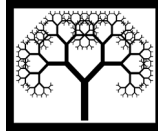


Paper 0123456789



©Civil-Comp Press, 2006.
Proceedings of the Fifth International Conference
on Engineering Computational Technology,
B.H.V. Topping, G. Montero and R. Montenegro,
(Editors), Civil-Comp Press, Stirlingshire, Scotland.

Optimisation Methods Applied to River Basin Management

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Abstract

This paper aims to present the methods used for water management in a test basin within the scope of the EU FP6-sponsored OPTIMA project. The study uses a simulation based water resources planning and optimisation system, established through a web-based client-server implementation to support distributed use and easy access for multi-criteria optimisation and decision support.

Keywords: OPTIMA, sustainable water management, multi-criteria optimisation, genetic programming, dynamic simulation, scenarios, decision support.

1 Introduction

River basins in most of the Eastern and Southern Mediterranean countries suffer from water scarcity due to rapid demographic and economic development particularly in the coastal zone, urbanization, industrialization, tourism, and an often inefficient agricultural sector as the dominant water user. Low availability of renewable water, overexploited groundwater, pollution, inefficient infrastructure, pronounced seasonality with unfavourable demand patterns very different from the seasonal supply aggravate the situation.

The Gediz River Basin along the Aegean coast of Turkey is a typical case where two major problems, water scarcity and pollution, need to be addressed for sustainable management of its water resources. The basin covers about 18,000 km² and approaches a total population of 2 million. The case demonstrates the entire range of prototypical water management problems in the region, and their potential solutions. The existing water resources are under pressure by rapid industrial development, population growth, related increases in agricultural production, and pollution. To provide water for different sectors, to maintain the sustainable development of the region and to assess the long-term impacts of water policies,