

## Impact of improved production technologies on chickpea yields, economics and energy use in rainfed Vertisols

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Received: 18-02-2016

Accepted: 13-05-2017

DOI: 10.18805/LR-3672

### ABSTRACT

A field study was conducted during *rabi* season of 2013–14 in ten farmers' fields of Joladarasi, K. Veerapur and Chellagurki villages of Bellary district in Karnataka, India to evaluate the improved chickpea variety JG11 with micronutrients application on yield, economics and energy flow in Vertisols. Adopting JG11 chickpea variety and application of micronutrient mixture at 5 kg ha<sup>-1</sup> during winter season increased the grain and straw yields by 26% and 31%, respectively over A1 variety cultivated by farmers without application of micronutrients. Application of micronutrients alone produced 9% higher yields in JG11 and A1. Greater gross and net returns with higher B:C ratio was observed with cultivation of JG11 chickpea variety and application of micronutrients. Energy flow results revealed that smaller input energy through micronutrients application and cultivation of JG11 variety produced higher total output energy and net energy benefit (NEB). The NEB per ha varied from 15966 MJ in control plots to as high as 22546 MJ in micronutrients applied plots with JG11 cultivation. Greater average energy use efficiency (EUE) of 3.57, energy productivity (EP) of 0.106 and lesser specific energy (SE) of 9.62 were observed with JG11 cultivation and applied with micronutrients compared to the control plots. Correlation studies indicated the positive and significant correlation of grain yield with net returns, B:C ratio, NEB, EUE and EP. In conclusion higher chickpea yields, profit and energy gains can be achieved by cultivating JG11 variety with micronutrients application at 5 kg ha<sup>-1</sup> in the Vertisols of Bellary region during winter season.

**Key words:** Chickpea, Economics, Energy, Micronutrients, Vertisols, Winter season.