



Suggest Land use and land cover changes of Udawalawe National park and their possible influence on the carrying capacity of elephants (*Elephas maximus maximus*) of the park.

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Abstract

Habitat loss is considered a crucial factor that influences the dispersion of animals. Anthropogenic changes in land use and land cover patterns are known to impact the carrying capacity of elephants. Udawalawe National Park (UNP) was established in 1972 to protect the catchment of the Udawalawe Reservoir and maintaining the carrying capacity (K) of its flagship species elephant (*Elephas maximus maximus*) by minimizing habitat loss due to land clearance and cultivations by villagers. Despite this, the vegetation cover of UNP has changed over time resulting in poor wellbeing of elephants at present. The present study was carried out to identify the temporal changes in land use and land cover of UNP from 1966 to 2018. Topographic maps 1966 and 1985 produced by the survey department of Sri Lanka and the interpreted data were converted into digital format by screen digitizing. Satellite imageries downloaded from the Google Earth website for 2018 of the area were used for the study. Satellite imageries were geometrically rectified to Kandawala_Ceylon_Belt_Meters to allocate a common coordinate system for all images, and on-screen visual interpretation followed by screen digitization was performed to identify and extract LULC categories. The LULC layers were in vector format and were subsetted into the boundary of the UNP area using ArcGIS 10.1 software. Land extents of each land use category about each year were calculated using Arc GIS 10.1 software. Thick forests had occupied the highest land cover at 54.23% in 1966 while total anthropogenic activities had only 11.79%. By 1985, thick forests have reduced to 2.86%. Grassland patches at the North-western end that had occupied 6.03% of the park have been lost to chena, scrub, forest, and thick forest, from 1966 to 1985. Scrub areas had gradually increased and reached up to 55.54% of the total area in 1985. Total anthropogenic land use has increased to 16.38% during the same period. The current geographic occupation of the park has 26.23% scrub, 24.99% thick forests and 23.89% of anthropogenic land use. The results revealed that human encroachment of UNP has dramatically increased from its Gazetted boundary due to natural succession. When vegetation thickness increases within the park from succession, elephants tend to avoid such areas. Thick vegetation will reduce the K of elephants and result in poor wellbeing of elephants. If the trending land-use changes continue, elephants will tend to move out from UNP, thus intensifying Human-Elephant Conflict.

Keywords: Land use, Land cover, Udawalawa National Park, Satellite imagers

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