

Reflections on Restoration efforts from the Field Trips: RHATC 2025-26

As part of the Ram Hattikudur Advanced Training in Conservation (2025–26), we undertook five field trips designed to align with this year’s RHATC theme of ecological restoration. Each visit provided us with practical, on-ground exposure to different restoration models, management strategies, and the challenges faced by diverse landscapes. Here, we present a compilation of our critical perspective on the field sites we visited, highlighting how each location approaches restoration and the lacunae we identified. This comparative essay is meant to provide an understanding of the different ongoing restoration efforts we saw in India, and to identify indicators of an appropriate versus inappropriate restoration project.

Here, we use the term restoration to refer to the process of assisting the recovery of any damaged ecosystem, with the goal of re-establishing its natural structure, functions, species composition (both flora and fauna), and ecological resilience. This can be either done by active interventions like planting native trees and removing the non-native trees, or passively like removing pressures to let nature recover on its own. Planting trees irrespective of whether they are native or non-native, and whether the site itself was a grassland or forest, is referred to as afforestation. Planting trees to cover land used for some invasive or destructive purpose, such as mining, is referred to as reclamation.

Nilgiri Biosphere Nature Park

NBNP was started in 1993 by the Coimbatore Zoological Park Society, a group of business owners who were interested in establishing a zoo in the city, after Sally Walker convinced them that a botanical garden/nature park would be of more value. Situated in Anaikatty, close to the Kerala border, NBNP has a petting zoo as well as a nature trail that winds through a large tract of restored land. It sells tickets for admission to the public, and also has a playground as well as a camping ground.



PROS:

- ↳ It is primarily composed of a great diversity of species native to the local forest type.
- ↳ The method of selecting and planting species was scientific, such as shading the saplings that needed it and planting different species with adequate space between them.
- ↳ It includes a nursery where native saplings are available for sale, potentially helping restoration efforts elsewhere.

A lot of thought has been put into the educational value of the park, e.g., species tags on most of the trees we saw; information boards about different topics at frequent intervals; nature observation foldouts provided; discovery sheds for rest, writing, and learning that focused on different taxa every few hundred metres, with some creative ways of sparking curiosity such as the pugmarks of different species cast in concrete in the mammal shed and Eric Ramanujan’s artwork in the insect shed.

Wild mammals travel through the area to reach the forest nearby, so the park provides some degree of connectivity and shelter for them. There is also an attractive butterfly garden that sees high butterfly diversity during the migration period.

CONS:

- ↳ NBNP still has a few individuals of alien species like Casuarina sp. which had been used as windbreakers to shelter native saplings while they were growing.

- ↳ It clearly functions more as an education-cum-recreation area than as a restoration area. It seemed quite commercial with the playground, campground, and petting zoo, and may become more so in the future.
- ↳ There are no restrictions on human presence to protect biodiversity, and no regulations about appropriate behaviour inside the park. Some domestic animals were also there (dogs and goats).
- ↳ Compromised ecological function, with little undergrowth or avian fauna.
- ↳ There is no evidence of systematic monitoring of either flora or fauna to understand the ecological health of the park or the spread of non-natives.
- ↳ The park lacks a dedicated guide to bring out NBNP's full educational value, as people can easily ignore the boards and other educational material.
- ↳ There are no restrictions on the sale of nursery saplings, potentially contributing to the spread of species native to this region to other bioregions.
- ↳ Some infrastructure aspects need maintenance, like broken educational boards

Puducherry Pitchandikulam Forest

Pitchandikulam Forest, started by Joss Brooks in the 1970s, was one of the first independent initiatives to increase green cover on barren land. Supported by Auroville, they focused on greening and then restoring 75 acres of land in Puducherry.

PROS:

- ↳ They actively include native species of underrepresented tropical dry evergreen forest (TDEF) in their restoration efforts, a relatively rare forest type that has been almost entirely lost in the natural state.
- ↳ They collect seeds from reference sites (sacred groves) and started a nursery for native species.
- ↳ They built a close-knit community who live in the forest and are dedicated to its upkeep, as well as connected with several other restoration practitioners, corporates, and government officials.
- ↳ They have a holistic attitude towards



understanding the landscape, with value given to the wealth of historical tradition of local communities. This included cultural and ecological practices (encompassing a range of aspects from burial rituals, to seed storage, to serial ponds to capture rainwater).

CONS:

- ↳ They continue to plant non-native species in some campuses, which could impair ecological interactions in the forest.
- ↳ The forest, while fairly large and developed in structure, doesn't seem to hold many animal species and pointed to a lack of ecological function and/or diversity.
- ↳ There is little to no monitoring of the trees to understand how and why they are growing the way they are (and how to help them grow better). The only indication of monitoring was from some camera trapping they had done 10 years ago, which showed a good range of mammals, but such monitoring needs to continue to understand the ecological trajectory of the forest.
- ↳ There didn't seem to be any outreach to locals about the forest and why they're maintaining it.
- ↳ We saw nothing about any documentation or publications from the work they've been doing, which could be very valuable given their long experience in the area.
- ↳ A trained ecologist had clearly never been involved in any part of their work - doing so could have significantly improved the ecological function.
- ↳ The number of staff is quite small while the work they need to do is quite a lot, resulting in

a diffused focus that does not allow them to execute any single project with the attention it deserves.

Auroville Botanical Garden (AvBG)

AvBG was started in 2000 by the people from the Auroville community in Puducherry to reestablish human-nature connections and to provide nature education for children. Later, they stepped into consultancy around landscaping and restoration of degraded and mined landscapes. Currently AvBG engages in eco-landscaping, mine eco-restoration, afforestation, conservation & research, nature education, ecological awareness & training programs, and provides courses on ecological horticulture.

PROS:

- ↳ Significant and diverse workforce from all over the world, which brings in multiple approaches and practices of restoration.
- ↳ They grow forest species with a dedicated nursery and plant them where appropriate for restoration, guided by appropriate reference sites and historical research.
- ↳ They are able to work in a way which fetches rich clientele (Hyatt, RAMCO Cement, Hidesign) and constant funding inflow. For example, they are flexible in terms of using a temporary solution that appeals to the CSR which fetches them time and funding to potentially work towards restoration in the long run.
- ↳ AvBG has focussed on building eco-parks, landscaping for 5-star resorts and township management, that helps people to understand the shift from supposedly degraded/barren land to the functional/beautiful one.
- ↳ Their research and development wing is active in terms of understanding corporate policies, soil condition, plant taxonomy, social engagement, and ongoing restoration efforts across the country.

CONS:

- ↳ They have strong corporate engagement which can limit their work as they have to fetch quick results, which sometimes pushes them into

planting non-native, fast growing trees. This is an obstacle to the ecological restoration of the landscape, even if the non-natives are not invasives.

- ↳ They mentioned that they are planting non-native / invasive trees at degraded mining sites, while historically, Tamil Nadu was mostly grassland, making it afforestation rather than ecologically appropriate restoration.
- ↳ Many of their projects focus on creating 'eco-parks', townships, and 'sustainable' timber harvesting system by setting up permanent study plots of *Acacia auriculiformis*, which are only for aesthetic afforestation or commercial use and don't support ecological functioning at all.

Their monitoring mechanisms focus on corporate reporting, such as measuring the carbon stock and sequestration for their selected site. The indicators they use are therefore lacking in ecological parameters, with no evaluation of support for biodiversity.

Mangrove forest

Twenty years ago the forest department started mangrove restoration in the estuarine area along the East Coast Road.

PROS:

- ↳ Potentially provided some habitat for local biodiversity (though this needs to be verified).

CONS:

- ↳ The restoration site was not meant for the mangrove restoration, the site was a non-mangrove area.
- ↳ Only a few species around 6–7 were planted, no species diversity was observed. Out of which only 2–3 which could adapt survive.
- ↳ Basic principles of restoration were not taken into consideration starting from: identification of restoration targets based on reference ecosystems, identifying barriers preventing natural recovery, monitoring, and interventions.



**Mangrove forest restoration site
 Pondichery. © G. Pannagasri.**

Aurovanam

Aurovanam is an effort by Pitchandikulam Forest Consultancy to revive the Matrikunj estate. It's called Nature's Lab where they emphasize grassroots education on natural farming, herbal medicine, and seed preservation. Aurovanam has a blue-green center and also has a nursery/vegetable garden that serves as a repository of rare and exotic edible plants.

PROS:

- ↳ They have done the reclamation of the Ousteri lake, it has a dense, rapidly growing forest that complements their objective of restoration.
- ↳ The seed bank helps preserve the variety of native and non-native edible plants, including many traditional varieties.



**Aurovanam Shiva
 showing the seeds
 and explaining
 about the seed
 bank.
 © G. Pannagasri.**

- ↳ The place serves as a great education outreach site that helps establish the connection between children and nature. For example, the vegetable and herb garden makes it exciting for education and exploration for children because of the variety of edible plants.

CONS:

- ↳ The reclamation of the lake ecosystem shows a lot of non-natives and in fact invasive species on the site which defies the purpose of restoration.
- ↳ The exotic plants in the vegetable and herb garden spread wrong information about the native species.
- ↳ As it's an education center, the onus lies on Aurovanam to provide authentic and scientific information which seems to be not taken seriously.

Sacred groves:

- ↳ We visited two sacred groves, Putthupet and Ooreni, both considered to be religious sites.

PROS:

- ↳ They are the last remaining natural fragments of TDEF species, acting as a reservoir for the future.
- ↳ Some of the trees are still tagged and used as a study site, providing ecological information about TDEF species.

CONS:

- ↳ Both groves are highly fragmented and have relatively low species diversity due to long term ecological disturbances.
- ↳ There are no policies being strictly implemented to minimize human disturbance due to activities like expansion of temple infrastructures, agricultural encroachment, timber collection, grazing of cattle, and plastic pollution
- ↳ Local management actively plants some non-natives and invasives. This prevents natural regeneration.
- ↳ There is little to no awareness about how unique these groves are and why they need protection.
- ↳ Removing seeds for nursery stalls regeneration.



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Nadukkupam

PROS

- ↳ Strong environmental education for students: Dedicated teachers lead plantation drives, kitchen gardens which support butterflies and local flora and fauna learning. They have a separate education centre with student-made arts/crafts used in village awareness programs like puppet shows, dramas, Villu Paatu storytelling, student-crafted props & costumes, native rice seed bank, and infographics on the bioregion.
- ↳ They carried out valuable livelihood supporting activities in Nadukkupam that helped reach out to the local community, such as arranging for medical/veterinary care camps and toilets and water at the local government school, and livelihood activities like spirulina production.
- ↳ Water retention and landscape modification: Transformed barren, eroded land into a fertile landscape via hydrology redesign (drainage paths to interconnected ponds).



Nadukkupam © G. Pannagasri

CONS

- ↳ Presence of non-native trees: While most school grounds and restoration areas prioritize natives, a few non-native varieties risk ecological imbalance and reduced biodiversity benefits. There is no reason for them to be planted at all.
- ↳ Incentive programs diverging from core restoration: Ayurveda, spirulina farm, and medical & veterinary camps for humans and cattle can generate community support but may not directly advance eco-restoration objectives.
- ↳ Livestock interference: Cattle roaming in the forest area undermines restoration by compacting soil, damaging saplings, and increasing erosion risks around water bodies which are not supporting restoration.

Siruseri Twin Lakes:

The twin lakes of Seruseri on the outskirts of Chennai, Periya lake and Chitteri earlier were divided by a small path and later made as a road which then slowly turned the lakes into a landfill. The lakes underwent rejuvenation efforts under a project which began in 2019, supported by a CSR initiative of Tata Consultancy Services and guided by Indian Institute of Technology (IIT Madras). The work was executed by Pitchandikulam Forest consultants with support from SIPCOT for a maintenance part which is approved by PWD and Siruseri Panchayat and Public Cooperation.

PROS:

- ↳ Removed all the waste dumped in the lake area
- ↳ Achieved the present water level in three years

by rainwater harvesting only.

- ↳ The project ensured that washing of clothes and utensils in the lakes was restricted, thereby regulating and maintaining water quality.
- ↳ As we were informed, wildlife such as wild boars and porcupines have been spotted visiting the lake, indicating the return of some ecological functions.
- ↳ Managed to have the cooperation of the Siruseri Panchayat and local public.

CONS:

- ↳ After removal of all the waste, desilting was undertaken and the mud extracted from the lake was used to create hillocks around the banks, without taking into account whether hillocks were ever there in that landscape historically.
- ↳ The depth of the lake was increased to 15 ft by excavation.
- ↳ The site included huts on the hillocks for people to sit in, which creates scope for human disturbances to the habitat.
- ↳ The waterbody today hosts fishes such as tilapia, snakeheads, and a few more ornamental fishes (no native fishes in the lake).
- ↳ No restrictions on local people for engaging in fishing and bathing in the lakes.
- ↳ No sight of any birdlife.
- ↳ Dominance of invasive species such as eucalyptus and acacia, along with other non-native trees, raises questions about the long-term ecological health of the rejuvenated zone.
- ↳ Wide gaps between trees and a lack of undergrowth were observed, both indicators of ecological stress and degradation.
- ↳ The forest department plans to commercialize the area by clearing a patch of the forest to build a cafeteria, which would increase human



Siruseri Twin Lakes Restoration Project. © Unknown.

footprint, disturb the fragile ecosystem, and risk undoing the rejuvenation efforts that were undertaken.

There didn't seem to be much attention given to ecology and protecting a natural ecosystem. The project leaned more towards beautification and a 'green' space designed for recreation.

Ooty Upstream Ecology

Upstream Ecology is a restoration non-profit company that primarily focuses on solutions based on plant ecology. They predominantly work in the Nilgiris on shola-grasslands, shola forests, and wetlands, with emphasis on restoring ecological services through reviving habitats. For example, the Shola-grassland restoration project is supposed to aid absorption and retention of water in the andic soil with the help of native grass root networks.

PROS:

- ↳ They possess a holistic perspective towards the landscape that they work with, including hydrology and historical ecology, and recognize the importance of restoration in conserving those habitats.
- ↳ They have the ability to work with a wide range of stakeholders from farmers to the forest department and involve interested students through interning/volunteering opportunities.
- ↳ The native nursery not only supplies plants for their restoration activities but sells saplings to others who are keen on having native plants on their property in the region.
- ↳ They have their own nursery which cultivates endangered native species of plants across plant types, belonging to different landscapes.

CONS:

- ↳ Although they aim to rebuild the 'form' or structure of the ecosystem through their restoration activities, there is a need for more emphasis on bringing back the function of the ecosystem too, with respect to supporting different faunal associations.
- ↳ Plant species are chosen (whether single or multi



spp.) with a primary focus on the use by specific animals, such as in Thaishola where they planted only *Tripogon bromoides* for Nilgiri Tahr alone and bamboo on the river bank in Mudumalai for elephants.

- ↳ Need for monitoring: The restoration plots are initially monitored once in 4 days until the plants are faring well, after which the sites are visited once in 6 months to assess survival and growth (not systematic or quantified) and to check whether the plants are being used by the specific target animals (e.g., Nilgiri Tahr for Shola-grassland site). Systematic monitoring is an important part of a well-rounded restoration effort and can help approach setbacks more scientifically, which is lacking here.

Coorg Rainforest Retreat

Rainforest Retreat is an eco-lodge located within Mojo Plantation, Coorg, managed by Sujatha, Maya, and Anurag Goel. The site emphasizes organic farming, biodiversity conservation, and minimal ecosystem disturbance. It supports ecological research and nature-focused tourism, while promoting plantation techniques such as composting, natural pest repellents, and leaving decaying logs to maintain microhabitats.

PROS:

- ↳ Organic farming reduces chemical impact on soil and water and helps support existing biodiversity.
- ↳ Undisturbed undergrowth and decaying logs support insects, fungi, and microhabitats.

- ↳ Active documentation in the form of booklets and checklists aids research and biodiversity knowledge.
- ↳ Eco-tourism provides education and awareness about sustainable agriculture and forest ecosystems to interested visitors, researchers, and students.

CONS:

- ↳ They planted non-native species alongside native ones in landslide patches to stabilize the land, potentially due to a lack of complete ecological knowledge, which could affect native flora.
- ↳ Use of invasive plants like *Lantana camara* for repellents may encourage their persistence.
- ↳ Biochar production process is poorly understood and may have environmental risks like increasing carbon emissions.
- ↳ Civet coffee promotion raises ethical concerns and may encourage wildlife exploitation.

Valparai Nature Conservation Foundation

NCF was established in 1996, and they work in various aspects of ecological research, conservation and education. On our trip to Valparai, we interacted with Dr T.R. Shankar Raman, a wildlife scientist whose focus is mainly on the ecology and conservation of tropical forests and Dr Divya Mudappa, whose goal is to improve the scientific understanding of patterns and processes in tropical ecosystems. They have



been heading NCF's project on Western Ghats forest research in Valparai since, with the goal of restoring degraded rainforest patches in coffee plantations.

PROS:

- ↳ Referring to historic and scientific research: Before starting the restoration work, their preliminary efforts included looking at historical references and conducting scientific research. Using sources like Flora of Anamalai Hills (1921) and traditional knowledge gathered by talking to local people, they designed their benchmark sites and grounded their approach in the landscape's past.
- ↳ Systematic nursery management: They maintain a dedicated nursery for native species where they don't arrange species in order but mixed, which helps in preventing the spread of diseases. They use locally sourced seeds and seedlings and maintain diversity by collecting year-round and choosing multiple parent trees to ensure genetic variation.
- ↳ Ethics: They minimize harm to wild populations like collecting seeds from roadsides, following best nursery care practices and avoiding sale or transfer of saplings to other eco-regions.
- ↳ Responsiveness to threats: From the beginning, they also identified potential threats and built threat mitigation into the entire restoration process. For example: they collaborated with the highway department to put barricades along the roadsides so that cattle don't enter the restored site, and to maintain mud banks along roadsides so that they don't need to be cemented.
- ↳ Robust monitoring: They follow a robust long-term monitoring process through different stages of recovery that track form, function, diversity, and relationships, such as the LEMON (Long-term Ecological MONitoring) plot.
- ↳ Learning through experimentation: Their commitment and dedication can be seen in how they keep experimenting with new techniques in various aspects from nursery management and seeding methods to planting saplings and dealing with invasive species.
- ↳ Transparency: They document and scientifically publish both failures and successes, which highlights their transparency.



- ↳ Involvement of local community members: This nursery is systematically managed by well-trained staff from the local Kadar community.
- ↳ Long-term commitment: Their presence in the landscape over 25 years has allowed NCF to develop an immense depth of knowledge, and they are still learning about the ecosystem and how to improve on their restoration efforts. This shows the importance of long-term dedication to a particular ecosystem to achieve success that can be sustained in the long run.
- ↳ Education and awareness: Alongside all this field work, they also focus on education. Their well-designed, artistic, and scientifically sound Nature Interpretation Centre helps educate and create engagement with the public.

CONS:

- ↳ Lack of popular communication: Their restoration work is not well known even among the people of Valparai because of limited popular communication. This also connects to their Nature Interpretation Centre, which is a treasure with a lot of scope for educating local people and especially tourists, but remains under-used.
- ↳ Lack of community outreach: Another concern is that the restoration work has limited community involvement. If more communities were involved and educated about the work, it could develop a sense of pride and it would directly benefit the restoration sites (for example, grazing of cattle could be brought down).

CONCLUSION

Comparing most of the different restoration (and non-restoration) sites we've been to, taught us

that there are a range of practices that try to support natural ecosystems, with different degrees of success. While non-forest areas like coffee plantations can still support a certain amount of biodiversity, making it imperative to promote nature-friendly practices like organic farming, there are also misguided restoration efforts, such as by Pitchandikulam Forest, where non-native species are actively planted, potentially negatively impacting the functioning of the forest. We also learned that there is no substitute for scientifically restored forest (apart from pristine forest, which is becoming increasingly rare!). The only example we saw of truly scientific and effective restoration work, carried out by ecologists, was by NCF in Valparai. However, even there, we saw that their work could potentially have been more successful if they had explored the potential for outreach and education to the fullest. Therefore, restoration needs equal attention to science as well as the social outreach aspect in order to be successful in the long run, with attention paid to all the vital ecological parameters of form, function, relationships, and diversity of species.

ANNEXURE

The Liana Trust

The Liana Trust is an NGO founded by Gerry Martin, focusing on snake conservation, human-snake conflict mitigation, and environmental education in rural and agricultural areas. The trust runs a serpentarium for antivenom venom supply, rescues and rehabilitates wildlife, conducts research, and engages local communities through education and organic farming initiatives. The previously degraded farmland now supports enhanced biodiversity including birds, herpetofauna, and mammals.

PROS:

- ↳ Scientific snake rescue and captive care reduce human-snake conflict.
- ↳ Serpentarium provides venom for anti-venom production free of cost, supporting public health.
- ↳ Each and every individual in the captive is provided optimal conditions and regularly monitored.
- ↳ Quarantine unit is present for safety and hygiene purposes.



- ↳ Rescues do not fully translocate snakes, rather promote co-existence
- ↳ Education programs raise awareness in schools and communities, promoting coexistence, prevention and treatment for snake bites (myth busters).
- ↳ Initiative for organic farming projects support biodiversity and provide alternative income for farmers.
- ↳ Biodiversity enhancement via owl perches and to reduce snake-human interactions. Maintaining exotic reptiles with proper management and welfare protocols.
- ↳ Trying to provide an alternate supply chain for organic farmers until they get organic certification. It's an incentive to help the initiative keep going.

CONS:

- ↳ Owl perch initiative is based on a success model from Thailand. Initiatives for other species like carnivorous bats can be considered.
- ↳ Promoting monoculture of bees could introduce diseases to local native species.
- ↳ Rescued and maintaining species like red ear slider, pacu etc. which are invasive

NCBS Plot – Thithimati

The NCBS Plot is an 85 acre estate bordering Brahmagiri Wildlife Sanctuary, leased for long-term ecological research. The area contains primary forest degraded by selective wood lopping and grazing. NCBS monitors tree dynamics such as carbon sequestration, methane emission, and litter fall, while also documenting mammal diversity using camera



traps. The plot hosts 148 plant species, with all native trees, supporting studies on forest recovery and ecosystem function.

PROS:

- ↳ Ecological monitoring of trees.
- ↳ It's a window of opportunity for new scientific research and forest restoration initiatives.
- ↳ Most trees are native, preserving local flora because of minimal disturbance selective lopping currently allows natural regeneration\\

CONS:

- ↳ Community grazing and cattle management remain challenging; local engagement is sensitive.
- ↳ Convincing local people about conservation can lead to conflict or resentment toward wildlife.
- ↳ Limited active intervention in some degraded patches may slow restoration.



MCBT

Madras Crocodile Bank Trust was established in 1976 to breed Indian crocodile species in captivity for conservation. Their operations have expanded to venom collection and herpetology research, including the captive breeding of other endangered species like Batagur kachuga.

PROS:

- ↳ Well-designed educational material to help raise awareness about herpetofauna and their conservation importance, helping in educational outreach.
- ↳ Well-established centre for herpetological research in India.
- ↳ High conservation value as it breeds endangered species for reintroduction to wild (in addition to zoo transfers)

CONS:

Snake venom extraction was not done scientifically or with attention to ecological ramifications/snake welfare, or with robust traceability.

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