

Energy Use and Econometric Models of Soybean Production in Mazandaran Province of Iran

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Abstract : This paper studies energy use patterns and relationship between energy input and yield for soybean (*Glycine max* (L.) Merrill) in Mazandaran province of Iran. In this study, data were collected by administering a questionnaire in face-to-face interviews. Results revealed that the highest share of energy consumption belongs to chemical fertilizers (29.29%) followed by diesel (23.42%) and electricity (22.80%). Our investigations showed that a total energy input of 23404.1 MJ.ha⁻¹ was consumed for soybean production. The energy productivity, specific energy, and net energy values were estimated as 0.12 kg MJ⁻¹, 8.03 MJ kg⁻¹, and 49412.71 MJ.ha⁻¹, respectively. The ratio of energy outputs to energy inputs was 3.11. Obtained results indicated that direct, indirect, renewable and non-renewable energies were (56.83%), (43.17%), (15.78%) and (84.22%), respectively. Three econometric models were also developed to estimate the impact of energy inputs on yield. The results of econometric models revealed that impact of chemical, fertilizer, and water on yield were significant at 1% probability level. Also, direct and non-renewable energies were found to be rather high. Cost analysis revealed that total cost of soybean production per ha was around 518.43\$. Accordingly, the benefit-cost ratio was estimated as 2.58. The energy use efficiency in soybean production was found as 3.11. This reveals that the inputs used in soybean production are used efficiently. However, due to higher rate of nitrogen fertilizer consumption, sustainable agriculture should be extended and extension staff could be proposed substitution of chemical fertilizer by biological fertilizer or green manure.

Keywords : Cobbe Douglas function, economical analysis, energy efficiency, energy use patterns, soybean

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