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Assessment of Production Efficiency of Intensive and Traditional Olive Farms in Southern Italy using Data Envelopment Analysis

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Abstract

In Southern Italy, especially in regions such as Apulia, Calabria and Sicily, olive growing systems are variegated, due to the co-existence of traditional and intensive orchards with low and high-density planting, respectively (Bernardi et al., 2016; Stillitano et al., 2017). Traditional systems are characterized by low levels of adaptation, conversion and mechanisation that often entail a not economically viable crop management (Pergola et al., 2013); on the contrary, the intensive systems are represented by higher yields (both of fruits and oil obtained), as well as higher levels of mechanization that result in high-quality olive oil production, and better levels of farm income. Thus, in an increasingly competitive olive oil market, where the estimated global demand for extra virgin olive oil is steadily growing (Accorsi et al., 2015), modern intensive olive groves can represent an innovative and economically viable opportunity for farmers. However, the profitability of many Mediterranean olive growing farms depends, even now, by public subsidies (Oxouzi et al., 2012; Stillitano et al., 2016). The current changes in European Common Agricultural Policy (CAP) 2014-2020, oriented towards the direct payments decreasing, will inevitably have important effects on farmers' incomes. This is why the olive farms will have to increase their level of direct profitability to ensure their resilience on the market. Therefore, the measurement of technical efficiency plays a crucial role for identifying more efficient management practices, and for this aim, Data Envelopment Analysis (DEA) represents the most widely used technique in productivity analysis. DEA is a non-parametric approach, based on a mathematical optimization method, used to identify relative efficiency of decision-making units (DMUs) (Cooper et al., 2006).

Since the first formulation of DEA by Charnes et al. (1978), based on a Farrell's (1957) definition of efficiency, an increasing number of applications have been published, also in

agro-food systems (Jurado et al., 2017; Aparicio et al., 2016; Atıcı and Gülpınar, 2016; Toma et al., 2015; Banaeian et al., 2011; Dios- Palomares and Martínez-Paz, 2011; Artukoglu et al., 2010).

In this paper, DEA approach was used to investigate the technical efficiency of intensive and traditional olive growing systems in Southern Italy, in order to highlight the performance of each farm.

Results showed that technical efficiency in intensive olive systems is greater than traditional ones, although improvements in the input allocation among all farms are needed. Findings could be useful to suggest the adoption of management strategies to optimize the use of inputs, aiming to achieve suitable levels of productive performance.

Keywords : Olive-grove, Technical Efficiency, Data Envelopment Analysis

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