, as defined by the United Nations Office for Disaster Risk Reduction, is a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources. In recent years, the frequency and severity of both natural and man-made disasters have increased resulting in significant human casualties and loss of property. According to the International Emergency Disasters Database (EMDAT), 22,773 people were killed and 98.6 million people affected in 346 disasters reported worldwide in 2015. The economic damage totaled USD 66.5 billion in the year 2015. Floods, storms and droughts were the three most frequent natural disasters in 2015. Other common disasters were: landslides, earthquake and tsunami, wildfires and extreme temperatures.

Nepal is susceptible to various kinds of disasters like earthquake, flood, landslide, fire (including forest fire), avalanche, epidemic, extreme rainfall, wind-storm and Glacial Lake Outburst Flood (GLOF). Every normal year, about 500 people are killed and many people get injured due to such disasters. According to the data of the Ministry of Home Affairs, the total property loss was USD 12 million in 2012. As per the Post Disaster Needs Assessment (PDNA) Report prepared under the leadership of National Planning Commission, the earthquake of April 2015 and its aftershocks caused a total of 8,790 human casualties, over 22,300 injuries, and property damages and loss worth USD 7 billion. The EMDAT reported this as the biggest natural disaster of the world in 2015.

There are various preventive and curative mechanisms against natural and man-made disasters. Most of them are highly technical, externally designed, needing huge investments and difficult to implement. In this context, the conservation and management of forests can provide locally available, relatively less expensive but significant contribution in protecting against disasters and in reducing the negative impacts of disasters. Trees and forests can contribute in disaster risk reduction and mitigation mainly in four ways.

First, forests and trees can offer physical barrier against natural disasters such as floods, landslides and tsunamis, thereby preventing loss of lives, property and livelihoods. Trees provide protection against floods, landslides and windstorms. Roots of the trees reduce soil erosion and land degradation by binding soils and

soil nutrients. By reducing the speeds of the wind and water, forests and trees can diminish the magnitudes of disasters. In this context, bamboos, due to their fast growth and extensive root system, have a powerful role in controlling soil erosion and protecting landscapes. The physical barriers created by mangroves against cyclone and tsunami are extensively reported in literature. Likewise, tree plantations and conservation along the rivers have been considered as a measure to prevent river scouring and protection against floods. The role of trees and forests in water storage and recharge is widely regarded as the good strategy against drought. Trees on our hills have also been found to prevent human casualties and injuries by stopping stone falls.

Second, forests provide building material for shelter and infrastructures in the recovery, rehabilitation and reconstruction phase to build back better. Forests provide the most convenient and locally available building materials for quick construction of shelters to the affected households and communities. The uprooted or damaged trees can be harvested to build temporary and permanent houses. Forests, therefore, have significant roles in the rehabilitation of communities affected by natural disasters.

Third, forests support people by providing various kinds of foods before, during and after disasters. Several forestry products can be used as safety nets in the case of emergency and food shortages.

Fourth, in the context of climate change contributing to increased frequency and severity of disasters, conservation of forests, reforestation/afforestation programmes, and sustainable forest management can minimize disaster risk by mitigating climate change through the reduction of greenhouse gases emissions and through enhanced carbon sequestration.

In Nepal, an estimate of Department of Forests showed that 52 million cubic feet of logs are required for the reconstruction of infrastructures destroyed by the 2015 earthquake. The Government of Nepal has also eased the process of transportation of timber salvaged from old and damaged houses within the 31 earthquake affected districts of Nepal. Moreover, the Government has been planning to increase the production and manage the supply of timber for post-disaster reconstruction in Nepal.

In this direction, prevalent community-based forest management regimes (community forestry, leasehold forestry, and collaborative forest management) should also be managed with ample emergency provisions for providing wood in any likely event of disaster. In addition, the forestry sector should have an emergency plan for responding promptly to any future disasters. Furthermore, there is a need for research on the role and effectiveness of trees and forests in preventing and mitigating various kinds of disasters in Nepal.