

### **Impacts of Urban Water Management in Attanagalu Oya Basin**

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#### **Abstract**

The demand for water in most parts of Sri Lanka has intensified within the recent years due to the increase in population growth and urbanization. Thus, the quantitative allocation of the available water resources to support the elevating demand for water by numerous sectors while maintaining harmony with the nature has been a challenge for the local and national authorities. Quantification of amounts of river flows that should be extracted to support the increasing demands for water with less or no impacts on the riverine ecosystems is difficult. Therefore, this research focuses on studying the impacts of urbanization on the demand of water by various sectors and employing advanced hydrological models to quantify the extractable amount of river flow while maintaining optimum flows along the Attanagalu Oya that have to be maintained to sustain the environment via assessment of environmental flow assessment to predict whether the flows of Attanagalu Oya would be sufficient enough to support riverine ecosystems and other requirements. HEC-HMS model was calibrated and validated for the Attanagalu Oya catchment and daily flows were generated for the period of 1960-2010. The past and future demand for water up to 2030 was quantified considering the extractions for urban water supply and irrigation and the simulated stream flows for the past fifty years and the future years were characterized using thirty two different hydrological parameters. The Range of Variability Approach (RVA) targets that should be maintained within the Attanagalu Oya were calculated using original flows before water extractions and diversions along with the rate of non-attainment of the flows for the past and the future scenarios. When the period of 1960-2010 is considered the mean rate of non-attainment of the Indicators of Hydrologic Alteration (IHA) groups after water withdrawals vary in between 12% to 80%. But when the future years (2010-2030) are considered a mean rate of nonattainment of 51.4% (if the rainfall patterns remains unchanged) or 79.0% (if the rainfall pattern is reduced to the worse as the minimum rainfall received in the past fifty years) or 48.6% (if the rainfall pattern of the future years exhibit a maximum rainfall of past fifty years) could be predicted for Attanagalu Oya in accordance to the RVA approach which are higher compared to the past. This situation will aggravate with the increase in urban water demand.