

## **Energy, economics, and water use efficiency of chickpea (*Cicer arietinum* L.) cultivars in Vertisols of semi-arid tropics, India**

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Pulses play a major role in providing overall prosperity to the small and marginal farmers through nutritional security by meeting their dietary protein requirements and improving production base through conservation of natural resources. Inclusion of pulses in the cropping system as a crop rotation improves soil fertility and crop productivity of cereals and oil seeds. Chickpea is one of the important pulses cultivated in Vertisols during winter season. We examined chickpea cultivars for energy use efficiency, economics, physiological efficiency and water use efficiency (WUE) under different rainfall situations for their sustainable yield and overall profit, in Vertisols of semi-arid tropics of South India. Results revealed that low input energy and high grain and stover yields of cultivars result in higher total output energy and net benefit energy. Higher dry matter efficiency of 0.702 was observed with medium-duration cultivar, whereas WUE was higher in short-duration cultivar followed by medium-duration cultivar. We conclude that medium-duration cultivar and short-duration cultivar are more suitable for the SAT region in terms of greater energy benefits, higher income per unit area, physiological efficiency and water use efficiency. Thus short-duration cultivar could be cultivated during normal to above normal rainfall years and during normal to drought years in winter season on residual soil moisture in Vertisols medium-duration cultivar for higher energy efficiency and economics.