

**TEMPORAL AND SPATIAL CHANGES IN VEGETATION COVER OF
MAHAWELI-H SYSTEM: MAHAWELI DEVELOPMENT
PROJECT (1988 TO 2022)**

U.D.H.P. Ariyasingha¹, G.G.T. Chandrathilake^{1*} and M.A. Kumara²

¹*Department of Forestry and Environmental Management Science, Faculty of Applied Sciences,
University of Sri Jayewardenepura, Sri Lanka*

²*Mahaweli Development Authority, Colombo, Sri Lanka*
**thilakawansha@sjp.ac.lk*

The Mahaweli development project is Sri Lanka's largest and most significant multi-purpose development initiative, covering an extensive area of $57,225 \times 10^4$ m² within the Mahaweli H zone. This project has profoundly impacted vegetation cover in the Mahaweli H System, prompting a study of the temporal and spatial changes since its initiation in 1988. This research aimed to assess these changes across the entire Mahaweli H System from 1988 to 2022 and included a trend analysis of vegetation health and conservation efforts within five forest reserves and one wildlife boundary. Data from 1988 to 2022 were analysed, with projections extending to 2042. The period was divided into five-year intervals, and satellite images from the Landsat 5 TM and the Landsat 8 OLI/TIRS were processed using ArcGIS software. Indices were classified using the natural breaks (Jenks) method, facilitating land size determination. A linear regression model was applied to analyse trends in five forest reserves (Licolawewa Upper, Lunuoya, Yoda Ela, Licolawewa Lower, and Bongamuwa) and one wildlife boundary from 1988 to 2042. The overall vegetation area exhibited fluctuations, notably decreasing to $9,980 \times 10^4$ m² from 1993-1997, followed by a recovery peaking at $20,230 \times 10^4$ m² from 2018-2022. The linear regression analysis of NDVI trends in ArcGIS revealed a positive trend in the Licolawewa Upper and Lunuoya Forest Reserves, as well as in the Wildlife boundary, indicating improved vegetation health and effective conservation efforts. Conversely, the Yoda Ela, Licolawewa Lower, and Bongamuwa forest reserves exhibited negative trends, indicating a decline in vegetation health. The study underscores the importance of continuous monitoring and sustainable land management practices to ensure the long-term health and conservation of vegetation in the Mahaweli H System.

Keywords: ArcGIS, Conservation, Landsat, Regression model, Remote sensing, Vegetation