

**IDENTIFICATION OF WATER MANAGEMENT
CONCERNS IN IRRIGATION - STUDY OF WATER
ISSUE PRACTICE AT RAJANGANA RESERVOIR,
SRI LANKA**

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138661R

Degree of Master of Engineering in
Water Resources Engineering and Management

Department of Civil Engineering

University of Moratuwa
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Thesis Submitted in Partial Fulfillment of the Requirements for the
Degree of Master of Engineering in Water Resources Engineering and Management

Degree of Master of Engineering in
Water Resources Engineering and Management

Supervised by
Professor N.T.S.Wijesekera

UNESCO Madanjeet Singh Centre for
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Department of Civil Engineering

University of Moratuwa
Sri Lanka

August 2014

DECLARATION

I declare that this is my own work. This thesis does not incorporate without acknowledgement of any material previously submitted for a Degree or Diploma in any other University or institute of higher learning to the best of my knowledge and belief it does not contain any material previously published or written by another person expect where the acknowledgment is made in text.

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Professor N.T.S. Wijesekera

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ABSTRACT

Sri Lankan paddy production satisfies only 90% of total demand and 10% is being imported from other countries. On one hand, the cultivable land is narrowing day by day because of the urbanization. On the other hand, Climate change factors, food requirements for increased population and present level of yields demonstrate the need to significantly increase the production in support of future food requirements. Average rice yield of Sri Lanka is 4.5 MT/Ha but the potential is between 7 to 12 MT/Ha. In most parts of Sri Lanka, water is the critical factor for cultivation. Using the appropriate amount saves water for more land to be cultivated. Hence efficient water management is very important to increase food production. Irrigation water distribution is usually carried out with the help of Guidelines. Therefore in a operational scheme, it is possible to compare a canal water issues and planned water issues to capture the status of water management for necessary improvements

The present work is a study of irrigation water issue practice in Rajangana Irrigation Scheme at Anuradhapura which is located in the North Central Province of Sri Lanka. Technical Guideline of Irrigation Department is the document used for irrigation system management in Sri Lanka. Using water issues and other data for the period of 2008-2013 the present work compared weekly water requirements with actual water issues. Initially using field data computed the water requirements as recommended by the Guideline was computed using field data and 75% probability rainfall. Then the quantities were calculated to identify the modifications to the plan with the availability of actual rainfall data during operations. These two data sets was named "Recommended Irrigation Plan" and "Anticipated water use" respectively. They were compared with each other and also with irrigation plans that had been prepared by Rajangana Irrigation Scheme, and with the water issues at the sluice gate. The study compared the case of Left Bank gravity fed irrigation area which covers an approximate 2500 Ha area with 39 Km tertiary canal network. The Rajangana project area is cultivated mainly with paddy during the two main rainy seasons namely "Maha" and "Yala". Water issue model for the study comparisons was developed using a weekly time resolution.

Comparison of actual water use with the quantities which were computed by following Irrigation Department Guidelines, disclosed a significant over issue in Maha and Yala seasons amounting to 63% and 52% respectively. In the case of making the adjustments to the plan with the receipt of actual rainfall, then a further reduction of water issue by 35% and 8% in Maha and Yala respectively could have been possible. It was revealed that though computations were based on the same Irrigation Department Guideline recommendation, average Maha and Yala water requirements land increased by 25% and 75% respectively in the Rajangana Irrigation Division plan when compared with the plan developed by the study. Average actual water use during the initial crop growth stage was 4 times higher than the guideline recommended plan and taking account of rainfall received at Rajangana Scheme. In case of other growth stages too, the average increase of usage between 1.5 to 2.4 times reflected a poor rainfall accounting in practice. Evaluation revealed the need of gauge network, a spatially distributed performance monitoring system and a critical evaluation of the present Guideline in order to suitably manage the water utilization in the Rajangana Left bank irrigation scheme. It has been pointed out that better use of water in the scheme would enable better chances of serving other water deprived areas.

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