

**EVALUATION OF OPERATIONAL PERFORMANCE  
IN  
RAJANGANA MAJOR IRRIGATION SCHEME**

**M. Eng Degree in Environmental Water Resources Engineering and  
Management**

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**DEPARTMENT OF CIVIL ENGINEERING  
UNIVERSITY OF MORATUWA  
SRI LANKA**

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**BY**

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of Moratuwa, Sri Lanka in fulfillment of the requirements for the  
Degree of**

**M.Eng in Environmental Water Resources Engineering and  
Management**

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**December 2008**

# DECLARATION

I hereby declare that the work included in this thesis in part or whole has not been submitted for any other academic qualification at any Institution.

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## **ABSTRACT**

Managing the resources in a major irrigation scheme needs more attention on system performance to get the optimum production out of the available resources. In Sri Lanka, most of the major irrigation schemes are managed with conventional management strategies along with the traditional experiences gained by both farmers and officers. Some instances, systematic observation of resource use and management are not adhered by the scheme managers as well as by the farmers. This situation has effected to low productivity of the schemes. Providing adequate effort for integration of inter-related activities and combining the physical, biological and human factors on productivity is not so easy task in the irrigated agriculture sector. Therefore assessing the issues and constraints and evaluating the scheme performance in a systematic way enhance the managers to take prompt action when required while delivering the services in operational procedures.

In view of developing a suitable performance assessment programme for a major irrigation scheme a study was done on performance assessment under water use efficiency, irrigation practices and land productivity in the LB Tract 01 area of Rajangana Irrigation Scheme. This study included turnout area basis assessment with the collection of data and information through literature review and field surveys along with the statistics collected from related institutions and departments. Study was carried out to evaluate the performances of Irrigation system through performance indicators by using systematic observations, documentation and interpretation methods. Several assumptions were made during the analysis with regards to data that were out of reach or inaccessible. Data and information used were from year 1990 Yala season to Year 2002 Yala season.

The Rajangana Major Irrigation Scheme is one of the Major Irrigation Schemes in dry zone of Sri Lanka and it is considered as a water abundant scheme following the restoration of Kalawewa under the system “H” of Mahaweli Development Program. Rajangana reservoir provides irrigation water to 5520 ha of lands under gravity

irrigation system and 1602 ha of lands under the lift irrigation system. At present there are about 6275 ha of lands under gravity irrigation system and area under the lift irrigation system has reduced to 1050 ha mostly due to other constraints of lift irrigation system such as irrigable land being utilized for homestead purposes and abandoning of some lands as a result of inadequate operation and maintenance of pump houses. This scheme has been divided in to 25 tracts to provide irrigation facilities. Out of these 7 tracts belong to the LB irrigation system and 18 tracts belong to the RB irrigation system. It appears that the productivity of the scheme does not show a good performance in utilization of water & land when compared with yield and income of the farmers and as a result the living standard of the settlers too does not indicate as satisfactory.

This study examined the cultivation patterns of past seasons, irrigation water use by the farmers, production cost, farmer incomes, cost of operation and cost of maintenance of the system. In this study the command area under the Tract 01 of LB system was selected as a pilot area because similar variations were observed in other tracts during preliminary surveys. Outputs of the study are expected to be generalized to whole scheme.

Performance of the irrigation system depends on a large number of variables. In this study 11 performance indicators assessed the system performance in four main areas viz, service delivery, agriculture production, agriculture economics & financing and system sustenance. Spatial and temporal variation of water deliveries were found in terms of adequacy and irrigation duty. Water use efficiency measured in terms of grain mass per unit volume of water reflects that the water use efficiency of the study area is far below the established benchmark value of 0.372Kg/m<sup>3</sup>. Study revealed that the irrigation system of the study area is subjected to deterioration due to inadequate attention on operation and maintenance. The efficiency of getting potential yield in the area is 68% with medium level productivity performance.

Recommendations of this study would be useful to managers who deal with major irrigation system management in planning the cultivation seasons by optimizing the productivity of land and water.

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S.M.D.L.K. De Alwis

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## **Abbreviations**

BC	Branch Canal
DAD	Department of Agrarian Developed
D	Distributory Canal
Div. IE	Divisional Irrigation Engineer
DOA	Department of Agriculture
EA	Engineering Assistant
ET	Evapo - Transpiration
FAO	Food and Agriculture Organization of United Nation
FC	Field Canal
FOO	Farmer Organization
ICID	International Commission for Irrigation and Drainage
ID	Irrigation Department
IMD	Irrigation Management Division
LB	Left Bank
LHG	Low Humic Glay
MC	Main Canal
MCM	Million Cubic Metres
MOM	Management, Operation and Maintenance
O & M	Operation and Maintenance
OFCC	Other Field Crops
PRDA	Provincial Road Development Authority
RB	Right Bank
RBE	Reddish Brown Earth
RDA	Road Development Authority
SOP	Seasonal Operation Plan
TO	Turn Out
WM	Water Master
WS	Work Supervisor