Small-Scale Irrigation Efficiency and Optimisation of the System within the Context of Integrated Watershed Management - The Case of Rift Valley Lakes Basin, Ethiopia

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To understand the performance of irrigation projects within the context of watershed management, evaluation and diagnostic analysis of the systems are the keys to understand inefficiency and possibilities for improvement of irrigation projects. In Ethiopia, the level of water resources development with respect to irrigation is very low and irrigation performance is facing continuous problems. Extensive utilisation of the basin's resources over the past years has resulted in considerable degradation of the environment, including land degradation, watershed deforestation, and water quality and quantity reduction.

This research will be conducted at selected irrigation projects and watersheds in the Southern Rift Valley Lakes Basin (SRVLB) of Ethiopia that exhibit characteristics, which are common to many water resource investigations. The inadequacy of water resources utilisation activities in the basin is a problem of highest priority. Thus, an integrated management system is needed, so as to achieve optimal water delivery based on adequacy, efficiency, dependability and equity. Effective management of this resource requires addressing its social, economic, institutional, and natural science dimensions.

The major objectives of this study are to:

- identify underlying causes for low efficiency of small-scale irrigation schemes within the context of watershed management interventions;

- optimise water utilisation and management activities by assessing the adequacy of water deliveries and hydraulic performances of the selected irrigation projects

- develop an information network database that provides a better understanding of water utilisation strategies;

- identify optimum and feasible ways to deal with problems associated with planning and management of irrigation water resources in the SRVLB.

The basic methodology is the selection of appropriate irrigation water utilisation and watershed management interventions and establishing an information network database using GIS and other softwares (e.g. SWAT) to improve water quality, quantity and utilisation of the basin. To do this, the procedure will be to identify nature and extent of irrigation performances and irrigation management problems in the basin and identifying factors that contribute to the physical problems to ensure sustainability of any physical innervations.

The expected outputs of this study are attaining improved conservation, management and utilisation of water resources for irrigation by developing a well-organised information network database, a decision support model and an optimal simulation model.

Generally, establishing a coherent database network, modelling efforts on irrigation system performances and management of the selected irrigation projects in the basin can have a paramount importance to make decisions on planning, utilisation and management of water resources for irrigation. Moreover, it helps to identify and evaluate the nature of the design, operation and maintenance activities in existing irrigation projects in the basin.