
CHANGES IN VEGETATION AND SOIL CHARACTERISTICS OF REGENERATING FOREST AT RANDENIGALA

¹SP Nissanka and ²RB Mapa

¹Department of Crop science Faculty of Agriculture,
University of Peradeniya, Peradeniya

²Department of Soil Science, Faculty of Agriculture,
University of Peradeniya, Peradeniya

Victoria, Randenigala, Rantambe(VRR) sanctuary is the largest sanctuary in Sri Lanka. Certain areas in the Rantambe catchment was disturbed for the construction of Randenigala dam in 1987 with no planned rehabilitation programme. This study was initiated to assess the changing pattern of vegetation and its influence on soil physical and chemical properties of disturbed forestland near Randenigala dam, relative to the surrounding undisturbed natural forests.

The site was located 1 km North of the Randenigala Dam in a hilly slope in the intermediate zone and was surrounded by relatively undisturbed natural vegetation of dry mixed evergreen forest. In the sampling site (about 100 ha) the vegetation and soil has been removed down to parental material for dam construction. Three rectangular transects measuring 5m x 100m were marked in each natural and regenerating forest sites. All plants were identified, height and diameter at breast height (dbh) over >2cm of woody plants were measured. Soil pits were cut in both disturbed and undisturbed forest sites and profiles were described. Soil samples were removed from each horizons for the analysis of soil physical and chemical properties. In the degraded sites, soil pits were cut in the open area (6m), in the canopy edge (3m), and 0.5m from the tree base of dominant pioneer tree species to observe the soil improvement.

Plant density of the undisturbed forest was three times higher than the disturbed forest and consists of 17 trees, six shrubs, and four woody climber species. Five trees, six shrubs, one woody climber, two grasses, and three creeping herbaceous species were found in the regenerating forest. Common families present were Euphorbiaceae (38%), Sterculiaceae (24%) and Rubiaceae (12%) in the undisturbed forest and Hipocrataceae (40%), Leguminosae (26%) and Apocynaceae (18%) in the disturbed forest.

Five and two major soil horizons were identified in the undisturbed and disturbed forest sites, respectively. Soil N, P, K and organic matter contents and hydraulic conductivity were greater and the bulk density was lower in the undisturbed site. The mean weight diameter (MWD) of the soil aggregate was greater in the soil horizons of undisturbed site (1.6-2.7mm) compared to the degraded site (1.1 mm). Similar trends were also observed for wet aggregate stability in the undisturbed (90% remaining) and disturbed (71% remaining) in forest soils. However, MWD (1.5mm) and wet aggregate stability (83% remaining) gradually improved towards the tree base of pioneer tree species. (i.e. under *Bouhinia racemosa*) in the regenerating disturbed forest site. Increase in soil organic matter content stabilizes the soil aggregates and makes soil more resistant to erosion by wind and water under the canopy of pioneer species. The retention of soil under these trees contributes to the development of the soil profile, improvement of soil fertility and subsequently, the vegetation diversity of degraded sites.