

Climate Change is Exacerbated by Mountain Deforestation

Climate Change has now become a major issue on the global agenda. Mountain peaks are becoming bare of snow, glaciers are melting, fresh water is decreasing and deserts are on the increase. In short, natural disasters caused by human activities, which have induced climate changes, are severely affecting the lives of millions of people around the world and threaten billions. These are predicted to greatly increase with the present rate of environmental degradation. However this is not a time to be daunted by the scale of the situation. There are still important changes that can be made and which could prevent even worse disasters from occurring in the future. Yet this cannot happen if we ignore the situation, underestimate it, deny the causes or fail to prioritise it for action.

"Climate change would be a less immediate threat, if we had kept pace with commitments to sustainable development enunciated again and again over the years." (U.N, 2008, Millennium Development Goals Report, New York)

Healthy mountain ecosystems are actually key elements within global climate regulation. Disturbingly since so much of the biodiversity within these regions has been removed worldwide and with mountain glaciers rapidly retreating, they are no longer able to effectively perform the important climate stabilizing and regulating functions that they once did.

"Glaciers are a critical component of the Earth system and the present accelerated melting and retreat of glaciers has severe impacts on the environment and human well-being, including vegetation patterns, economic livelihood, natural disasters, and water-energy supplies." (UNEP, 2007)

Rapidly melting glaciers, reduction in mountain snow and extreme changes in weather patterns are recorded in mountain regions worldwide. and having seriously negative affects upon the global climate, water supply and energy. However the way that mountain deforestation and mountain

region ecosystem degradation is impacting upon climate change is often overlooked.

Climatologists and microbiologists have demonstrated, that the relationship between plants, forests, biodiversity and global atmospheric are not simply a one-way affair. It is well known that glaciers in mountain regions are an essential element in climate regulation worldwide. Yet it is less understood, how much the mixed forests of these regions affect the on-going replenishment of these snows and glaciers and therefore what a pivotal role they play in atmospheric and climatic regulation. Fortunately there is a growing awareness and recognition of this interdependent relationship.

“Most people assume that global warming is caused by burning oil and gas. But in fact between 25 and 30 percent of the greenhouse gases released into the atmosphere each year – 1.6 billion tonnes – is caused by deforestation.” (FAO 4 September 2006, Rome)

For greater effectiveness in dealing with and addressing climate change, the ecological restoration side of the equation needs to be placed in the forefront. There is presently a lot of focus directed towards stopping or reducing activity that harmfully impacts upon the climate. However ecological restoration needs to be allotted equal importance. Reforestation for the purpose of creating carbon sinks is considered to be a valuable way of limiting carbon dioxide in the atmosphere. However there are multiple other ways in which mixed forests impact upon climate and not all of them are immediately apparent.

“In addition to impacts on the global carbon cycle, forests can alter the composition of the atmosphere through the emission of gas-phase and aerosol species (biogeochemical effects) and can modify land-surface properties (biophysical effects).” (D. V. Spracklen et al., 2008, 'Boreal Forests ')

Forests play a major role in Earth's carbon cycle. Trees convert atmospheric carbon from CO₂ into organic woody biomass as part of a respiratory process called photosynthesis. Trees then store the carbon until the woody biomass is destroyed. This carbon storage is called sequestration. When

forests are cut down, not only does photosynthesis– and thus carbon absorption– cease, but also the carbon stored in the wood of the trees is released into the atmosphere as CO₂ if the wood is burned or decays. Microbiologists have also demonstrated that large quantities of ice nucleating bacteria (*Pseudomonas Syringae*), which naturally live on the surface of plants, may be essential in cloud formation, rain and snow and thus play an immensely crucial role in climate regulation.

“This work is truly multi-disciplinary, bridging the disciplines of ecology, microbiology, plant pathology and climatology” (Brent Christner, LSU professor of biological sciences)

Recent discoveries in the field of microbiology shine fresh light upon the role of biodiversity in climate and water regulation.

“Unearthing a role for biological Ice Nucleators in the precipitation cycle has implications for deciphering feedbacks between the biosphere and climate”(Brent Christner et al.2008, Science, 'Ubiquity of Biological Ice Nucleators in Snowfall')

This research is another indicator that in order to truly address human induced climatic instability, we need to call upon the ingenious services that healthy functioning ecosystems provide. We need to acknowledge the necessity of these ecosystems and where they have been seriously depleted, we need to work to restore and conserve them as fast as possible.

“Forests are not only a critical part of the climate solution – they hold multiple benefits for all members of society,” (UN Secretary-General Ban Ki-moon, Climate Summit 2014)

The success of mixed forest protection and restoration projects, ultimately affect the lives and long-term well being of all humanity and all other species upon Earth. Healthy mixed mountain forests provide many essential services that are irreplaceable.

Forests are essential to our future. More than 1.6 billion people depend on them for food, water, fuel, medicines, traditional cultures and livelihoods.

Forests also support up to 80% of terrestrial biodiversity and play a vital role in safeguarding the climate by naturally sequestering carbon. Yet, each year an average of 13 million hectares of forest disappear. (UN Climate Summit 2014, New York Declaration on Forests)

Considering the important role that mixed mountain forests play in naturally regulating climate; protecting, conserving and restoring the crucial biodiversity and ecosystems of these regions worldwide should be a central part of mitigating climate change. The impacts of this would yield more positive and restorative affects than simply focussing upon neutralising negative impacts.

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