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Unto Nature's wilderness until harmonise our understandings to restore healthy ecosystems

Amitha Bachan K.H. and Devika M Anilkumar

We were wondered about the diversity of vegetation and its heterogeneity when we moved along the river courses in the Anamalai landscape of the Western Ghats. The riparian flora merges with the evergreen forest formations from very low elevations to the wet evergreen forests in the medium elevations. The species assemblage is depicted as the important forest compositions of *Cullenia exarillata* – *Palaquium ellipticum* – *Mesua ferrea* – *Canarium strictum* in the wet evergreen forests changing to *Dipterocarpus indicus* – *Vateria indica* at low elevations. The riparian forests hide its unique compositions of *Humboldtia vahliana* – *Madhuca neriifolia* – *Garcinia wightii* – *Ochlandra scriptoria* and many in the camouflage of the evergreen associations *Hopea parviflora*, *Vateria indica* etc. The forest varies in associations within every forest strand along with regional bioclimate and microclimate created through complex species interactions. This wilderness filled us with in-depth knowledge and understanding that sustainable living and ecosystem values and immense biodiversity can only exist within these heterogenic permutation combinations of biota with these wide spectra of

ecosystems.

The rich mountainous landscape has been exposed to various kinds of exploitations, started during the British East India Company regime with timber extraction, which had gone through monoculture based conservation to the post-independent industrialisation, conversion to plantations and hydro projects, and the infrastructure and largescale conversion in the neoliberal regimes. This has destroyed more



The valley and the peaks in the Western Ghats. The land is heterogenous, forests, plantations and the anamudi peak at the background. A view from Sholayar forests © Authors

than 70% of the forest in its extent, and present estimates in the landscape indicate the availability of unmanaged primary forests as less than 10% and even less remains for the state or the Western Ghats Sri Lanka biodiversity hotspot.

The anthropocentric view of conservation



The forest canopy - Medium elevation evergreen forest © Authors

of state forests as economic production started during colonial times. This has gradually evolved to environmental consciousness (Stockholm conference 1972), deep ecology, concerns for the ozone (Montreal protocol) and climate change (IPCC), biodiversity (CBD), inclusive conservation with settling of rights of ecosystem people (UNDRIP 2007), questions of sustainability and equity (CoP 14) and finally the requirements of ecosystem-based approaches for conserving biodiversity and the requisite of Eco restoration (SER 2014). The forest conversion history indicates the inadequacy of forest legislation and the compatible frameworks such as the Biodiversity Act 2002, Forest Right Act (FRA) 2006 and pushing out of its instruments of the forest regime with the inherent systemic colonial rigidity. The clearance obtained for conversion of forest to non-forest from MoEFCC during 1980–2012 was 13.7 lakhs hectare, and the recent decisions have cleared 2.5 lakhs hectare of forests in India (2009–2019) and decided to convert plantation in 1.82 lakh ha.

The questions of representing the heterogeneity of the vegetation and ecosystem composition in the Anamalai region remained unresolved until we have elucidated a methodology and classified the riparian forests into 26 types and their degradation stages. These, along with works of Pascal and Ramesh in the Western Ghats forests, added another dimension to Champion and Seth's classification for Indian forests (1962). The second question of intervention to the ecosystem

management regimes of forest ecosystems and setting up ecorestoration targets remains a hurdle. The working plan guideline 2014 (MoEFCC) provides more space for incorporating these, and we managed to do it for Vazhachal Forest Division in the Kerala part of the landscape. This has opened hopes of ecorestoration prioritisation and setting up targets of site-specific ecorestoration of

riparian forests with local community involvement along the Chalakkudy river—the richest in fish diversity and riparian forest in the Western Ghats.

Puzzles came up like the complexity of Nature, easier to understand with her harness and difficult to explain with our systemic non-harmony. The learning alarmed the need for precautions to minimise the potential harms during ecosystem intervention. We have experiences of Acacia plantations across the land and are afraid to use the word afforestation. Removal of black wattles trees has become one ecorestoration program of the state in the Shola forest regions of the Munnar Landscape.

How to ensure planting trees not disrupting the niches of other species or other ecosystems; even though we plant native species, the thoughts became a worry when the state promoted planting along disaster impacted riparian zones along the rivers. This compelled us to develop methodologies of ecorestoration for the region, reviewing the international ecorestoration principles (SER 2014, 2019) and our legal and administrative frameworks. A methodology was evolved incorporating more than one decade long works on riparian forests in the region and presented in the international river restoration conference during 2019. Thanks to the administrators and people for accepting such concerns of ecosystem management and ecorestoration.

It is necessary to define properly, simplify and mainstream the principles of ecorestoration

into the practitioners. It shall focus on reducing the damages that we have done to Nature and not repeating the mistake that focused only on planting trees of any origin. The thoughts can be summarised into six simple principles: (1) Need to have a scale or benchmark for beginning and setting up targets for selecting species for each location under ecorestoration. This can be achieved either through offsetting a more diverse composition available close to the restoration site or with scientific studies on heterogenic vegetation composition of the ecosystem, its niche modelling for suitability and niche profiling of structure; (2) Understanding the existing status of the available vegetation in the restoration site comparing with the benchmark to avoid species that represent further degraded situations; (3) Planting the selected species based on spatial allocation of the targeted community composition along with continuous maintenance and monitoring; (4) Maintain the local gene pool through selecting parent trees and setting up nurseries at a local or regional level suitable to the selected species to maintain the genetic diversity of species populations we are intervening; (5) Ensure local community involvement and multiple partnerships with community-based statutory bodies such as BMCs (Biodiversity Act 2002) at local self-government level, CFRMCs (FRA 2006) at Grama Sabha or JMF bodies in forest areas, and schemes such as MNREGS; (6) The ecorestoration has to be multidimensional with multiple options for prime targets including restoration for livelihood, recreation, disaster management, cultural aspects and not alone for its primary and important objective restoration of primary ecosystems.

Our one and half decade intervention succeeded in opening up broad discussions across Kerala and launching in central Kerala. The flood (2018) impacted riparian areas, landslide

zone in the forest, degraded sacred groves, and climate change-induced disaster-hit zone of the coast are the few locations under consideration in the landscape. The Sree Narayanapuram Grama panchayat in the coastal region of the Thrissur district of central Kerala, their BMC came in front involving the local people through MNREGA with technical support from Western Ghats Hornbill Foundation. The local species were identified following the above-said protocol and set up targets for restoring (i) screw-pine and thickets in the sandy coastal regions; (ii) along the streams draining directly to the Arabian sea, including littoral mangrove and associated species; (iii) Freshwater channels and ponds in the coastal sandy area; (iv) along backwater canals and (v) sacred groves with low land evergreen forest composition. The program was supported by the Kerala state biodiversity board, the BMC, Vazhachal Forest Division and the Research Department of Botany, MES Asmabi College, along with local communities at different scales.

The coastal areas were badly hit with unusual cyclonic events during the last decade and continuing, necessitating bringing back the stability of the coastal landscape to harness Nature and its dynamism. The present attempt is being documented to scale up to different locations. People and authorities are committed to this and hope the CEM team can have good learnings and contribute in the future. The Western Ghats plants specialist group is also associating with restoration activities in the selected forest locations, hoping to develop some simple methodologies for modelling habitat suitability and profiling targeted ecorestoration compositions through Niche modelling and profiling for the threatened species. The local species, parent trees and nurseries have been propagated as a slogan of ecorestoration—'seeds of ecorestoration' by the team.

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