Impacts of Clear-cutting in a *Pinus* Plantation Within the Nonpareil Area of Belihuloya, in the Southern Intermediate Zone, Sri Lanka

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Clear-cutting can be recognized as an economical way of timber harvesting in terms of profit and time-saving. Simultaneously, the rapid change within any ecosystem caused by the removal of entire vegetation causes serious environmental problems. Thus, the study was carried out to determine the key consequences of a post-clearcutting scenario (on aspects such as regeneration, soil erosion, and carbon storage). The study area, "Perawaththa Pinus Plantation" underwent a clear-cut during the period from 2014 to 2016. The study area is a sloppy land in the Nonpareil area in Belihuloya within the Mid country Southern Intermediate zone of Sri Lanka. After the clear-cutting, the Forest Department has planted native plant species and together with an exotic *Eucalyptus sp.* with the intention of converting the needle-leaf Pinus plantation forest into a broadleaf forest. However, the study found that natural regeneration of the exotic *Pinus caribaea* (as original stand) outperformed the supported attempt at restoring native broadleaf species, resulting in *P. caribaea* dominating the area (% of regenerating plants) after five years of clear-cutting. The growth rate of *P. caribaea* was calculated as 1.68cm in diameter per year based on the DBH increment. Plot data represents 16 plant species regenerating in the area after the clear-cut belonging to 10 plant families, representing 9 introduced species (incl. *Eucalyptus sp.*) and 7 species that are regenerating naturally (incl. *P. caribaea*). The mean annual soil erosion was calculated by employing the InVEST SDR model, and it has increased from 3.1 tons$\cdot$ha$^{-1}\cdot$yr^{-1} to 423.8 tons$\cdot$ha$^{-1}\cdot$yr^{-1} in the post clear-cut scenario. The mean value of carbon storage determined using the InVEST carbon model, also changed dramatically from 253.7 tons$\cdot$ha^{-1} to 27 tons$\cdot$ha^{-1} respectively, in between the years of 2013 and 2017. The findings of the study provide on the ground impacts of clear-cutting, which should be validated with multiple sampling sites and used for decision and policy-making in plantation forest management.

Keywords: Clear-Cutting, Regeneration, Soil Erosion, InVEST (SDR Model; Carbon Model), Nonpareil