

Research note

Measuring conveyance efficiencies to improve irrigation water management

MANUEL RIJO & LUIS SANTOS PEREIRA

Department of Agricultural Engineering, High Institute of Agriculture, Technical University of Lisbon, Tapada da Ajuda, P-1399 Lisboa Codex, Portugal

Received 16 February 1987; revised 1 June 1987; accepted 15 June 1987

Key words: conveyance efficiencies, discharge measurement, irrigation water management

Abstract. This paper presents a study of conveyance efficiencies of Canal de Salvaterra, in the Sorraia Irrigation Project, Portugal. The Canal and the Project are briefly described and the water measurement techniques and structures utilized are analysed. Results comprise the main aspects of the inflow-outflow balance with identification of water losses and conveyance efficiencies. Analysing the results showed that irrigation efficiencies are higher during work days and labour hours and lower during weekends and at night. This identified the need to improve operation and management of the irrigation system, adapting inflow to demand according travel time and response time of the conveyance (and distribution) system, of the different main sections of the system.

Introduction

Recent developments on irrigation water management and irrigation techniques, the need for intensification of agricultural production, and requirements of water and energy savings, are some of main reasons for the modernisation of irrigation projects. This is the case with the Sorraia Irrigation Project, a well operated and maintained project in the Tejo basin, Portugal.

Among others, research is done on the modernisation of the conveyance and distribution system and its operation and management (Pereira 1987). The study of conveyance efficiencies is a part of this research because the inflow-outflow balance of the canal system is a base for mathematical modeling of the hydraulic system (Rijo 1986) and for further simulation of the management of the system. Knowledge of conveyance efficiencies is necessary to support criteria and decisions on modernisation as well as to evaluate water losses and the potential for water savings (Rijo & Pereira 1986).

Given the large dimensions of the entire system (Fig. 1, Table 1) the Canal de Salvaterra (Fig. 2) has been chosen for developing the methodologies necessary for the studies. This paper reports the results as oriented to improve water measurement in the conveyance system and to evaluate the related efficiencies.