

## Integrated Nutrient Management For Sustainable Rice Production In Degraded Shifting Cultivation Soil Of Assam

Jasbir Singh\*, Kuntala N. Barua and N. Das

Rain Forest Research Institute, Jorhat. Assam (India)

### ABSTRACT

An investigation under field condition was conducted during 2000-2003 to study the impact of integrated use of *Lantana camara* and *Chromolaena odorata* green manure and inorganic fertilizer in degraded jhum soil at Silonijan, Karbi Anglong district of Assam. Local paddy variety (dimro) responded significantly to the application of combined green manure and inorganic fertilizer treatment. The treatment consisted as control, green manure and combination of green manure with NPK fertilizer doses 50:50:25 kg/ha. The highest grain yield was obtained with the application of *L. camara* (750.9 kg/ha) treatment followed by *C. odorata* (660.5 kg/ha) along with inorganic fertilizer treatment. Similarly, number of tillers (208/m<sup>2</sup>), plant height (68.20 cm), panicle length (22.21 cm), number of fertile grain (150/panicle), N-uptake (17.87 kg/ha) and K-uptake (72.14 kg/ha) were also significantly raised in *L. camara* and inorganic fertilizer combination. The nutrient status of soil also increased with the application of green manure over control. Incorporation of *C. odorata* as a green manure showed better increment of nitrogen. As well as maximum percent increase of exchangeable potassium was recorded in *L. camara* with fertilizer treatment (72.56%) over control. Study revealed that *L. camara* and *C. odorata* are the potential manure for degraded jhum soil that sustained crop yield and soil fertility level.

**Key words:** Green manuring, *Lantana camara* –*Chromolaena odorata*, sustainable rice productivity, degraded jhum soil.

### INTRODUCTION

The concept of integrated nutrient management gains popularity in increasing productivity and environmental sustainability. Continuous use of chemical fertilizers increased the crop productivity for the initial years but at later stage deteriorate the soil health as well as pollution of ground water resources. Therefore, use of chemical fertilizers alone may not be allowable at long run Tolanur and Badanur, (2003). Observation of Sharma and Mitra (1988); Pillai *et al* (1990); Hundal and Dhilon (1993) shows that application of organic amendments along with inorganic fertilizers increases the fertilizer use efficiency. Whereas, incorporation of organic matter increased water retention capacity as well as improve physical environment of soil Tomar *et al*, (1992)

Shifting Cultivation is the dominant crop production system in North-Eastern hilly region and paddy is the primary crop under such cultivation. Such soil having low range of nutrients and organic matter that is most essential for crop productivity. Paddy soils are usually deficient in organic matter because rapid decomposition of organic matter owing to high temperature and moisture Paturde and Patankar, (1998). Under this situation use of organic

amendments like green manure seems to be a key factor in improving soil and overall productivity. *Lantana camara* and *Chromolaena odorata* are the two obnoxious exotic weeds under jhum system of North-Eastern India. They invade the cropland at an alarming rate as an early colonizer and growing in the field vigorously that contributed to rapid degradation of land. Jhum soil offering favorable agro climatic condition for growth and decomposition of both the species. Due to high regeneration potentiality a complete eradication of this species are very difficult. Therefore, alternative approaches like green manure, possibility of *L. camara* and *C. odorata* are admissible because of higher nutrient availability with maximum foliage. The increase of available phosphorous due to addition of *Lantana* as green manure and also increase in the different fraction of inorganic and organic Nitrogen due to long term addition have been reported by Sharma and Verma (2000, 2001). Whereas, *C. odorata* for enhancement of soil fertility was studied by Kanmegue *et al* (1999). Present investigation was undertaken to assess the effect of *L. camara* and *C. odorata* as green manuring on degraded jhum soil of Assam.

---

\*Author for correspondence