

**Harmonizing water allocation for multiple uses in irrigation reservoirs
of the Kala Oya river basin, Sri Lanka**

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The primary use of many lowland reservoirs in Sri Lanka is to supply of water for irrigation, and inland fishery has become a secondary use. In the present study, four irrigation reservoirs in the Kala Oya river basin, namely: Dewahuwa, Kala Wewa, Siyambalangamuwa and Usgala-Siyambalangamuwa were selected to investigate the optimum water requirements for irrigation, fisheries and other small-scale economic activities such as livestock farming and brick making. A cross section (from year 2014 to 2015) of household heads (n=756) adjacent to the four reservoirs were interviewed to gather information on their degree of dependence on reservoir water for those multiple uses. General Stochastic Production Frontier Model was employed to evaluate the technical efficiency of water uses for various economic activities, and to quantify the volume of water that can be saved through more efficient uses. Water poverty index (WPI) was estimated to investigate accessibility and availability of water for multiple uses. Water valuation and optimum level of water allocation between uses were then calculated based on Marginal Value Product (MVP). The results indicated that the highest technical efficiency of water uses was for fisheries followed by livestock farming, rice farming and brick making, mainly due to non-consumptive use of reservoir water for fisheries. The lowest WPI was in Dewahuwa reservoir situated in the upper region of Kala Oya river basin followed by Kalawewa, Usgla-Siyambalangamuwa and Siyambalangamuwa, which were located in the lower regions of the river basin where water uses for irrigation and other consumptive uses are much higher. In terms of MVP, the value of product for a unit of water use was higher for livestock farming and brick making. However, these economic activities are less significant compared to agriculture and fisheries. As such, this analysis highlights the need for concerted action of reservoir water management through cooperation between irrigation and fisheries authorities.

Keywords: Irrigation systems, Technical efficiency, Water Poverty Index, Water management