



MITIGATING IMPACTS OF DISASTERS THROUGH CARBON STOCK ENHANCEMENT IN NATURAL FORESTS AND PLANTATIONS

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ABSTRACT: Carbon stock in trees, ground flora, litter and soil was compared in natural forests and plantations in different ecosystems including protected and territorial forests, small pocket of forests in gated enclave, coal mine overburden dumps and adjoining native soil for its role to mitigate the impact of natural disasters. Trees stocked maximum carbon in small pocket of forest in TFRI campus (75.54 t ha^{-1}), which is the mix of natural forests and plantations in comparison to tiger reserves (26 t ha^{-1}) and territorial forests (23.96 t ha^{-1}) due to high tree density in TFRI. The plantations raised on native soil comprised 1.4 times carbon in trees than those raised on nutrients deficient adjoining coal mine overburden dumps. In contrary, carbon in herbaceous pool was found maximum in tiger reserves (1.4 t ha^{-1}), followed by territorial forests (0.82 t ha^{-1}) and meager amount in TFRI campus (0.02 t ha^{-1}). Among all the carbon pools, the contribution of soil organic carbon was observed maximum in tiger reserves (39.48 t ha^{-1}), small pocket of forest (34.5 t ha^{-1}) and territorial forests (30.67 t ha^{-1}). Developing small pockets of forests in gated enclaves is surely a way forward in achieving the targets of India's Nationally Determined Contribution, while maintaining pace with the developmental activities of the country. Simultaneously, protection of natural forests is the urgent need of the hour to mitigate disasters caused by global warming and climate change.

Keywords: *Carbon sequestration, coalfields, natural disaster, natural forest, plantation, small pocket of forests, tiger reserve.*

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INTRODUCTION

Large scale industrialization, deforestation and unsustainable use of natural resources have increased pollution leading to global change in the environment. This human induced climate change has increased the overall global temperature, resulting into excessive melting of glaciers in the Himalayas and consequent increase in water related disasters. Forest ecosystem too experiences disaster. The most common hazard in forests is forests fire. During summer, when there is no rain for months, the forests become littered with dry leaves and litters, which could ignite into flames with a slightest spark. They pose a threat not only to the forest wealth but also to the entire flora and fauna and its biodiversity.

The Himalayan forests, particularly, Garhwal Himalayas have been burning regularly during the last

few summers, with enormous loss of vegetation cover of that region. Forest depletion or degradation is another important cause of concern. Indian forests have been experiencing significant loss since long time due to various factors, mostly anthropogenic. Despite that the overall forest cover in the country is on increase, most of the forest areas in the country are ecologically in various stages of retrogression. The forest ecosystems are reeling under acute form of degradation, which has adversely affected the Indian society, both socially and economically.

Owing to various other factors, the deterioration of the forest is the major cause for increase in both physical as well as socio-economic vulnerability of country to disasters. It has been widely accepted that deforestation increases the intensity of natural disasters and is often the factor that transforms a natural hazard or climatic extreme into a disaster.