(112)

Assessment of Mangrove Restoration Potential in the North Western Province of Sri Lanka for Climate Change Mitigation

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Abstract

Over the geological time, the planet's climate has been changing constantly, with large variations in global average temperatures. Millions of people are already suffering as a result of natural disasters worsened by climate change. The Paris Agreement is an international climate change treaty, and countries will present their climate action plans, referred to as Nationally Determined Contributions (NDCs). In response to the Paris Agreement, Sri Lanka presented NDCs in 2016. In which the coastal and marine sector has a restoration target of 10,000 ha of mangroves as a coastal greenbelt with mitigation co-benefits. However, identification of potential lands for such restoration of mangroves has not been done. Therefore, identification of potential areas for mangrove restoration is most important because mangroves cannot be restored where they were not previously existed. The main objective of this research therefore was to identify potential areas for mangrove restoration within the North-Western Province. Identification of potential lands in North-Western Province were done by using Google Earth Pro and ArcGIS 10.2.2. Most important physicochemical parameters such as salinity, pH, soil organic matter content, soil water holding capacity were analyzed under laboratory conditions, samples were obtained by different sites of mangrove habitats. Soil salinity, pH were measured by using calibrated multiparameter. The loss of ignition method for soil organic matter content and a customized method for soil water holding capacity were used. All parameters were subjected to two-way ANOVA in MINITAB 14 after following Anderson Darling Normality test. The mean of soil salinity, pH, soil organic matter content, and soil water holding capacity were ranged respectively; 4.26% to 5.93%, 6.07 to 8.62, 3.40% to 9.31%, and 30.39% to 46.38%. The potential lands for restoring mangroves in North-Western Province were identified in Chilaw, Kalpitiya, Mundel, Panirendawa, Puttalam, Vanathawilluwa and Vennappuwa Divisional Secretariant Divisions. Among them, availability for historical images in Google Earth Pro there were specially chosen areas to restore the mangroves. There is no any significant difference of physicochemical parameters among mangrove habitats and an abandoned shrimp farm where there were previously mangrove plants existed. Hence, abandoned shrimp farms and salterns can be used to restore the mangrove plants and the assisted natural regeneration of mangroves in suitable abandoned shrimp farms by way of facilitating hydrology to be explored as the best option for mangrove restoration.

Keywords: Mangrove restoration, Nationally Determined Contributions (NDCs), Assisted natural regeneration, Areas suitable for mangrove restoration

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72