

## **Water Resources Assessment and Water Productivity Analysis & Mapping in Malwathu-Oya West Sub Catchment, Anuradhapura, Sri Lanka**

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Assessment of water resources and water productivity enables in identifying approaches to address the agricultural water demand and water scarcity in dry zone of Sri Lanka. This study was undertaken to assess water resources, analyze and map water productivity in Malwathu-Oya West Sub Catchment using Geographic Information Systems (GIS). The Rainfall Anomaly Index (RAI) was derived by using daily rainfall data for the period of 1989-2018 from *Anuradhapura* and *Mahagalkadawala* rain gauging stations to identify wet (2015), dry (2016) and normal (2017) years for the analysis. Monthly Net primary production (NPP) and Actual evapotranspiration and interception (AETI) data gathered from WaPOR (Water Productivity through Open access Remotely sensed derived data) database of the FAO were used for the water productivity analysis and mapping. The total water availability for 2018 *Yala* and 2018/19 *Maha* seasons were estimated using a simple water balance method and water demand for different sectors was estimated. Spatial and temporal variabilities of Gross Paddy Water Productivity (GPWP) were identified in the analysis. The highest GPWP was reported in 2015, which identified as a wet year and this condition was evident in *Maha* seasons compared to *Yala* seasons of each year because of relatively high water availability. Hence the study revealed that GPWP values are synchronized with the rainfall. The ancient tank cascade systems (*Mahakanumulla*, *Thirappne*, *Ulagalla*) show high GPWP even in *Yala* seasons possibly due to better water management practices applied by the farmers. According to the water resources assessment, there is a water shortage of 42.85 million cubic meters (MCM) during *Yala* season even in the normal rainfall year of 2018. As per the water resources assessment, the estimated water demand for domestic, commercial, industrial and irrigation are 3.24, 0.39,  $7.73 \times 10^{-5}$  and 100.02 MCM in 2018 *Yala* season and 4.66, 0.56,  $1.06 \times 10^{-4}$  and 114.16 MCM in 2018/19 *Maha* season. Irrigation sector is the largest water user. The spatial variability of paddy water productivity in this area could be minimized through appropriate interventions to improve paddy production.

**Keywords:** Geographic information systems, Paddy water productivity, WaPOR data

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