

## **An Assessment of Land Use Change and Its Contribution to the Climate Change in Selected Sites in the Intermediate Zone of Sri Lanka**

W.D.K.V. Nandasena<sup>a</sup>, Hemanthi Ranasinghe<sup>b</sup> and W.M.P.S.B. Wahala<sup>c</sup>

<sup>a</sup> *Department of Geography and Environmental Management, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka*

<sup>b</sup> *Department of Forestry and Environmental Science, University of Sri Jayawardenapura, Sri Lanka*

<sup>c</sup> *Department of Tourism Management, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka*

*kalpanie@ssl.sab.ac.lk*

Tropical deforestation and degradation and climate change are highly discussing contemporary phenomena of the globe. Investigating the temporal and spatial variation of deforestation, degradation, climate and interrelationship of the mentioned variables in the intermediate zone in Sri Lanka, which have been regarded lightly in research so far, are the objectives of this paper. Land use change over 56 years was investigated at the district level in the intermediate zone by using Land matrix tool. In order to identify the climate change over 56 years, rainfall, temperature and wind speed were selected as climatic variables and temporal change was detected by time series and spatial changes by kriging analysis. During the period of 1956 to 1981 extent of forest cover has declined by 3% and 54% in Badulla and Monaragala districts where deforestation rates were 48% and 19% respectively during the period of 1981 to 2012. Main contributors to deforestation common to study area were Chena cultivation, home gardens and paddy cultivation. Home gardens and paddy cultivation have increased in every district throughout the time especially within the 50m buffer zone from a dense forest. Proximity analysis identified that low and mid-country had the highest closeness for the above two land uses. Eastern and southeastern part of the intermediate zone had received the highest amount of mean rainfall while it had declined in the northwestern direction. Highest mean rainfall amount was received from second inter-monsoon and the lowest from southwest monsoon during which the amount of rainfall decreased by 0.64mm per year. Nevertheless, northeast monsoon rainfall growth was by 1.74mm per year. The average maximum temperature in the intermediate zone had a positive linear trend that contained a rise in temperature of 0.008 C° per year. When considering the overall trend of temperature in the intermediate zone, the maximum had a gradual growth trend while the minimum had a declining trend in a geometric manner. Low country (2.8 km/h) showed a prevailing wind with a speed higher than that in the mid country where both recorded high flows in the evenings. The impact of forest cover change on climate variables such as rainfall ( $p=0.042$ ) and wind ( $p=0.001$ ) was identified. Further investigation, adopting new methods, is needed on this matter.

**Keywords:** kriging analysis, land matrix, proximity analysis, tropical deforestation