

Analysis of Eco-Efficiency and the Determinants of Family Agriculture in Southeast Spain

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Abstract : Eco-efficiency is receiving ever-increasing interest as an indicator of sustainability, as it links environmental and economic performances in productive activities. In agriculture, these indicators and their determinants prove relevant due to the close relationships in this activity between the use of natural resources, which is generally limited, and the provision of basic goods to society. In this context, various analyses have focused on eco-efficiency by considering individual family farms as the basic production unit. However, not only must the measure of efficiency be taken into account, but also the existence of a series of factors which constitute socio-economic, political-institutional, and environmental determinants. Said factors have been studied to a lesser extent in the literature. The present work analyzes eco-efficiency at a micro level, focusing on small-scale family farms as the main decision-making units in horticulture in southeast Spain, a sector which represents about 30% of the fresh vegetables produced in the country and about 20% of those consumed in Europe. The objectives of this study are a) to obtain a series of eco-efficiency indicators by estimating several pressure ratios and economic value added in farming, b) to analyze the influence of specific social, economic and environmental variables on the aforementioned eco-efficiency indicators. The present work applies the method of Data Envelopment Analysis (DEA), which calculates different combinations of environmental pressures (water usage, phytosanitary contamination, waste management, etc.) and aggregate economic value. In a second stage, an analysis is conducted on the influence of the socio-economic and environmental characteristics of family farms on the eco-efficiency indicators, as endogeneous variables, through the use of truncated regression and bootstrapping techniques, following Simar-Wilson methodology. The results reveal considerable inefficiency in aspects such as waste management, while there is relatively little inefficiency in water usage and nitrogen balance. On the other hand, characteristics, such as product specialization, the adoption of quality certifications and belonging to a cooperative do have a positive impact on eco-efficiency. These results are deemed to be of interest to agri-food systems structured on small-scale producers, and they may prove useful to policy-makers as regards managing public environmental programs in agriculture.

Keywords : data envelopment analysis, eco-efficiency, family farms, horticulture, socioeconomic features

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