
Threats to Himalayan Ecosystem due to Long Range Transport of Air Pollutants and Land Use Changes

UMESH CHANDRA KULSHRESTHA

Editor-in-chief

School of Environmental Sciences, Jawaharlal Nehru University, New Delhi-110067, India.



Article History

Published on 20 April 2019

Dear Readers

I am glad to present before you the April 2019 issue of the journal. I thank all the reviewers, editors and the journal office for their cooperation in timely publication of the issue. This issue includes diversified articles covering emerging research topics. The theme of this editorial is the threats to the Himalayan Ecosystem due to expanding local anthropogenic activities and transported pollution.


The energy and food needs of mankind have significant impacts on the atmosphere and ecosystems in various manners. One of these impacts is the change in air composition which in turn affects sensitive ecosystems through atmospheric depositions. Himalayan ecosystem is also not an exception to it. The back trajectory analysis showed that a large amount of sulphate and nitrate is transported to the Himalayan ranges through the long range transport (LRT) from far Europe.¹ Some samples of snowmelt had relatively low pH indicating higher acidity which may be a threat to the Himalayan ecosystem in due course of time. The high particulate matter is contributed by the dust storms arising from Middle-east and Africa.²⁻³ However, local sources including land use changes and agriculture also contribute to such substances. Especially, the construction and deforestation contribute to huge amount of dust particles rich in calcium. High loadings of particulate matter due to developmental activities in the Himalayan ranges are also responsible for poor air quality in the region. Hence, the interaction of atmospheric aerosols with different gaseous species has very high research significance in the region.

Generally, construction and road making are the major developmental activities in the hills. These activities affect air, water, soil and vegetation. Road run off damages vegetation and water bodies. Heavy metals of run off contaminate river water as well ground water. A significant impact on ecosystem services of natural

CONTACT Umesh Chandra Kulshrestha ✉ umeshkulshrestha@gmail.com 📍 School of Environmental Sciences, Jawaharlal Nehru University, New Delhi-110067, India.



© 2018 The Author(s). Published by Enviro Research Publishers.

This is an  Open Access article licensed under a Creative Commons license: Attribution 4.0 International (CC-BY).

Doi: <http://dx.doi.org/10.12944/CWE.14.1.01>

pastures has also been reported due to increased human activities⁴. A report entitled 'The Economics of Ecosystems and Biodiversity' (TEEB, 2011) by the United Nation Environment Programme (UNEP) highlights the importance of values of nature and the economics of ecosystem services and biodiversity which needs to be considered seriously for the conservation of Himalayan ecosystem.⁵ Role of local community is very important for achieving the goals of sustainable development. Saxena and co-workers have studied the role of society through different approaches of integrated resource management in Himalayan region.⁶ Another studies suggests a large scale need for the development of technology resource centers in the region.⁷ Hence, the participation of local people should not be ignored in biodiversity conservation. Rao and co-workers have alarmed us for a detrimental situation if the local community is marginalized for a longer period.⁸

Hence, there is a great need of research about different nitrogen species (Nr) after air pollutants and before their sources, transport, transformation and deposition on to these mountains. Also, there is a need of integrated assessment of the possible impacts of atmospheric deposition on the Himalayan ecosystem. A comprehensive studies is needed to find out how the transported and locally emitted pollutants through various developmental activities are affecting the natural capital and related ecosystem services in the Himalayas?

References

1. Kumar, B., Singh, S., Gupta, G.P., Lone, F.A., Kulshrestha U.C. Long Range Transport and Wet Deposition Fluxes of Major Chemical Species in Snow at Gulmarg in North Western Himalayas (India), *Aerosol and Air Quality Research*, 2016, doi: 10.4209/aaqr.2015.01.0056.
2. Begum, B. A., Biswas, S. K., Pandit, G. G. Long-range transport of soil dust and smoke pollution in the South Asian region, *Atmospheric Pollution Research*, 2011, vol. 2, no. 2, pp. 151–157.
3. Kulshrestha, U. and Kumar, U. Airmass Trajectories and Long Range Transport of Pollutants: Review of Wet Deposition Scenario in South Asia, *Advances in Meteorology*, 2014, doi.org/10.1155/2014/596041.
4. Dong X, Yang W, Ulgaiti S, Yan M, Zhang X. The impact of human activities on natural capital and ecosystem services of natural pastures in North Xinjiang, China, *Ecol Model*. 2012, 225: 28-39.
5. TEEB (2011). THE ECONOMICS OF ECOSYSTEMS AND BIODIVERSITY. <http://doc.teebweb.org/wp-content/uploads/2014/04/TEEB-in-national-and-international-Policy-Making2011.pdf>, retrieved on April 20, 2019.
6. Saxena, K. G., K. S. Rao, K. K. Sen, R. K. Maikhuri, and R. L. Semwal. Integrated natural resource management: approaches and lessons from the Himalaya, *Conservation Ecology*, 2001, 5(2): 14. URL: <http://www.consecol.org/vol5/iss2/art14/>.
7. Rawat, L.S., Maikhuri, R.K., Negi, V.S., Bahuguna, A., Rao, K.S., Agarwal, S.K. and Saxena, K.G. Managing natural resources with eco-friendly technologies for sustainable rural development: a case of Garhwal Himalaya, *International Journal of Sustainable Development and World Ecology*, 2010, 17, 423-430.
8. Rao, K.S., Semwal, R.L., Maikhuri, R.K. Nautiyal, S., Sen, K.K., Singh, K. Chandrasekhar K. & Saxena K. G. Indigenous ecological knowledge, biodiversity and sustainable development in the central Himalayas, *Tropical Ecology*, 2003, 44(1): 93-111.