World Academy of Science, Engineering and Technology
International Journal of Economics and Management Engineering
Vol:16, No:12, 2022

Technical Efficiency in Organic and Conventional Wheat Farms: Evidence from a Primary Survey from Two Districts of Ganga River Basin, India

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Abstract : With the increasing spread of organic farming in India, costs, returns, efficiency, and social and environmental sustainability of organic vis-a-vis conventional farming systems have become topics of interest among agriculture scientists, economists, and policy analysts. A study on technical efficiency estimation under these farming systems, particularly in the Ganga River Basin, where the promotion of organic farming is incentivized, can help to understand whether the inputs are utilized to their maximum possible level and what measures can be taken to improve the efficiency. This paper, therefore, analyses the technical efficiency of wheat farms operating under organic and conventional farming systems. The study is based on a primary survey of 600 farms (300 organic ad 300 conventional) conducted in 2021 in two districts located in the Middle Ganga River Basin, India. Technical, managerial, and scale efficiencies of individual farms are estimated by applying the data envelopment analysis (DEA) methodology. The per hectare value of wheat production is taken as an output variable, and values of seeds, human labour, machine cost, plant nutrients, farm yard manure (FYM), plant protection, and irrigation charges are considered input variables for estimating the farm-level efficiencies. The post-DEA analysis is conducted using the Tobit regression model to know the efficiency determining factors. The results show that technical efficiency is significantly higher in conventional than organic farming systems due to a higher gap in scale efficiency than managerial efficiency. Further, 9.8% conventional and only 1.0% organic farms are found operating at the most productive scale size (MPSS), and 99% organic and 81% conventional farms at IRS. Organic farms perform well in managerial efficiency, but their technical efficiency is lower than conventional farms, mainly due to their relatively lower scale size. The paper suggests that technical efficiency in organic wheat can be increased by upscaling the farm size by incentivizing group/collective farming in clusters.

Keywords : organic, conventional, technical efficiency, determinants, DEA, Tobit regression
Conference Title : ICAEP 2022 : International Conference on Agricultural Economics and Policies
Conference Location : Sydney, Australia
Conference Dates : December 02-03, 2022