

**COURSE REPORT**

**Training on the Restoration  
of Degraded Lower and Upper Montane Forests  
in Sri Lanka's Wet Zone**

Sri Lanka Forestry Institute, Moon Plains, Nuwara Eliya, Sri Lanka  
February 9-12, 2016

An event organized by:  
Sri Lanka Forest Department  
Environmental Leadership & Training Initiative (ELTI)



**Introduction:** Sri Lanka's central highlands are the main watershed of almost the entire country, with most of the major rivers originating from this region. Historical deforestation and forest degradation have been the heaviest in this region due to agricultural expansion, which continues even to date. As a result of this reduction in natural forest cover, biological diversity and the valuable ecosystem services that it provides have been seriously diminished.



As the damaging effects of deforestation and forest degradation are clearly evident in the montane area of the country, there is an increasing recognition of the urgent need for the conservation and restoration of these forests. Consequently, the National Planning Department of Sri Lanka has identified and demarcated a central fragile zone within an altitudinal belt of around 500m to 2100m. This environmentally sensitive area has high risks of soil erosion and landslides as a result of prevailing improper land use, particularly in areas with steep and rugged topography. Restoration of native species diversity and the ecosystem services they offer in appropriate areas within this region is a national priority.

The Ministry of Mahaweli Development and Environment has designated a national tree planting program, *Vanaropa*, to increase the forest cover by 3%, which translates into about 180,000 ha, over a period of three years starting in 2016. The most important ecosystem services the forest cover critically needs to provide in the montane region—an important target area for the *Vanaropa* program—are the regulating services, which include regulation of water, climate, floods and disease, and supporting services, such as soil formation, nutrient cycling, erosion (and fire) control, and primary production. These in turn would enrich the habitats of the indigenous and naturalized biota that sustain other provisioning services for human well-being.

Understanding the ecological processes that relate to forest functioning can guide decision-making and the development of strategies for effective forest restoration and sustainable land management. This knowledge is indispensable for managing the provision of environmental services in a sustainable manner in human modified landscapes, which are often highly fragmented and isolated.

This four-day training course aimed to introduce the basic and applied ecological principles and techniques to design and implement restoration strategies to increase forest cover and in turn facilitate the provision and regulation of ecosystem goods and services, with special emphasis on the critical watersheds and fire-prone areas of the montane region. These principles and practices were conveyed through a series of lectures based on case studies and field-based observations and exercises.

**Objectives:**

- To present the fundamentals of tropical forest ecology and the scientific advancements on evaluating ecosystem services in multiple-use landscapes of the aseasonal/seasonal tropics.
- To present the drivers of forest disturbances and environmental degradation, their influence on the provision and regulation of ecosystem services, as well as the potential for natural regeneration, forest succession and restoration.
- To provide an understanding of the range of forest restoration options in relation to prioritized ecosystem services, and guidance on how to quantitatively and qualitatively evaluate both biophysical and socio-economic variables to select the most appropriate strategies for the respective divisions and ranges of the Forest Department.
- To provide participants with the opportunity to begin developing plans for forest restoration projects with a realistic assessment of the opportunities and constraints for implementing those plans with collaboration, technical assistance, and other forms of support from ELTI's Leadership Program and other institutions.

**Content:****Day 1:**

The training opened with remarks by Dr. K.M.A. Bandara, Director of the Sri Lanka Forestry Institute, and Mr. Anura Sathurusinghe, the Conservator General of Forests. Dr. David Neidel (ELTI) then provided an introduction to forest restoration by citing global trends in forest cover, the increasing influence of the ecosystem services approach in motivating calls for international action, and an array of international initiatives aimed at catalyzing global landscape restoration. Mr. Anura Sathurusinghe followed with an overview of the current



state of Sri Lanka's forest cover, and the vision and forest restoration strategies that are part of the present Government's development framework. Prof. Nimal Gunatilleke (University of Peradeniya) then discussed the ecological complexity of Sri Lanka's montane and submontane forests, provided an introduction to the primary drivers of deforestation and forest degradation, as well as the impact of these land-use changes on the provisioning of ecosystem services, and introduced ecological principles underlying active and passive forms of forest restoration. To give more concrete examples, Dr. Thilanka Gunaratne (University of Peradeniya) and Ms. S.H. Bandumala (Forest Department), both of whom conduct research on forest restoration techniques, then provided case studies of their forest restoration initiatives in a variety of montane and submontane sites. Finally, Dr. K.M.A. Bandara discussed issues surrounding the need to improve and conserve genetic diversity of native tree species, while Mr. M.A.A.M. Jayaratne (Forest Department) discussed some of the practical problems and institutional hurdles to the effective conservation and restoration of the region's forests.

## Day 2:

The second day of the training started with a field trip to the Bombura Ella Forest Reserve, where participants visited a solid waste facility and discussed its impact on downstream water quality. They then conducted a comparison of the environmental services provided by a Eucalyptus plantation compared to that of a near by area of natural forest. Within the Eucalyptus plantation, they also established a plot in order to quantify how much natural regeneration was occurring on the site, the species composition of the natural regeneration, and the presence of indicator species of insects for biodiversity. The plantation site was subject to fire wood harvesting, so there was little in the understory, but this served as a baseline for a similar exercise the following day. Following the return to the Sri Lanka Forestry Institute, Dr. Neidel gave a presentation on lessons learned from different approaches to forest restoration, including Assisted Natural Regeneration, the Framework Species Method, and Rainforestation, practiced in the region. This was followed by presentations by Dr. Suranjan Fernando (Center for Applied Biodiversity Research and Education) and Dr. Enoka Kudavidanage (Saberagamuwa University) on





using a variety of indicator species, including birds, butterflies, insects, orchids and lichens, to monitor the habitat quality and return of biodiversity to the restoration sites.

### **Day 3:**

The third day of training started with a fieldtrip to several sites in the Meepilimana-Kande Ela Area. Participants were led into a Eucalyptus plantation that was being managed for watershed protection and where destructive harvesting of firewood was not permitted. Participants reflected on the watershed service value of the area, the contradiction in having this site planted with Eucalyptus (a tree known for consuming a large amount of water) and the potential of using the existing understory for native forest regeneration. In a younger site that was similarly protected from fuelwood collection, participants were introduced to some of the native forest trees and conducted a plot assessment to determine the amount and species composition of natural regeneration in that site—similar to the day before. Upon returning to the Sri Lanka Forestry Institute, Dr. Sisira Ediriweera (Uva Wellassa University) gave a presentation on tree selection, seedling ecology and plant propagation of native forest trees, while Prof. N.G. Pushpakumara (University of Peradeniya) gave a presentation on forest landscape restoration, looking particularly at how best to integrate biodiversity into different land use systems that also address local community's social and economic needs.



### **Day 4:**

On the final day of the training, participants were taken to Welahinna, the site of a species trial set up by Dr. K.M.A. Bandara together with the Forest Research Division to examine the growth performance of sixteen native forest species and four exotic species. Discussion revolved around the reasons for the (generally) better performance of the exotic species, but also the need to move beyond the narrow criteria used in plantation forestry in determining what species to use for restoration. The training came to a close following a course evaluation, a short presentation by Dr. Neidel on ELTI Leadership Program opportunities that the participants could now avail themselves, and the issuing of course certificates.





**Participants:** The training was attended by 37 participants from the Sri Lanka Forest Department, including Divisional Forest Officers, Assistant District Forest Officers, Range Forest Officers, as well as lecturers from the Sri Lanka Forest Institute.

**Follow-Up:** All of the participants have forest restoration targets which they will need to address by developing forest restoration projects of their own. A Google group listserv was set up to help facilitate continued communication between training participants and resource people. The participants were also encouraged to apply to the ELTI Leadership Program for assistance with their various restoration projects. Recognizing the need to provide clear guidelines, Profs. Nimal and Savitri Gunatilleke and Dr. Suranjan Fernando have also begun to explore the possibility of developing a publication on recommended native species planting mixes for different regions of the country. A training on forest restoration for Forest Department officers in the Dry Zone of the country is also tentatively scheduled for October 2016.

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