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Nepal Earthquake: Need to Quantify Impact on Forest Ecosystem

Forest ecosystems are affected by many kinds of disturbances which are recognized as natural and integral part of their development. However, when the normal range of variation due to a disturbance is exceeded, it could result in large-scale destruction of forest ecosystem structure and its functioning. Geophysical disturbance such as earthquakes and volcanoes can be cited as examples of such disturbances. Although earthquakes commonly occur in tectonically active regions, large-magnitude earthquakes can have serious disturbance in forests over large areas. The extent of the damage is, however, determined by the distance from the epicenter of the earthquake.

Nepal is situated in a tectonically active region in South Asia. On 25th April 2015, Nepal experienced a major earthquake followed by numerous aftershocks. These events resulted in the loss of thousands of lives, severe-injuries and devastating damages to buildings and infrastructures. The districts in the central part of Nepal that were close to the epicenter were the hardest hit. The earthquake triggered landslides in many districts of Nepal. These landslides have not only damaged houses and farmlands but also impacted the forest areas on the mountain slopes. The impact of landslides include removal of surface vegetation, damage to trees during the movement of debris from higher-slopes to down-slopes as well as final deposition which either completely cover forested-areas or cause partial damage to forest stand. The landslide impacts have the potential to get worse during the monsoon season. The impacts on forest can also include physical impact to tree roots, shift in ground level due to soil liquefaction and even water table. Thus, in addition to immediate mortality, trees may suffer longer-term impact of disturbance in terms of wood quality, regeneration and stand structure.

Another impact of the kind disaster on forests would be increased demand for timber for reconstruction of damaged buildings. Also, there is a likelihood of encroachment in forest areas as they often provide open-access land for people to build temporary shelters. Forest administration has to be vigilant of this possibility and should, therefore, adopt appropriate strategies to manage this possibility.

Landslides can influence forest biodiversity and services through their impact on forest structure, composition and function. Maintaining biological diversity and

other ecosystem services are significant in the context of Nepal where many people are dependent on forest resources. In order to build our scientific understanding of the impact of abiotic disturbance such as landslides, more information is required regarding the nature and extent of forest disturbance. Therefore, there is an immediate need to quantify earthquake-induced impact on forest resources in Nepal so as to plan and implement appropriate actions to mitigate damages as well as to support forest restoration in future. Recently, the Ministry of Forests and Soil Conservation, in coordination with the Ministry of Science, Technology and Environment has contributed to the preparation of environment and forestry component of the post-disaster need assessment. This exercise has provided important baseline information for identifying major issues, and direct and indirect impacts on environment and forests.

With the development of remote sensing methods/algorithms as well as availability of high-resolution satellite imageries, monitoring of the impacts of disasters such as earthquake, flood and forest-fire on forest resources over larger areas have become feasible. Besides, a joint effort amongst the concerned organizations is needed to better understand the impacts of such disasters on forest resources.