

Identifying the Factors that Influence Water-Use Efficiency in Agriculture: Case Study in a Spanish Semi-Arid Region

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Abstract : The current agricultural system in some arid and semi-arid areas is not sustainable in the long term. In southeast Spain, groundwater is the main water source and is overexploited, while alternatives like desalination are still limited. The Water Plan for the Mediterranean Basins 2015-2020 indicates a global deficit of 73.42 hm³ and an overexploitation of the aquifers of 205.58hm³. In order to solve this serious problem, two major actions can be taken: increasing available water, and/or improving the efficiency of its use. This study focuses on the latter. The main aim of this study is to present the major factors related to water usage efficiency in farming. It focuses on Almería province, southeast Spain, one of the most arid areas of the country, and in particular on family farms as the main direct managers of water use in this zone. Many of these farms are among the most water efficient in Spanish agriculture, but this efficiency is not generalized throughout the sector. This work conducts a comprehensive assessment of water performance in this area, using on-farm water-use, structural, socio-economic and environmental information. Two statistical techniques are used: descriptive analysis and cluster analysis. Thus, two groups are identified: the least and the most efficient farms regarding water usage. By analyzing both the common characteristics within each group and the differences between the groups with a one-way ANOVA analysis, several conclusions can be reached. The main differences between the two clusters center on the extent to which innovation and new technologies are used in irrigation. The most water efficient farms are characterized by more educated farmers, a greater degree of innovation, new irrigation technology, specialized production and awareness of water issues and environmental sustainability. The research shows that better practices and policies can have a substantial impact on achieving a more sustainable and efficient use of water. The findings of this study can be extended to farms in similar arid and semi-arid areas and contribute to foster appropriate policies to improve the efficiency of water usage in the agricultural sector.

Keywords : cluster analysis, family farms, Spain, water-use efficiency

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