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An International Journal for Sustainable Production Systems

Volume 30, 2014 - Issue 2

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Articles

Crop diversification, crop and energy productivity under raised and sunken beds: results from a seven-year study in a high rainfall organic production system

A. Das , D.P. Patel, G.I. Ramkrushna, G.C. Munda, S.V. Ngachan, M. Kumar, ...show all

Pages 73-87 | Received 31 Mar 2013, Accepted 09 Oct 2013, Published online: 31 Oct 2013

 Cite this article  <https://doi.org/10.1080/01448765.2013.854709>



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Abstract

Low productivity, crop diversification, employment and income are the major constraints of existing production systems of the high-rainfall north-eastern hill region (NEHR) of India. Field experiments were conducted for seven consecutive years to evaluate crop performance, production and energy balance of cropping sequences under raised and sunken bed (RSB) systems in mid-hills (950 m above mean sea level) of

subtropical Meghalaya, India. Five vegetable-based cropping sequences on raised beds and six rice-based sequences on sunken beds were tested and compared with rice monocropping (control) under an organic production system. On raised beds, tomato-okra-French bean gave highest rice equivalent yield (REY; 44.7 t ha^{-1}) followed by carrot-okra-French bean (42.5 t ha^{-1}). Rice (cv. Shahsarang 1)-pea (cv. Prakash) gave highest REY (17.3 t ha^{-1}) on sunken beds. Among raised bed sequences, tomato-okra-French bean recorded greatest production efficiency ($162 \text{ kg ha}^{-1} \text{ day}^{-1}$) and carrot-okra-French bean recorded highest land use efficiency (77%). Employment was enhanced by 187% with potato-okra-French bean and 181% with tomato-okra-French bean on raised beds, whereas rice-pea sequence on sunken beds enhanced employment by 62% over monocropping of rice. The energy productivity (energy output/input) was also higher with these cropping sequences. The adoption of RSB land configuration facilitated 244% cropping intensity (gross cultivated area/net cultivated area $\times 100$) compared with 100% in rice monocropping. There was a significant improvement in soil chemical and biological parameters due to continuous organic production under RSB land configuration, indicating potential for organic farming in the subtropical hill ecosystem of India.

Q Keywords:: [cropping sequence](#) [hill farming](#) [land configuration](#) [organic farming](#)

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