Agroforest Syst
DOI 10.1007/s10457-012-9535-3

Crop response and soil fertility as influenced by green leaves of indigenous agroforestry tree species in a lowland rice system in northeast India

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Received: 13 March 2012 / Accepted: 30 May 2012

Abstract Field experiments were conducted during rainy seasons of three consecutive years (2008–2010) to study the effect of green leaf manuring on dry matter partitioning and productivity of lowland rice (*Oryza sativa* L.). Green leaves of five indigenous agroforestry tree species viz., *Erythrina indica*, *Acacia auriculiformis*, *Alnus nepalensis*, *Parkia roxburghii*, and *Cassia siamea* were treated at 10 t ha^{-1} on fresh weight basis in rice fields and compared with recommended N–P_2O_5–K_2O (80:60:40 kg ha^{-1}) and control treatments. During 2008–2009 year, yield attributes and rice yield were greater in NPK plots as compared to the green-leaf manured ones. However, in the third year, green leaf manuring (except that of *Alnus*) surpassed even the recommended N–P_2O_5–K_2O treatment in terms of dry matter production and yield; better response was however observed with *Erythrina*. The soil available N after final harvest increased by ca. 14–20 % in *Alnus* and *Erythrina* treated plots as compared to the control. Over all, it could be said that management of plant residues can have long-term implications apart from the desired maintenance of soil organic matter and improving crop yield.

Keywords Agroforestry trees · Green leaf manure · Nutrient uptake · Rice · Soil fertility

Introduction

Research impetus towards organic rice production throughout the world and issues surrounding various aspects of organic rice production are increasing day-by-day (Saha et al. 2007). Rice is the major staple food of the indigenous communities living in the bio-resource rich north-eastern region of India. The farmers of the region in general and hill farmers in