

Linking restoration and afforestation drives to ecological studies in India: an urgent need

Wasteland development and restoration are major themes in many conservation-specific studies across the world and many recent schemes in India have focused on wasteland developments as well. The administrative and technical involvement of the Government of India in wasteland development has been big enough that we have a dedicated Integrated Wasteland Development Programme under the Department of Land Resources (DOLR), Ministry of Rural Development (<https://dolr.gov.in/integrated-wasteland-development-programme>). The National Wasteland Development Board (NWDB) was established in 1985 under the Ministry of Forests and Environment and in 1992 it was reconstituted and placed under DOLR. As the government link suggests, the constitution of this board was deemed necessary in order ‘...to tackle the problem of degradation of lands, restoration of ecology and to meet the growing demands of fuel wood and fodder at the national level.’ With these goals the NWDB ‘emphasized more on tree planting activities rather than Community Participation for wasteland development’.

One of the most recent afforestation projects in India is the ‘great green wall’ traversing the centre of India. The idea for this green wall is inspired by Africa’s green wall which runs from Senegal in the West to Djibouti in the East. The goal of this wall is to restore lands in one of the poorest regions, the Sahel. In India, to pledge a green wall seems appropriate given the recent Conference of the Parties (COP14) of the United Nations Convention to Combat Desertification (UNCCD) which was held in India. The Indian green wall is proposed to run from Gujarat to Delhi–Haryana border and to be ~1,400 km long and 5 km wide. The goal of the Indian green wall is to arrest land degradation and desertification by the eastward expanding Thar desert. While small afforestation schemes have already been initiated by various state governments towards this massive greening effort, the lack of a clear floristic plan towards this restoration effort is concerning. Parts of Aravali which will be directly affected by this wall may undergo massive ecological restoration efforts, but the details of what is predicted and planned are unknown or not available on the public domain. One of the goals of this green wall is to restore many degraded

parts of the Aravali, but floristically the expected outcomes of this region are not clear, given that detailed historical studies in this region are lacking. Additionally, for this restoration effort to be appropriately assessed, it seems incrementally important that current and historical floristic studies be collated to understand the outcomes of this restoration project.

Tree plantation efforts across India have been funded by many governmental and non-governmental agencies under the general call for ‘afforestation’. In fact, it has become fashionable to plant trees even in areas that most ecologists may identify as natural scrublands or grasslands (i.e. regions without the dominant presence of trees). Interestingly while afforestation is strongly associated with the need for wasteland restoration or habitat restoration, this does not seem to be the case when it comes to wastelands one may notice around cities and in industrial areas. These areas continue to remain disturbed and reclamation processes are anything but distant. So, the question is: Are we compensating for lack of wasteland restoration by rampant planting of forests in scrublands, thereby disturbing an otherwise natural habitat? Are these afforestation drives helpful in improving our environment? And, is this the only way forward, or could we have contributed to improving our biodiversity at lesser costs with better outcomes?

Since we are discussing wastelands, let me formally introduce the term ‘wasteland’ here. Wastelands are degraded land, or what many may refer to as barren, sterile land. One of the criteria that has also been used to define wasteland is the complete loss of topsoil. Terms such as barren/sterile/uncultivable that are used to describe wastelands inherently suggest that plant-life may not be supported in these regions and that these lands are also incapable of supporting plant life without further management interventions. Many areas come into mind, such as water-logged areas, areas with high salinity, areas facing heavy erosions (wind or water), chemical pollutants, and others. However, in the push to identify wastelands and put them under restoration schemes, often areas such as grasslands and deserts get identified as wastelands (read Tyranny of trees in grassy biomes by Veldman, J. W. *et al.*, *Science*, 2015, **347**(6221), 484–485). This

misconception is rooted amongst us primarily because wastelands are described using terminologies such as barren/sterile and lack of topsoil, which sends an image that any land without lush-green tall trees is probably not a fertile or productive ecosystem.

The first example of restoration efforts that I am going to discuss here has to do with the greening or afforestation drives that are currently being locally carried out in India. These plantation drives are not just in natural scrub lands but in the edges of forests with plants that are economically important such as teak and bamboo. Since one of the primary goals of any afforestation effort is to improve the land by making it economically favourable, most afforestation drives are biased towards economically important plants that yield timber. Here, one of the factors that we have consistently failed to identify and quantify is to equate the worth of a forest (forest economics) in terms of its potential to provide other services such as pollination services, dispersal services, and its role in improving water tables and affecting the global environment. How do we put a price tag on these aspects? I am of the firm belief that these price tags can and should be added, because these services are irreplaceable and they represent some of the most essential services a forest provides. So, instead of replacing edges of forests with clonal or monodominant timber trees, or carrying out afforestation drives using only economically important, fast-growing timber trees, efforts should be made to expand forest edges with fast growing locally available native trees that may be interspersed with some timber trees. This will not only allow a natural expansion of the forest edges but it will also extend available habitats for the forests' other service providers such as the fauna engaged in pollinator and dispersal services (bees, bats, birds and mammals).

The second example of wasteland restoration efforts that has made a comeback in the news is in the context of installation of solar parks in India. In Germany, wastelands have been restored, wherein a land that was rendered unusable by accumulation of excavation deposits from a road building project was converted into a solar park. Airports across India have converted themselves as major solar-power hubs and have efficiently utilized the land which otherwise cannot support any green space. However, some of the major solar parks recently established across India are not essentially built as restoration projects on wastelands, unless one qualifies farmlands that have been severely hit by droughts for the past few decades as wastelands. One of the failed opportunities of these solar parks has been a lack of visible initiative to restore the native flora and fauna of the region through planned and concerted afforestation efforts.

While both afforestation and wasteland restoration are positive steps towards attaining goals such as those outlined in the Bonn Challenge (restoring 350 million hectares by 2030), we do not have many/any large scale

restoration study that can be called a pan-Indian study (the details of the green wall are not public as of today). The need of a common large-scale ecological study that spans the country is critical because a common monitoring, evaluation and learning (MLE) system is essential for our assessment of the usefulness of any restoration project. While India has been one of the first countries to develop the progress report for the Bonn Challenge and has claimed an area of 9.8 million hectares under restoration since 2011, we are still very much behind when it comes to detailed studies pertaining to restoration ecology. Some of the big lacunae in Indian ecological studies are the lack of large-scale, multi-institutional, pan-Indian studies, and the absence of long-term ecological plots with cutting edge facilities such as canopy walkways/cranes or drone-aided monitoring.

In conclusion, initiatives such as the green wall and our success with the Bonn Challenge are commendable and this momentum needs to be further channelled towards improving our presence among the Asian and SE Asian countries as a leading force in conservation studies. India has always been academically rich in terms of its publicly funded educational institutions, private universities, industry and innumerable active NGOs. The challenge we now face is to address: How can we collectively lead exemplar conservation efforts and ecological studies for the rest of the continent? Some of the solutions to this may lie in first and foremost establishing active research projects and collaborations with our neighbouring countries in the fields of conservation, ecology and evolution. This is the need of the hour since we not only share our flora, fauna, viruses and economies with our neighbours but also our cultural and evolutionary histories. Carrying out restoration/afforestation efforts cannot be our goal in isolation. We need to also prioritize improving our ecological and evolutionary understanding of the biodiversity and environment, surrounding us. Hence, as emerging world leaders, all eyes should be on both DOLR and MoEF to prioritize conservation efforts with careful scientific monitoring and understanding of the ecological mechanisms governing them. With the current pandemic, we now risk putting our ecology- and biodiversity-related critical needs in the back seat, as we gear up to face the economic challenges. However, taking our eye off the biodiversity-ball right now, may only prove to be economically devastating in the long-run, and it is a distraction we cannot afford.

Vinita Gowda

Tropical Ecology and Evolution Lab,
Department of Biological Sciences,
Indian Institute of Science Education and
Research – Bhopal,
Bhopal 462 066, India
e-mail: gowdav@iiserb.ac.in