



Balance sheet of nitrogen, phosphorus and potassium in rice-groundnut cropping system

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Abstract : Field experiments were conducted in the wetland farm of S.V. Agricultural College, Acharya N.G. Ranga Agricultural University, Andhra Pradesh for two consecutive years 2002 – 2003 and 2003 – 2004 to investigate the effect of crop residues, organics and inorganics in rice based cropping system. Highest rice grain equivalent yield of the rice-groundnut cropping system was recorded with the incorporation of fieldbean crop residues along with the supply of recommended nitrogen through FYM to rice. Substitution of N through FYM led to build up of soil fertility status after the entire cropping system.

Key Words : Rice, Groundnut, Nitrogen, Phosphorus, Potassium

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INTRODUCTION

Currently used crop management practices based on chemical fertilizers do not provide a balanced approach between soil nutrient supply and crop requirements. Rather these practices deteriorate the sustainable soil fertility and health in the long run basis. An integrated nutrient management approach seems appropriate for sustained crop production. The *in situ* crop residue incorporation is beneficial in areas, where fallow of a short duration is available preceding the transplanted low land rice. Crops like greengram, cluster bean, field bean and cowpea could be raised in that time. After the harvest the residues can be incorporated prior to transplanting of rice, which is reported to contribute about 50 to 60 kg N ha⁻¹ to the succeeding rice crop (Dixit and Gupta, 2000). Organic manures are the viable components of nitrogen management, which can supplement and successfully replace costly fertilizer nitrogen. Research efforts to maximize the productivity and soil fertility status of the rice-groundnut cropping system, by developing appropriate and viable nitrogen management practices, without any compromise on

soil health are long due in the Southern Agro-Climatic Zone of Andhra Pradesh. The present experiment was, therefore, conducted to study the effect of crop residues, organics and inorganics on rice equivalent yield and soil fertility status of rice – groundnut cropping system.

MATERIALS AND METHODS

Field investigations were conducted during 2002-03 and 2003-04 at wetland farm of S.V. Agricultural College, Tirupati. The soil was sandy clay loam in texture, slightly alkaline in reaction (pH 7.6), low in organic carbon (0.27 %) and available nitrogen (160.8 kg N ha⁻¹), medium in available phosphorus (25.6 kg P₂O₅ ha⁻¹) and available potassium (175.4 kg K₂O ha⁻¹).

The experiment was laid out in factorial RBD with five replications. There were four treatments comprising of preceding crops to rice raised during *Kharif* season viz., greengram, clusterbean, fieldbean and cowpea. Their residues were incorporated prior to transplanting of rice crop. Samples of all the crop residues were taken to estimate the nutrient

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