International Journal of Disaster Risk Reduction 10 (2014) 392–398

Contents lists available at ScienceDirect

International Journal of Disaster Risk Reduction

journal homepage: www.elsevier.com/locate/ijdrr

Pre-eminence of extreme precipitation event over deforestation: A primary cause of Himalayan disaster of June 2013

ARTICLE INFO

Keywords:
Deforestation-disaster linkage
Extreme precipitation
Himalayan disaster
Glacier debris
Flash flood
Alpine ecosystem.

Extreme precipitation events and their disastrous consequences are not uncommon in the Himalayan region. The northwestern part of the Indian Himalaya, especially the Uttarakhand State has experienced an event of extreme and incessant rains during 16–17 June 2013. The excessive rainfall triggered massive landslides, glacial debris flow and flash floods that resulted into enormous loss of human lives and widespread devastation of infrastructure, development projects, forest, crops–orchards and other natural resources that were linked to the ecosystem and cumulatively this has ceased the livelihood of the people dwelling in the hilly terrain. Due to the large extent, high intensity, most adverse socio-economic impact and massive mitigation operation involved in the disaster, perhaps it was considered to be the worst disaster in the recent century in Himalayan region [1].

The post-disaster analyses and comments have been presented by various experts including ecologists, environmentalist, civil societies and Non-Governmental Organisations. Both print as well as electronic media had covered the disaster in the form of panel discussions, blogs, reports and research articles. In most cases, deforestation in Himalaya was under the debate for their assumed role in the disaster. The existing ground conditions, such as landuse change due to deforestation for developmental activities, especially in the Mandakini River Valley, were accounted to the disaster [2,3]. However, Himalayan forest are one of the important repository of biodiversity that caters variety of direct and indirect human needs, besides ecosystem services that are essential for sustenance of human life. These luxuriant forests are inevitable to strengthen the environmental security in the Uttarakhand State but recently, public opinion of assumed linkage between deforestation and disaster has gathered attention of the environmentalists worldwide, especially of the researchers working in Himalayan region. The research article recently published by Kala (2014) in the IJDRR also linked the disaster to the deforestation in the Uttarakhand State [3]. Dr. Kala in his research article presented a comprehensive account of recent disaster and development in the Uttarakhand region and it will be very important and useful to the researchers, policy makers and disaster managers. However, on the basis of cited literature, it was categorically stated in the article (page number 148, left column and 3rd paragraph) that deforestation was a major cause of calamities in the sensitive and fragile ecosystem of Uttarakhand. It was further reported that worst devastation had occurred in the areas where maximum deforestation has been undertaken for infrastructure development such as roads, hydropower projects and transmission lines. It was explained that, since, the year 1980, nearly 44,868 ha of forestland have been diverted to non-forest use and the process of deforestation was speeded up after the creation of the Uttarakhand State in the year 2000. Out of the total area deforested, a maximum of 9500 ha has been diverted for construction of roads, followed by 5500 ha for hydroelectric projects and 3100 ha for transmission lines. Even some of the districts such as Chamoli, Pithoragarh, Rudraprayag and Uttarkashi were marked as worst affected areas due to the conversion of maximum forestland for various non-forest activities. Due to prevailing public opinion, perhaps, nearly 98 existing and 41 under construction large, small and mini–micro-hydroelectric schemes were deemed responsible for large scale deforestation and its consequential disaster. Keeping deforestation and disaster linkage in mind, The Honourable, Supreme Court of India had ordered to reinvestigate the Environmental Impact

http://dx.doi.org/10.1016/j.ijdrr.2014.09.013

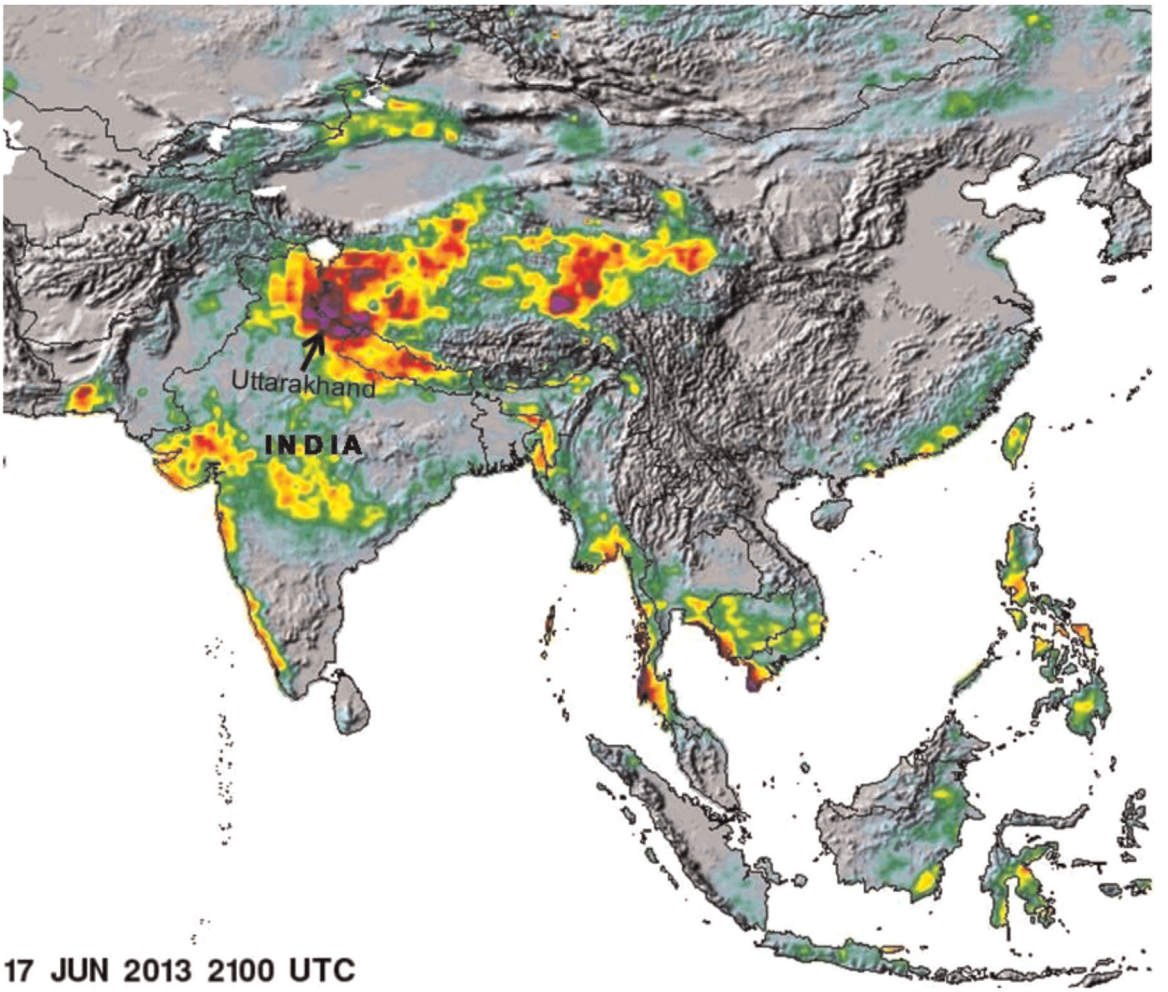

Fig. 1. TRRM image.

Assessment of 24 hydroelectric projects of Uttarakhand and also issued direction to stop release of any environmental/forest clearance for hydroelectric projects till further orders [4].

The wide publicity of assumed linkage between forest and disaster has developed public opinion against the major development projects and, hence, all operational and under construction hydro-power projects are being looked upon against the environment and livelihood of the people in the region. Moreover, future of proposed 197 hydro-power projects is considered gloomy and uncertain. This unscientific but well propagated linkage between deforestation and disasters is a matter of paramount concern that is likely to mislead the disaster management policy and planning. Moreover, it has significant bearing on future policy matters for overall development in the region. Therefore, it was imperative to investigate the potential linkage between deforestation and disasters for scientific fraternity and policy planners to facilitate realistic disaster mitigation strategy and promote sustainable development in the Himalayan region.

Efforts have been made to investigate the potential linkage between deforestation and disaster along with causes and factors involved in the event. Data generated both from ground investigations as well as from remote sensing method for pre and post-disaster period were considered during the study. The current and historical meteorological observations for the affected area were obtained from respective departments. The overall change in the forest cover during the relevant period was also determined.

The investigation revealed that recent torrential rainfall and associated catastrophe was not directly linked to deforestation in the Uttarakhand State. In fact it was linked to the extreme event that was governed mainly by behaviour of Westerlies and Indian Monsoon System under the influence of global pressure belts. The existing landuse, especially degraded forest of the Uttarakhand State or even North India, neither played any role nor could influence such a global phenomenon because (i) the satellite data show that during April–June the low pressure area initially developed in the neighbourhood of Mediterranean Sea. Due to development of low pressure area, strong Westerlies were active over the mid-latitudes i.e., areas between 30° and 60°N, that caused torrential rain fall and subsequently flooded the Central Europe at first. And later on during mid-June, strong