

Building a Culture of Ecological Landscapes

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The Western Ghats (WG) are a UNESCO World heritage site and are recognized as one of the world's eight 'hottest hotspots' due to exceptionally high level of biological diversity and endemism. But in its recent assessment of the natural world heritage sites, IUCN has put the WGs in the significant concern category. The WG are a complex ecosystem, with different types of forests and are home to a diverse variety of flora and fauna, many of which are endemic. The ecological integrity of the WG has a long-term effect on the climate, life and livelihood of the people. India's new forest policy of 2018, aims to bring a minimum one-third of India's total geographical area under forest cover, while in the hills and mountainous regions, the policy's goal is to maintain two-thirds of the area under forest and tree cover. Over the past 90 years there has been a decline of 35% forest cover in the WG. Of the many listed threats to the region, most depend on the local people and government policies and can be restricted to specific areas. However, WG Being extremely scenic, Tourism is one of the major threats widespread over the entire region. Rapid change of land use and infrastructure for accommodating tourism exerts tremendous pressure on the forests. Lack of awareness about ecology, ambiguous construction rules and trending ideas of recreation, leads to haphazard development while high cost of land parcels drives the development towards commercialism. Architecture, space creation, art take a back seat in this process. Traditional wisdom in architectural design approach, materials, construction, needs to be explored along with ecological landscape planning and designing. New species of flora and fauna are regularly being discovered from the region; at the same time invasive species of flora and fauna is a significant concern. On this background landscape architects can contribute meaningfully towards deriving design and ecology sensitive guidelines, to retain the integrity of the land.

Keywords— Ecology of Western Ghats, approach to regional ecological conservation, tourism in Western Ghats, Ecological landscape planning, loss of habitat due to urban pressure, design policies for projects in Western Ghats

I. INTRODUCTION AND ISSUES

The Western Ghats (WG) run north to south along the western edge of the Deccan plateau, and separates the plateau from a narrow coastal plain, along the Arabian Sea. Roughly covering an area of 129037 km² it runs approximately 1490 km through 6 states^[1]. The Ghats are a barrier for the south west monsoon winds, and hence play a vital role in the biophysical and ecological processes of the region. These hills also form the catchment area for complex riverine drainage system that drain almost 40% of India. More than 28 crores of people from six States are dependent on the WG for water for irrigation and drinking.^[2] The WG also conserves a number of threatened habitats, such as unique seasonally mass-flowering wildflower meadows, Shola forests

and Myristica swamps.^[3] The ecological integrity of the WG has a telling effect on the climate, resulting in the quality of life and livelihood of the people.

Despite being included in the UNESCO World Heritage sites in 2010 for being a hotspot for biological diversity, the WG does not yet have a 'biodiversity conservation plan' or a comprehensive development plan. Conservation efforts for protected areas are fragmented, limited to national parks and sanctuaries. The region has never been looked at as whole but rather as part of each state, with different approaches to forest policy, development and management priorities. The WG, starting during British times, has been exploited for resources rather than conserved. With the rejection of the Gadgil Committee report, the question and answers about Government policy meander into grey areas and are best left for debates. **For ground level progress, working in individual capacity in the best interest of the ecology of the WG seems to be the way forward.** So while the whole to part implementation may be possible once there is a regional ecological conservation plan, this paper looks at the development of the region from a part to whole approach. The study region is limited to Northern Western Ghats (NWG), called *Sahyadris*, as a case study.

The IUCN, (International Union for Conservation of Nature), in its assessment of the natural world heritage sites, has listed 12 major threats to the WG.^[3] Most significant amongst these, having long-term effects, are related to land use change due to urban pressure for resources. There is tremendous pressure for land in the region for mining, natural energy, power plants, as well as recreation.

The WG are very popular tourist destinations for weekend/ holiday tourists. Dotted with many peaks like *Kalsubai* (1648m), *Salher* (1567m), vast plateau hill stations like *Mahabaleshwar* (1353m/ 6226mm avg. rainfall), *Matheran* (800m, 5167mm avg. rainfall), around 300 forts like *Torana*, *Rajgad*, waterfalls like *Tamhini ghat*, *Malshej ghat* and historic places like *Naneghat*, *Madhe ghat*, there is variety of choice. The landscape is extremely scenic throughout the year and these areas are easily accessible by road from major cities like Mumbai, Surat, Nasik, Pune, and Kolhapur and smaller towns in between. The region has hence also been preferred for many years for 'farm' houses (*Lonavala*, *Khandala* in yesteryears and *Karjat*, *Igatpuri* in present day), large scale townships (*Aamby valley*, *Lavasa*) & Weekend Resorts (*Amboli*, *Pachgani*). Due to awareness about the uniqueness of destinations in WG, availability of travel information in abundance at fingertips, ease of travel, easy access to destinations, easily available accommodations, curiosity about destinations through social media, increase in number of the affluent middle class, the attitude to travel has

changed. People are increasingly looking at travelling as spending 'quality time' with family, due to urban work pressures. However this change in outlook is increasing disturbance to sensitive areas, mostly unknowingly.

With the economic liberalization of India in 1991, and subsequent industrial policy by Maharashtra government in 1993, there was successful investment in the industrial sector. Being a difficult region in terms of topography and climate, the WG region had been sidelined from infrastructure development point of view for many years. MIDC attracted industries to set up manufacturing units, by offering huge land parcels within the WG, with plenty of subsidies. With large scale investors and political backing, township projects too were given sanctions causing irreparable damage by fragmenting habitats. Other developments like roads, mining, certain agricultural practices and tourism have led to a decline in the forest cover of the WG.

A wide variety of flora and fauna species are found in the WG and on an average more than 50% of these are endemic. Along with being the home for few globally endangered species, new species are regularly being discovered. In high biodiversity areas, the number of endemic species is exceptionally high but due to tourism, these species are vulnerable and threatened. Eg: *Ceropegia anjanerica* a 5-20 cm erect endemic herb, is known from only a single location, Anjaneri Hills, Nashik, which is under high pressure due to cattle grazing, trampling by tourists and land use changes.^[4] In *Amboli* 32 species and in *Khandala* 37 species of flora and fauna are threatened^[5] The Amboli bush frog, (*Pseudophilautus amboli*) is listed as IUCN Critically Endangered due to continuing decline in the extent and quality of its habitat.^[6] **A new Scorpion species, *Lychas aareyensis* was discovered in Sanjay Gandhi National Park, Mumbai^[7] in 2010.** 7 new species of night frogs^[8] and 4 new species of burrowing frogs have been discovered and named from WG in 2017.^[9] An estimated 103 new species have been discovered from the WG from 2006-2015. This goes to show that the WG are rich in biodiversity and there is tremendous scope for research and biodiversity explorations and mapping. This will be possible only if the current haphazard development is directed towards ecological conservation.

The land use in the WG is rapidly changing. Land parcels which were previously under cultivation are being converted to accommodate tourists and scrub areas along the edge of the villages are converted to farm lands. For many years gram panchayat has been the sanctioning authority for projects in the *Sahyadris*, and continue to be so even today in many areas. There is no set of rules for construction like the National Building Code or Development Control Rules in the gram panchayat. Most projects are built on mutual goodwill between the land owner and gram panchayat. Structures are frequently built by local contractors/ engineers without considering the surrounding context. Existing houses in the villages which were traditionally constructed in local materials with a small footprint are being replaced by *pakka* houses with multiple floors, to accommodate tourist facilities.

New lands are purchased by affluent people from nearby urban areas for second homes or business ventures related to tourism. These purchases happen at very high prices

and hence every sq. inch is cleared and constructed upon; unnecessary exotic and elaborate design elements are preferred or demanded; ecology and environment obviously take a back seat. The existing land use is ignored while catering to tourist demands. Traditionally these areas were conserved by small populations of indigenous tribal people leading sustainable lifestyles. Living in the hills is difficult, villages are spaced apart under tree canopies, and towns are far away. For locals, selling land is lucrative and tourism brings decent money. During holiday season tourism is promoted beyond the carrying capacity and leads to scarcity of water, increased sewage and solid waste with no management plan.

However, it needs to be accepted at the very beginning of any kind of development that any piece of land is part of a bigger landscape; before human intervention, the land has its existing flora, fauna, habitats and the resulting ecosystem for the past few hundred years. So, the existing landscape on any land parcel up for development needs to be restored to near original and if it is pristine it needs to be retained.

II. POINTERS TO ECOLOGICAL LANDSCAPE PLANNING, ARCHITECTURE & DEVELOPMENT PROJECTS IN WESTERN GHATS

Any type of plan prepared for projects in the WG needs to begin with the understanding that the entire region is ecologically sensitive; development needs to be looked at holistically and thoughtfully and guidelines need to originate from landscape planning, design and ecological integrity. Macro level planning needs consider the protection of catchment areas and the protection of animal movement corridors. Natural layers of landscape like geology (rocky outcrops have unique biodiversity, unique geological formations), hydrology (major rivers of southern India originate in the WG), flora and fauna need to be studied in depth for the smallest site as there is very less research documentation that has been done in the NWG. Even small sites may have rare plants or animals. Broadly any project can be divided as land, water, vegetation & architecture and following broad policies may be implemented.

A. Land

Sensitive areas like grass lands, plateau, rocky outcrop (as art elements), biodiversity rich areas etc should be responsibly integrated during site planning. Valleys and slopes in the WG should not be modified. If at all top soil is excavated during construction activity, it needs to be heaped separately and reused. Transporting soil causes irreparable damages. Planning should consider existing contours & by application of grading technique, storm water flow should be integrated with natural drainage system. Paving should be restricted, paved areas should be porous as to allow percolation and reduced runoff speed; roads and vehicular movements must be limited.

B. Water

Protecting all valleys and streams however small or big, needs to be the primary task on any site. Protected valleys become movement corridors for fauna and torrential streams. No development should be planned in the valleys and adjoining areas, (width of adjoining area can depend on site conditions) dry stone masonry bunds can be proposed after due consideration for fish ladders. Wetlands, water bodies should be responsibly integrated in the design. All waste water should be managed using natural methods for cleaning, like reed bed / polishing pond. Rainwater should be stored and used or recharged. Runoff speed should be controlled by using swales, brick gutters etc

C. Vegetation

Any existing cluster of vegetation and all existing trees must be protected and responsibly integrated in the design. Vegetative clusters act as seed banks and may house rare plants. Invasive alien species (IAS) have been considered as a major threat to native flora of WG by IUCN. Non native plants, especially invasive plants cause serious damage. Reference for local native plants can be taken from nearby forests/ *devrai* (sacred groves). As a design policy each site should dedicate 10% land to '*devrai*' / sacred grove on site itself. Fauna can then establish a connection between such various groves. Native plants have their own defense mechanisms in the form of fauna; chemicals and pesticides should be avoided.

D. Architecture

Architecture should become integral with context of the site. Time tested traditional spatial elements, wisdom can be incorporated. Number of floors and footprint of the building should be consciously restricted. On sloping sites, possibility of raised structures to be explored, such that existing ground remains unaltered. Local materials and construction techniques like sloping roof structures in bamboo or traditional timber construction, walls in mud + dried grass, construction in stone excavated from site, local materials should be explored.

knowledge and resources are utilized ,which in turn ensures cultural sustenance

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III. CONCLUSIONS

- Unique ecosystems are a matter of pride for a nation and conserving them should be our priority
- A part to whole approach creates a base for a whole to part approach, for further policy planning. Conservation measures, simultaneously, on both levels are required.
- By enhancing the ecological integrity of the region, visual beauty of the region can get further enhanced.
- Responsible development can convince people towards responsible tourism and hence responsibility towards environment. Spending quality time with family in a healthy environment will lead to a healthy society.
- By building a culture of ecological landscapes, monetary sustenance is ensured at grass root level as local traditional