Spreadsheets for water management — a case study from the Brantas Delta, East Java

N. BULLOCK & M.A. BURTON
1 Sir M MacDonald and Partners Ltd, Consulting Engineers, Cambridge CB1 2RS, UK;
2 Institute of Irrigation Studies, The University, Southampton, SO9 5NH, UK

Received 15 January 1988; accepted 10 February 1988

Abstract. The use of commercially available spreadsheet programs for scheduling of water supplies for large scale irrigation networks is a relatively new phenomenon. The paper describes the development and application of such a program for a 30 000 ha irrigation scheme in the Brantas Delta, East Java. The program has been in use for day-to-day scheduling of main system supplies since April 1986, during which time refinements and adjustments have been necessary to formulate a working package. The paper draws conclusions regarding the value of the program for improving water management.

Introduction

The Brantas river forms one of the largest catchments in East Java, rising in the mountains near Malang and discharging into the sea some 30 km south of the city of Surabaya (Fig. 1).

The river is an important resource for generation of hydroelectric power, industry, agriculture and domestic purposes. The division of this resource between the various users is particularly important at the last major regulating structure, the Lengkong Barrage near the town of Mojokerto. At this point there are five main uses for the river water:
- Potable water supplies for Surabaya, abstracted via the Surabaya river.
- Industries along the Surabaya river and within the irrigation area.
- Dilution of effluent and maintenance of minimum flow levels.
- Irrigation of crops in the delta, covering some 30 000 ha.
- Fish farming, which currently relies on drainage flows from the irrigation area.

The dry season water supply available at the Lengkong barrage is already a constraint on development in the Brantas Delta. The pressure on the major consumer, irrigation, can be expected to increase appreciably in the future...
Fig. 1. Delta irrigation area.