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Tree-Planting has enormous potential but significant Socio-Ecological challenges for climate action

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Tree-planting features prominently on discourses around climate change mitigation and possible strategies. These initiatives are quick to capture public imagination because of its apparent ease and promise of long-term benefits. Such campaigns have truly gone global.

For example, Goal 5 of the New York Declaration on Forests, a voluntary and non-binding political declaration involving civil society and some local governments targets the restoration of 150 million hectares of degraded landscapes and forestlands by 2020 and an additional 200 million hectares by 2030. It is widely and well-understood that planting trees, under the broader umbrella of restoring natural ecosystems, remains among a bouquet of climate actions that need our attention — and urgently.

But exactly how impactful are the activity of tree-planting in reducing emissions and helping nations meet their emissions targets?



A rainforest juxtaposes with rows of cut trees from the recent clearance of forest inside the PT Wana Catur Jaya Utama palm oil concession in Mantangai, Kapuas district, Central Kalimantan. Image credit: Ulet Ifansasti / Greenpeace

The 'potential' global tree cover

This was just the question that researchers were seeking an answer to in a **landmark study published in** *Science* this year. They tried to estimate the tree-bearing capacity of natural ecosystems. In other words, they wanted to see how much tree cover would be possible globally in the absence of any human activity.

Natural ecosystems around the world have been altered significantly by human activities and global agreements have set ambitious targets for forest conservation and restoration. The researchers wanted to understand the spatial distribution of tree cover under the current environmental and climatic conditions. They developed a model encapsulating the relationship between tree cover and corresponding soil, environmental and topographic conditions in protected areas around the world — national parks and wildlife sanctuaries in India included.



An aerial view shows a deforested area of the Amazon jungle in southeast Peru caused by illegal mining, during a Peruvian military operation to destroy illegal machinery and equipment used by wildcat miners in Madre de Dios, Peru, in March 2019. Reuters

Protected areas are a reasonable representation of ecosystems in their natural state while varying greatly in their individual environmental and ecological conditions. Understanding these ecosystems well helped the researchers train the model to gain a predictive understanding of potential tree cover across the world. This led the group to build a first-of-its-kind "potential tree cover map" depicting the tree cover that could potentially exist under a given set of environmental conditions, with human activity at its minimum. Some of the model's estimates are truly staggering.

Outside existing croplands and urban areas around the world, an additional 0.9 billion ha of land (thrice the total land area of India) is capable of supporting trees. Vegetation in these areas can store over 200 gigatonnes of carbon once restored to their natural states, which is about half the carbon in biomass stored in all terrestrial ecosystems currently. This is roughly enough to sequester two-thirds of all CO2 emissions since the start of the Industrial Revolution in the 18th century.

The trouble with tree-planting

The study was lauded for its innovative approach and scientific endeavour, considering the key knowledge gap in science and society about how restoring trees can contribute towards climate change mitigation targets. That said, it was also met with skepticism in the scientific community for its dramatic findings. In keeping with the spirit of constructive debate and discussion within the community, Science published a series of comments by various research groups (see Veldman et al., Lewis et al., Friedlingstein et al. and Grainger et al.).

Among the key arguments raised was an overestimation of the carbon sequestration potential from the "restoration areas" identified in the study. The focus on tree-planting, they suggest, could also distract from the much-needed push to cut fossil fuel emissions. Moreover, Veldman et al. claim that the study misrepresents the complex ecology of some ecosystems like savannas, suggest instead that these ecosystems should be excluded from tree-based restoration initiatives entirely. Afforestation, in their opinion, would impact the biodiverse nature of savanna ecosystems gravely. This argument, in particular, has implications for climate action initiatives in India.



What does this mean for India's tree cover?

According to the **State of Forests Report 2017**, the total forest and tree cover in the country is 80.1 million ha, which is 24.3% of the total geographical area of the country. There has been a constant endeavour to increase this percentage to 33%, as per the National Forest Policy 1988. The Indian government sees the forestry sector as a key part of **its climate action commitments**, and it has committed to '...create an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through additional forest and tree cover by 2030'.

Existing government programmes like the Green India Mission (which aims to restore 10 million ha of land) and CAMPA (focused on compensatory tree planting in lieu of conversion of forest lands for non-forest purposes) are expected to contribute significantly towards meeting these goals.

Overlapping with these goals is **the government's target** to restore **26 million hectares of degraded land and wasteland** by 2030.



Figure 1Over 1 lakh hectares of coffee plantations and agroforest were damaged in Kodagu in floods last year. PTI

Where's the available land to expand these plans?

The government's production-centric view, a legacy of the colonial times, has meant that more than 1/6th of the country currently comes under the term 'wastelands'. This category includes a wide-range of ecosystems — marshes, savanna grasslands, pasturelands as well as rocky outcrops and plateaus. Such characterization has often meant that these 'degraded' ecosystems need to be reclaimed by planting trees.

The potential tree cover map indicates that some of the country's grasslands have been identified as lands ripe for restoration and tree-planting. Among sites for potential reforestation in India are parts of Chhattisgarh, Madhya Pradesh, Maharashtra, Telangana as well as areas over the western coastline. Some of these areas are natural savanna ecosystems, supporting not only characteristic flora and fauna but also local livelihood systems'.

These non-forest ecosystems are not marginal habitats or wastelands, rather they are as important as forests in sequestering.

Despite extensive research establishing the ecosystem services provided by these landscapes, the idea that such landscapes are "unproductive" still dominates public policy debate. This point of view ignores the ecological history and societal significance of these landscapes.

Need for natural climate solutions

In response, the authors of the original study insisted that it wasn't meant as a policyprescriptive tool or what 'should' or 'should not' be done. Rather, the researchers hoped the findings provide estimates for the extent and spatial distribution of global potential tree cover. They also reiterate the urgent need to reduce emissions from fossil fuels and land-use changes. The endeavour to estimate global tree-planting capacities is indeed appreciable, but local context is key when interpreting such studies.

In India, other 'natural climate solutions' like agriculture and grassland management, and agroforestry should be considered, too.

These activities represent some resilient and long-lasting climate actions, in favour of keeping the global temperature rise within 2 degrees Celsius in the future, and avoid the dangerous consequences that climate change will undoubtedly bring if we don't react quickly and efficiently.

Source: <u>https://www.firstpost.com/tech/science/tree-planting-has-enormous-potential-but-significant-socio-ecological-challenges-for-climate-action-7682271.html</u>