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Identification of Forest Fire Vulnerable Forest Types and Suitable Areas for Forest Restoration in Sri Lanka

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Abstract

Forest fire is the main driver on deforestation that severely impact for the forest resources annually. As per the past records of forest fires and according to the Forest Department data, annually about 100 ha to 1,000 ha of forest and forest plantation were destroyed due to forest fire in Sri Lanka. According to the current government mandate called "Vistas of Prosperity of Splendors", percentage of forest cover of Sri Lanka will be increased from 29.7% to 30% at the end of 2025. In order to achieve this target, forest degradation and deforestation need to reduce while improving the forest restoration activities. On the other hand, still, the Forest Department does not have proper forest fire vulnerable area maps to identify the threaten forest resources for forest fires. In order to achieve the forest cover enhancement target in Sri Lanka the Forest Department need to be identify the forest fire impacted forest types and proper land areas for forest restoration activities. In this study shape file like forest cover, population density, forest fire ignition points, temperature and rainfall data from 2000 to 2020, slope and elevation data were used to analysis. Using several GIS tools such as special joints, intersect tools forest fire vulnerable forest type maps was created by using ArcGIS Pro software. Multi-criterial analysis technique was used to perform to identification of site suitability for replanting activities. Findings clearly indicated that dry monsoon forests are having high vulnerability for the forest fires followed by the forest plantation. The forested areas that are having canopy cover equal of less than 15% are the area which are more suitable for forest cover enhancement programs. These forest types are open and sparse forest lands, scrublands, and savanna lands. On the other hand, dry monsoon forested areas are also having some potential for replanting activities that cover 2/3 of the total forest lands. High elevation forested lands are normally not suitable for forest restoration being having high operation and maintenance costs as well as high canopy cover. Scrubland, open and sparse forested areas that are located in Rathnapura and Kaluthara districts are the best forested areas that can be highly recommended for forest restoration activities. On the other hand, open and sparse forest, savanah, and scrubland forested land areas in Monagarala, Hambanthota, Ampara, and Batticaloa districts can be used for the forest restoration activities.

Keywords: Forest fire, Multi-criterial factors, Weighted overlay, Forest restoration, Dry monsoon forest