

Research
Paper

Adding nitrogen through crop residues, organics and inorganics in rice based 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 performance of greengram, clusterbean, fieldbean and cowpea as preceding crops to rice and effectiveness of their crop residues incorporation, farm yard manure and fertilizer on performance of rice and on succeeding groundnut crop. Among the four short duration leguminous crops tried preceding to rice, fieldbean produced the highest the quantity of biomass and crop residues. Incorporation of fieldbean crop residues was found to be superior to any other crop residue incorporation with regard to growth and yield as well as nutrient uptake of rice. Dynamics of soil fertility status with regard to organic carbon, available nitrogen and potassium was superior with incorporation of fieldbean crop residues. Supply of 100 per cent N through fertilizer to rice was found to be superior with regard to growth and yield as well as nitrogen uptake of rice. Incorporation of fieldbean crop residues to preceding rice has recorded the highest yield attributes and pod yield of groundnut. Growth, yield attributes and pod yield of groundnut were the highest with the supply of 100 per cent of nitrogen through FYM to preceding rice.

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INTRODUCTION

Rice –groundnut is one of the important cropping system in the southern agroclimatic region and maintenance of optimum soil fertility is an important consideration for obtaining higher and sustainable yield due to large turn over of nutrients in soil plant system. In recent years the emphasis has been shifted from individual crop to cropping system as a whole since the response in component crop of the cropping system are influenced by the preceding crops and the inputs applied to them. Legume crop residues incorporated into the field after harvesting seed can contribute considerable quantity of nitrogen to succeeding crops (Rekhi and Meelu, 1983). Conjunctive use of nutrients partly through organics and inorganics to preceding rice exhibited significant residual effect on succeeding groundnut (Thimmegowda and Devakumar, 1994). The version of crop residue incorporation is beneficial depending upon the farming situation. Grain legumes, in contrast with green manures, provide grain to

augment income and protein as well as reduce the use of mineral nitrogen in rice-based cropping systems. In areas, where clear cut fallow of a short duration is available preceding the transplanted low land rice crop, crops like greengram, cluster bean, fieldbean and cowpea can be raised as preceding crops to rice and after the harvest of the saleable yield, the left over crop residues of these crops can be incorporated prior to transplanting of succeeding rice. The practice of crop residue incorporation after pod harvest is feasible and economical, where a period of 45 to 60 days is available before planting of rice and this can contribute about 50 to 60 kg N ha⁻¹ to the succeeding rice crop (Kulkarni and Pandey, 1988). Organic manures and crop residues have been proved to be viable components of nitrogen management, which can supplement and successfully replace costly fertilizer nitrogen. Research efforts to maximize the productivity and economic returns of the rice-groundnut cropping system, by developing appropriate and viable nitrogen management practices, without any discount of soil health