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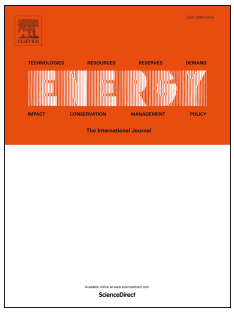

Energy budgeting and carbon footprint of pearl millet – Mustard cropping system under conventional and conservation agriculture in rainfed semi-arid agro-ecosystem

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Energy budgeting and carbon footprint of pearl millet—mustard cropping system under conventional and conservation agriculture in rainfed semi-arid agro-ecosystem

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Abstract

Modern agricultural systems are energy and carbon intensive. Reducing the carbon footprint and increasing energy use efficiency are two important sustainability issues of the modern agriculture. Realizing the implications of energy and carbon use, the present study was conducted to compare pearl millet–mustard production system in conventional and conservation agriculture practices. The results showed that zero tillage with 4 t ha^{-1} crop residue increased grain yield of pearl millet and mustard by 22.3 and 24.5 % respectively in comparison to conventional tillage without residue which ultimately helped to maintain higher net returns (1270 US$ ha^{-1}). Mulching of crop residue consumed considerable energy and carbon. It comprised 72.3 to 87.1% of the total energy consumption. Thick residue cover (4 t ha^{-1}) noticed significantly higher energy output and energy intensiveness in both conventional and zero tillage whereas energy-use efficiency (11.5), net energy return (201977 MJ ha^{-1}) and energy productivity (0.32 kg MJ^{-1}) was highest under no-residue cover. Carbon foot print value was increased with intensity of residue cover and found least under no-residue treatment. Therefore, crop residue should be judiciously used in arid and semi-arid region where livestock mainly depends on it for their fodder requirement.

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