

The analysis of energy audit for sunflower production in Northern Transition Zone of Karnataka, India

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■ **ABSTRACT** : Energy plays a major role in agricultural production of any country. The aim of this case study was to create awareness about energy usage for the sunflower production per hectare in Northern Transition Zone of Karnataka, India. The data were collected from the 40 randomly selected farmers using face to face questionnaire method, and farmers having more or less homogeneous red sandy loam type soil. The results showed that energy ratio, energy productivity, specific energy and net energy gain for sunflower were 2.312, 0.09 kg MJ⁻¹, 10.81 MJ kg⁻¹ and 281 18.21 MJ ha⁻¹. The study revealed that sunflower production consumed a total 21427.72 MJ ha⁻¹ out of this, fertilizer energy consumption was 40.96 per cent followed by electricity (30.78%) and diesel fuel (11.35%). The direct and indirect type energy contribution was 47.06 per cent and 52.94 per cent, as well as renewable and non-renewable energy contribution was 12.01 per cent and 87.99 per cent, respectively.

■ **KEY WORDS** : Energy ratio, Specific energy, Sunflower production, Input output ratio

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Sunflower is originated in Southern United States and Mexico from where it was introduced into Europe and later into former USSR. Sunflower (*Helianthus annuus* L.) is an important oilseed crop in India popularly known as “Surajmukhi”. The name “Helianthus” is derived from ‘Helios’ meaning ‘sun’ and ‘anthos’ meaning ‘flower’. It is one of the fastest growing oilseed crops in India. In early 1970s, only about 0.1 million hectares were under sunflower cultivation, however by 2009-10, it had gone up to 1.48 million hectares of area with a production of 0.85 million tonnes in the year 2009-2010. Karnataka stands first place in both production and area of cultivation *i.e.* 35.76 per cent (0.30 million tonnes) and 53.79 per cent (0.79 million hectares) during the year 2009-2010 in the country (Source: Ministry of agriculture, Govt. of India). Sunflower is grown also in summer season under irrigation farming system. The present study is to create clear idea of energy contribution by each source for sunflower production under summer season in Northern Transition Zone (Zone 8), Karnataka, India. Energy auditing is most important consideration in agriculture, this were in different forms, such as mechanical (tractor, bullocks, human, etc), chemical fertilizer, pesticides, electrical, etc. Lot of studies have been done to

evaluate the energy consumption by different forms. Uzunoz *et al.* (2008) concluded the energy requirement for sunflower production was 18931.09 MJ ha⁻¹ in Turkey. In this study, fertilizer was the highest energy contributing input *i.e.* 51.28 per cent, followed by diesel fuel *i.e.* 28.55 per cent. Kallivroussis *et al.* (2002) revealed that the total energy consumption in sunflower production in Greece was 10.49 GJ ha⁻¹, with fertilizer being the major energy input. Energy ratio and net energy gain were 4.5 and 36.87 GJ ha⁻¹, respectively. The main objectives of this study are :

–To find the direct and indirect source of energy contribution in sunflower cultivation, to find the renewable and non-renewable source of energy contribution in sunflower cultivation.

■ METHODOLOGY

The data were collected from the 40 randomly selected farmers using face to face questionnaire method, having homogeneous red sandy loam type soil. Twenty villages were chosen to represent the status of sunflower farm activity around Hirekerur Taluk, Karnataka, India in the period of 2011-12. The data collection involved the various operational