

Abstract No: BO-22

Drought risk reduction by small tank cascade systems and isolated small tanks in the dry zone of Sri Lanka: an ecosystem based approach

L. A. Prematilaka^{1*}, D. Wickramasinghe¹ and S. Vidanage²

¹Department of Zoology and Environment Sciences, University of Colombo, Sri Lanka

²Department of Zoology and Environmental Management, University of Kelaniya, Sri Lanka
lihini9531@gmail.com*

Sri Lanka is a proud owner of a flamboyant irrigation based history with a wide array of tanks. A cascade of water tanks (Small Tank Cascade System -STCS) which recycles water to help paddy cultivation, act as the backbone of the dry zone irrigation. The STCS are gaining attention not only as a water source but also as a resource to reduce drought risk in the dry zone. Droughts have been recognized as a major disaster in the Sri Lankan context. Owing to various anthropogenic influences, the occurrence of droughts in the dry zone of Sri Lanka is now rapidly exacerbating. The aim of this study was to investigate how tanks in a STCS and isolated reservoirs contribute to retain water during the dry season. This investigation was carried upon two selected tanks of the Kapiriggama STCS and two selected individual isolated small tanks in the Anuradhapura district of Sri Lanka. The cascade tanks were compared with the isolated tanks to determine whether the two systems differ in minimizing the drought risk in the dry zone. The present study adopted the use of Remote Sensing (RS) and Geographic Information System (GIS) techniques. The analysis was conducted using Normalized Difference Vegetation Index (NDVI) for the years 2006, 2014 and 2018. The NDVI images for the study sites were processed and analyzed for the two driest months of the selected years. The results revealed that the tanks in the STCS contribute more than the isolated small tanks to reduce the risk of droughts by retaining more water during the dry season. During April 2014, the two cascade tanks retained a water extent of 2.14% and 22.92% while the two isolated tanks retained a water extent of only 0%. In addition, during May 2018, two cascade tanks retained a water extent of 0.36% and 0.54% while the two isolated tanks retained a water extent of only 0% and 0.12%. Further, the present study highlights the significance of sustainable management and operation of both cascade and isolated tanks, since a growing body of evidence indicates that both tank systems are under heavy anthropogenic pressure. In addition, our study indicates the successful use of NDVI as a tool to assess water availability in reservoirs which can be beneficial in decision making related to water management.

Keywords: Droughts, NDVI, Paddy cultivation, Small tanks, STCS

Acknowledgment

This work was supported by the Department of Zoology and Environment Sciences, Faculty of Science, University of Colombo.