Water Balance analysis to Pelwatte Sugar Cane Plantation in Sri Lanka

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Abstract

Water balance technique is a standard hydrologic process based on the basic physical principle of conservation of mass. In most cases, the term water balance implies an analysis which balances the continuity of equation either on a static or dynamic basis. On long term, the changes in storage are relatively unimportant and it is customary to assume that inflow to the system is balanced by out flow. In Sri Lanka the production of sugar cane can be increased by three folds with the same extent of land under cultivation by supplementary irrigation since water is the life blood of sugar cane and also is the main limiting factor in achieving the potential yield when sugar cane is grown under rainfed conditions. Water balance studies shows soil moisture changes and the amount of run off which is available to store in the reservoirs which subsequently can be used for supplementary irrigation and this is one alternative approach to overcome the yield reduction due to water storage.

Water balance model consists of balancing input and output of the aquifer was used to calculate water yield from the catchment and analysis was conducted using daily observed rainfall data of 17 stations from 1982 to 1996 and daily pan evaporation reading from 1991 to 1996. Result showed that only during *Maha* season there was significant amount of runoff generated and *Yala* season required irrigation for sugar cane to have optimum growth conditions. In a given year, an average value of runoff generated from rainfall during *Maha* and *Yala* seasons were 196 mm and 49 mm respectively. However some years showed very low values of runoff generated even in *Maha* season. Only 200 ha can be irrigated with the generated runoff during *Maha* season from an area of 1000 ha during an average year. It can be concluded that the amount of runoff and deep percolation depend on not only rainfall and better distribution of rainfall of a year but also an amount of rainfall received in the previous year and its distribution during *Maha* and *Yala* seasons. The generated runoff from the catchment was insufficient to effectively irrigate entire plantation.

Key words: Rainfall, Water balance, Sugar cane

Mikunthan, T (2000). Water balance analysis to Pelwatte sugar cane plantation, Proceedings of the 8th Annual sessions of the Jaffna Science Association, held on April 5th – 7th 2000, 8(1): 28**.**