Peeyush Sekhsaria

RESTORING THE LAND TO ITS ORIGINAL GLORY

In 2003, well known theatre and cinema actor Atul Kulkarni, along with his family and friends purchased twenty four acres of land near Wan Kusawade village, overlooking the backwaters of the Koyna dam, Satara district, Maharashtra to nurse his dream of creating a natural forest. In 2006, Oikos for Ecological Services, Pune, a consultancy firm working in the field of ecological management was engaged for the realization of this dream. Oikos started work with a year long eco-assessment of the site. Covering all seasons, the land, its biodiversity and its potential for eco-restoration was surveyed. Further, it formulated ecological restoration strategies for the site followed by actual implementation.

The Western Ghats – Sahyadris

The Western Ghats is a mountain range that starting from the border of Gujarat and Maharashtra, south of the Tapti river runs approximately 1600 km along the western edge of India through the states of Maharashtra, Goa, Karnataka, Tamil Nadu and Kerala, ending at Kanyakumari, at the southernmost tip of the country. The Western Ghats are broadly categorized as the Northern and the Southern Western Ghats. The South Western Ghats are generally wetter, of higher elevation and more diverse. This mountain chain is one of the world's thirty four "biodiversity hotspots" with over 5000 species of flowering plants, 139 mammal species, 508 bird species and 179 amphibian species. At least 325 globally threatened species occur in the Western Ghats. They harbour numerous wild relatives of everyday food and medicinal plants like that of grains (rice, barley), fruits like mango, garcinias (monkey fruits – amsol, kokam), banana, jackfruit, spices like black pepper, cinnamon, cardamom, and nutmeg, making them an important source of numerous medicinal plants and vital genetic resources. The rivers originating in the Western Ghats sustain the lives of over 300 million people.

Site and Assessment

The land was in two similar sized parcels separated by a 6 acre plot. The topography of the region was dominated by a lateritic plateau with the site situated just below it. It had a gentle to moderate slope with a main part comprising of fairly plain levelled land. This land was barren and degraded. Its first impression gave no clue that it had dense semi-evergreen forest some 70–80 years earlier and that there was a time when villagers were afraid of passing through it due to the presence of wildlife like *gaur* and tiger!

The trees had been cut extensively for timber and charcoal making. The land had since been farmed and grazed. It was reduced to an impoverished piece of land with heavily eroded soil, poor moisture content, few existing trees, over grazed grasses and shrub clusters. The two phenomena of 'succession' and 'disturbance' were seen on site – succession resulting in a few regenerating trees and disturbance resulting in stunted shrub clusters. Although mostly covered with shallow soil and boulders, the land held good soil cover in parts. The crops of *nachni* (finger millet – *Eleusine coracana*) and *til* (sesame – *Sesamum indicum*) had took over some part of the land.

The land was characterized by lack of vegetation and poor soil fertility, despite the fact that in some areas the soil profile showed fine soil to loose soil-stone mix for more than fifty feet depth. Existing vegetation comprised of mixed grasses not more than one feet high with few shrubs and trees, all pointing to the presence of semi-evergreen forest in the past. Regular grazing and cutting pressure was not allowing the vegetation grow back. A small sacred forest in the village of Wankusawade that had retained some of the original biodiversity and character of the region served as a source of reference and inspiration.

Ecological Restoration

The ecological restoration work started in 2006 with the long term aim of forming a dense canopy structure using localized native plants. The restoration plan was made after considering the condition of the land, the client needs and interaction with the local village community. The involvement of the local community was considered important and integral to the success of the project. The aim was to restore the land to its near original pristine condition of semi-evergreen forest, creating a model of eco-restoration & biodiversity conservation in the Sahyadris.

Zoning

Broadly, the site was divided in four zones. Zone-A was a low lying area, easily accessible from the main road. It was conceived as the 'Home Consump-

BELOW | Initial status of the site – Lack of canopy, poor fertility of soil and intense grazing

tion Area' hosting basic infrastructure facilities like a house, water tank, nursery and toilets. With undulating slopes, Zone-B was designated as the 'Conservation Zone' with a focus on regeneration of tree species suited for sloping sites. Zone-C was relatively flat, with poor vegetation but good soil, making it suitable for plantation of commercial species. It was designated as the 'Productive Zone'. Zone-D, with its sloping profile, medium sized seasonal stream and good stream habitat with regenerating vegetation would be the, 'Bio-diversity and Conservation Zone'.

The Intervention Strategies

It was decided not to plant much trees in the initial stages as the land's capacity to support any kind of plantation had been lost. A broad plan was prepared to restore the land, arrest soil erosion, improve the soil, its nutrients & moisture and organic matter, through various techniques like constructing stone lines, plugging of *gullies*, total grazing control, local grass protection, creation of ponds and building stream bunds. The interventions were planned keeping in mind various factors including that of cost and practicality. Protection from grazing using local materials and local techniques like fences made of thorny cuttings, restoration of soil & moisture content for the initial ten year period using different techniques of soil-moisture conservation like stone lines, percolation ponds, protection to vegetation, pro-

tection from fire, seed dispersal of local species and protecting regenerating vegetation clusters on the slopes were few of the strategies. These techniques gave better results since the seeds were of species from the land itself and the regeneration gave a chance to a root stock that was under pressure but already existed on the land for a very long time. Plantation plan comprised of native species, about 150 per year, starting with hardy ones in first five years, evergreens in next three years and finally habitat specialist species in the subsequent three years.

Timelines

The work is broadly organized into three phases:

Phase 1: Year 1 to 7 includes protection to small land parcels, soil – moisture conservation work, protection from fire, encouraging growth of local vegetation and planting hardy species.

Phase 2: Year 8 to 11 includes plantation of evergreen species also.

Phase 3: Year 12 to 15 comprises of planting evergreen and specialist species.

FACING PAGE
TOP ROW [LEFT TO RIGHT] | ***Works done for restoration: Protecting the site; Soil & Water Conservation measures – Stone lines and Creating ponds***
MIDDLE ROW [LEFT TO RIGHT] | ***Stream restoration: Loose boulder dam; Habitat development; and, Results: Development of hedges***

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TOP ROW [LEFT TO RIGHT] | ***Results: Conserved soil – Year 1, 2 & 4***
BELOW RIGHT | ***Results: Improved biomass resulted in increased height of grass***

*BELOW | **Improved habitats – Change in species composition***

Plant Selection

To date, around 1500 plants of 130 native species have been planted. While selecting the plant species, only plants native to this area were chosen. Non-native varieties that are generally used for plantation were strictly avoided. The species planted include local varieties like *umbar (Ficus racemosa), kaswi (Elaeocarpus spp), phansada (Garcinia talbotii), amba (Mangifera indica), jambhul (Syzygium cumunii), ain (Terminalia tomentosa), hirda (Terminalia chebula), satwin (Alstonia scholaris), padal (Stereospermum colais),* and few rare plants like *dhup (Canarium strictum), wet (Calamus spp)* and *lodhra (Symplocos racemosa).*

Areas for planting were selected on basis of soil fertility, existing vegetation. The criteria for plant selection also included use of local species (from Northern Western Ghats) which are hardy, fast growing for the initial phase, habitat specialist species for diversity, needing more care and also easy availability of saplings.

It is estimated that it will take more than thirty years to have a medium sized canopy comprising of local vegetation including trees, shrubs, climbers, grasses and herbs.

Water Management and Local Community Involvement

The area receives very high rainfall during June to October, but after these months the land is completely dry. For the first two years the project managed with a perennial spring located nearby for its watering needs. There was an underground water source at site and now a bore well yields good water.

The project aimed at using less water and reducing short and long term water needs. Thus, hardy plants were planted. Moisture conservation techniques like mulching were adopted. The aim is to restore resources on site to a healthy state, reducing and eventually eliminating external water needs.

The local community was explained what the project intended to do. Initially they could not understand why somebody would buy land and not put it to some 'productive' use. With time, the attitudes of the local community are changing. One of the original farmers is now being hired to work on the project. One of the benefits to the local community involvement has been that local people now harvest better quality grass for their cattle from selected areas within this land.

Ecological restoration plans have to be highly site specific as each piece of land is different in terms of soil, water availability, moisture, microclimate and other such important parameters. These play a vital role in restoration. Another key learning on this project has been that changes in species every year are unpredictable.

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Change in landscape: Year 1 – Barren landscape with scanty grasses; Year 2 – First monsoon with seasonal grasses; Year 3 – Increased biomass; and Year 4 – Regenerating shrub clusters.

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*LEFT | **Change in landscape: Year 6 – Current state with increased shrub canopy and dominance of perennial grasses***

*Clients | **Atul & Gitanjali Kulkarni, Nitin & Suniti Kulkarni, Dheeresh & Snehal Joshi***

*Site Location | **Near Wan Kusawade, Patan, Satara, Maharashtra***

*Area | **24 Acres***

*Ecology Consultants | **Oikos for Ecological Services, Pune – Ketaki Ghate & Manasi Karandikar***

*Starting of project | **2006***

Though eco-restoration is a slow science, the land already boasts of improved soil fertility and a greater diversity. After six years of restoration work, there is an improvement in grass species & growth, more vegetation diversity, better plant growth, improved soil moisture, increase in soil fertility and greater organic matter and biomass. Soil erosion has been brought down. The number of new species of fauna found on the land since the project started is few, yet the site has witnessed an increase in effective numbers and sightings of certain bird species. A leopard pugmark was recently recorded for the first time.

Challenges

There continue to be serious challenges, the most important being cutting of vegetation for fire-wood, grazing of free ranging cattle, high soil erosion rate and very dry conditions for almost eight months post monsoon. In addition to this is the remoteness of the site, difficulty of access and very high wind speeds. There is a need to maintain the land forever, assuring that plants continue their growth, protecting the site from fire and cattle grazing and assuring that there is no damaging human intervention. The clients will have to assure that the ecological processes already started are not hampered.

The project costs roughly RS. 2.5 lakhs per year and the land cost came to roughly RS. 30,000 per acre. These kinds of lands, located in remote areas remain relatively cheap and if bought by a like-minded group of people interested in these works, then costs can be shared.

It is hoped that looking at the improvement of the quality of land in a relatively short span of six years, the villagers will follow these techniques, most of which are inspirations from local knowledge itself.

Oikos for Ecological Services (www.oikos.in) is a consultancy working with private land owners for betterment of the ecosystem on their lands. Depending upon the land ownership and planned use, the eco-principles are integrated in planning of each project.

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All photographs courtesy the author.