

Article

Integrated Management to Address Structural Shortage: The Case of Vega Baja of the Segura River, Alicante (Southeast Spain)

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Abstract: The principal objective of this study is the detailed analysis of the water deficit based on the information gathered by hydrological planning in terms of both the supply of water resources from different sources (surface and groundwater natural sources, transferred from other basins and non-conventional sources based on the reuse of regenerated waters and the desalination of seawater) and the demand for water (urban, agricultural, environmental, industrial, and recreational uses). To do this, the balance between resources and demand is determined, identifying the water deficit and its repercussions, mainly in the agricultural sector. Subsequently, a series of recommendations are proposed that can contribute to the management of water resources in accordance with their origin and availability. The study focuses on the district of *Vega Baja del Río Segura*, which is located in Southeast Spain, specifically in the *Segura* River Basin of the province *Alicante*, and characterized by being one of the European spaces with the greatest structural shortage of water resources. The 27 municipalities, which it constitutes and are the object of analysis in this study, have a semi-arid climate with mild temperatures and scarce torrential rainfall, which generates a continuous situation of water stress and structural shortage. The management of water resources in this area is vitally important for socio-economic development and the maintenance of the natural ecosystems. According to the climate change predictions, this deficit situation is set to worsen, which will aggravate the water imbalance.

Keywords: water; water stress; climate change; hydrological planning; water management; demands; water deficit; non-conventional resources; agriculture



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1. Introduction

Water is a fundamental resource for the development of societies throughout the world, essential for both domestic needs (consumption and sanitation), economic activities (agriculture, industry, and energy), and the environment. The increase in consumption due to these activities has generated impacts on the sustainability of the management model, causing deficit and scarcity situations that limit the development of many regions [1,2]

Within the European Union, Spain is one of the countries where water stress is the most severe. In most parts of the country, the consumption of water accounts for over 40% of the available resources, contrasting with the majority of other European countries with consumptions less than 30% [3].

Meanwhile, the *Segura* River Basin (SRB), located in Southeast Spain, is the only Spanish basin with a structural shortage [3]. This situation has given rise to a limitation in its economic development [4]. These adverse effects caused by the severity of the scarcity have fostered the development of an integrated management of water resources in order to obtain greater efficiency in the distribution of natural resources, incorporating external resources mainly through the *Tajo-Segura* Transfer (TST) and the application of non-conventional resources (reuse of regenerated water and the desalination of seawater),