Optimizing the energy consumption of tomato production in Khouzestan province, Iran

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Abstract

In this study a non-parametric method of data envelopment analysis was used to estimate the energy efficiencies of tomato production in open-field system based on nine inputs concluding fertilizer, farmyard manure, chemicals, human labor, diesel fuel, machinery, electricity, irrigation water and seed also with single output of yield. Data were collected from 63 tomato farmers through random sampling method in Khuzestan province, Iran. Results revealed that total energy consumption and output energy in open-field tomato production system was 38307.9 and 32584.13 MJ/ha. The Highest share of total energy in open-field tomato system was assigned for fertilizer with 30%. Also the results of DEA application showed that, the average of technical, pure technical and scale efficiencies for were calculated 0.81, 0.90 and 0.90 respectively. Energy saving target ratio was calculated 29.9%, indicating that by following the recommendations resulted from this study, about 38307.9 MJ/ha of total input energy could be saved while holding the constant level of tomato yield.

Keywords: fertilizer, Yield, Energy consumption, Technical efficiency, energy saving target ratio