Water Poverty; a Water Management Tool in Kala Oya River Basin

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Abstract

The provision of reliable and safe water supply for people worldwide has become a top priority, especially in the areas of water scarcity. Water managers face with increasing and competing demands with the limited available resources. In many river basins of Sri Lanka, especially in associated reservoirs, there are multiple/competing users of water with a growing demand. The result of scarcity has made a severe inter-sectoral competition for available water resource. This issue is crucial as it needs to make a decision on prioritizing multiple-uses. As such, there is a necessity to develop feasible indicators to measure various social, economic, and environmental aspects related to water poverty to develop appropriate tools for policy planners for monitoring, performance evaluation, decision making and comparisons of poverty among the rural farming communities. Water Poverty Index (WPI) enables decision makers to assess water stress and scarcity by linking physical estimates of water availability and socioeconomic factors on poverty measured using five components such as Resource, Environment, Access, Capacity and Use. The catchment area of Kala Oya river basin in Sri Lanka covers an extent of 2,870 km^2. The reservoirs in this river basin are primarily constructed for irrigation, and inland fisheries production is essentially a secondary use of these reservoir resources. The present study was designed to investigate WPI of various users of four selected reservoirs in the Kala Oya river basin namely, Siyambalangamuwa, Usgala-Siyambalangamuwa, Dewahuwa and Kala Wewa. Agricultural farming communities were the target group and agricultural households were randomly selected for data collection, to represent more than 40% of total farming households. The pre-tested structured questionnaires were designed to capture various dimensions of each component in the study. Water Poverty Index is a weighted sum of five components as Resources, Access, Capacity, Use, and environment. Each of these components includes number of sub components. From the principal component analysis (PCA), sub components which has greater influence on score loading were

selected and those which has insignificant contribution to factor loading were discarded to combine using an additive aggregation. The calculated values fall between 0 and 100 where 100 is the lowest possible level of water poverty and 0 is the maximum possible level of water poverty. The estimated WPI for all four reservoirs in Kala oya catchment was 69.83 to which the contribution of each component, in their descending order, was Resources (19.28), Environment (11.84), Access (11.27), Capacity (14.96), and Use (12.48). However, WPI for individual reservoirs varied from 63.82 to 68.03 [Siyambalangamuwa reservoir (68.03), Usgala-Siyambalangamuwa (64.10), Dewahuwa reservoir (63.82), and Kala Wewa (64.41)]. It was revealed that low value of WPI was mainly due to greater distance to the water resource used and the time spent to collect water. This indicates inadequate accessibility and availability to water resources. Accessibility restricted by water use rights and less water availability occur due to high allocation of water for paddy farming. As each reservoir accounts for higher number of agricultural farmer organizations i.e. six in Usgala Siyambalangamuwa, nine in Dewahuwa, and uncountable number in Kala Wewa, the prioritization procedure on agricultural farming neglects the other water users. Capacity to manage water is minimum due to poverty levels. Severe drought effect during 2013 and 2014, kidney disease and the low rate of water quality assessment are the reasons for the less contribution from Environment component. Access component has low value due to higher distance to the water resources, time and effort. The drought severely affected the access to water. The outcome of analysis implies that WPI can be used effectively at ground level for water management to address the relationship of water scarcity and poverty which enables implementation of new strategies for water management in reservoir based farming communities. Development of water supplying scheme in wider basis is recommended to increase the water use efficiency.

Keywords: Agricultural farmers; Irrigation systems; Kala Oya; Water Poverty Index; Water management