

Hydraulic and Operational Performance of Irrigation Schemes in View of Water Saving and Sustainability

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Full Length Research Paper

Hydraulic performance assessment of Tahtay Tsalit small scale irrigation scheme, Tigray, Ethiopia

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Assessment of irrigation performances is very essential while planning and chalking out management strategies for various irrigation. However, in Ethiopia, especially Tigray, performance evaluation of irrigation schemes is rarely conducted. The performance of Tahtay Tsalit irrigation scheme was not assessed yet and hence, this research was undertaken to assess the hydraulic performance of the irrigation scheme. The study was carried out during the irrigation season from September to November, 2016. The field measurements on canal dimensions, water flow measurements and water surface elevation were undertaken at selected sampling points. Simple descriptive statistics was employed for analysis of the data collected from field measurements and observations. However, hydraulic performance indicators were used to evaluate the performance of this irrigation scheme. Several factors such as flooding, sedimentation, design problems, damage of sluice gates, abstraction of irrigation water by unwanted plants has been identified in this irrigation scheme for mal-functional of different irrigation structures. Hydraulic performance of the irrigation system was evaluated using ten hydraulic performance indicators. There was no problem in irrigation adequacy (0.84 fair), equity (fair), dependability (0.057 good) and efficiency (0.77 fair) of irrigation water in this irrigation scheme. The average water surface elevation ratio, delivery performance ratio, and delivery duration ratio of the main canal during the monitoring period was less than one, greater than 5 and 150%, respectively. The highest sediment accumulation was observed at head and middle reaches of the irrigation scheme than the tail reaches. Generally, in this irrigation scheme there were a number of irrigation structures which had mal-functioned, and now required to be remodeled with sustainable solution to improve the performance of the irrigation scheme. Hence, it has been recommended that capacity building and awareness creation for irrigation water users, water committee, Woreda and Kebele expertise are the main key factor to bring a change in irrigation water managements.

Key words: Hydraulic structures, hydraulic performance, small scale irrigation scheme.

INTRODUCTION

Ethiopia has abundant rainfall and water resources, its agricultural system does not yet fully benefit from the technologies of water management and irrigation (Awulachew et al., 2010). Since it is already suffering

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