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Diversity and Restorative Assessment of Fragmented Cloud Forest Ecosystem in Bopaththalawa; Central Highlands of Sri Lanka

Perera P.M.^{1,2,3*}, De. Silva S.^{2,3}, Amarasekara H.S.⁴

¹RDL Corporate Responsibility, Colombo, Sri Lanka

²EarthLanka Youth, Network, Kesbawa, Sri Lanka

³Adaptation Research Alliance

⁴Department of Forestry and Environmental Science, University of Sri Jayewardenepura, Nugegoda, Sri Lanka

*spiderconservation@gmail.com

Abstract

The central highland cloud forest of Sri Lanka serves as the primary source of water for the nation, playing a pivotal role in preserving biodiversity, preventing soil erosion, and sustaining the flow of 103 rivers. This ecosystem harbours a diverse array of endemic and endangered species within unique ecological niches. However, anthropogenic activities, including invasive species spread, illegal logging, forest encroachment, and manmade fires, have subjected certain forest patches to heightened stress. This project proposes a restorative initiative focusing on the degraded central highland cloud forest in Agarapathana, Bopaththalawa (6°80'95.06" N, 80°69'58.25" E) by Olu Water. Project aims to enhance the health of the local cloud forest vegetation, prioritize wildlife conservation, and establish safe pathways for wildlife movement, thereby mitigating the impacts of fragmentation. Recognizing the importance of preserving vital connections within the ecosystem, project addresses the long-term well-being of both flora and fauna. Over the initial 20 months (March 2022-November 2023) of the project, a comprehensive biodiversity survey was conducted on the 23-hectare restoration site and its wider buffer area. Utilizing visual encounter survey methodology with random sampling, opportunistic observations, and confirmation records from scat, skulls, and recorded dead species, the study documented 12 amphibians, 11 butterflies, 12 dragonflies, seven reptiles, two freshwater fish, nine mammals, 63 birds, and 121 plants. Notably, 33.3% of the recorded species fell under threatened categories. To facilitate restoration, local pioneer cloud forest plant species were identified, and community plant nurseries were established to cultivate *Shorea spp.*, *Syzygium rotundifolium*, *Calophyllum spp.*, *Neolitsea cassia*, *Melicope lunu-ankenda*, *Elaeocarpus subvillosus/ E. glandulifer*, *Symplocos spp.*, *Neolitsea fuscata*, *Arundinaria densifolia*, *Macaranga peltata* and *Ochlandra stridula* plant varieties. The project empowered 11 local smallholder families to participate in home garden planting for forest restoration, providing an alternative livelihood fostering community-based restoration. Saplings will be continuously purchased and planted along the restoration border during the rainy season to aid natural regeneration. Additionally, a 3 m wide fire prevention belt was implemented during drought periods to mitigate the risk of man-made forest fires. In line with restoration efforts, community awareness activities are ongoing communicating the importance of the cloud forest preventing illegal activities such as poaching, gem mining, and deforestation. The project is committed to continuing its restorative initiatives until 2026, with the support provided in the first year by the Adaptation Research Alliance. Furthermore, the initiative is poised to implement a volunteer carbon and biodiversity offsetting mechanism in the coming five years.

Keywords: Cloud forest restoration, Bopaththalawa, Biodiversity offsetting, Olu water, Water catchment enhancing