

## Productivity and economics of rice groundnut cropping system under integrated nutrient management

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### ABSTRACT

The field experiments were conducted during *kharif* and *rabi* seasons of 1998-99 and 1999-2000 at the Agronomy Farm, College of Agriculture, Dapoli, dist. Ratnagiri to study the effect of integrated nutrient management on the fertility status, productivity and economics of rice (*Oryza sativa* L.) – groundnut (*Arachis hypogaea* L.) cropping system. Application of 50% recommended dose of NPK through fertilizers + 50% N substitution either through glyricidia or FYM to rice recorded higher grain yield. Groundnut supplied with 75% recommended dose of fertilizers preceded by 50 % RDF + 50 % N substitution through FYM to rice registered significantly higher pod yield. In rice – groundnut sequence, maximum net returns and benefit cost ratio were observed due to application of 100% RDF to both the crops. The total uptake of N, P, K by the crops increase significantly with the increased in the dose of fertilizers over control whereas combined use of inorganic fertilizers registered the highest value with organic manures. Among the organic manures the overall performance of green manure was the best, followed by farmyard manure. Judicious use of organic manures like FYM and glyricidia with inorganic fertilizers improved the availability of NPK in the soil significantly.

**Key words :** Rice-groundnut, Integrated nutrient management

### INTRODUCTION

Rice - groundnut sequential cropping plays a significant role in total productivity of crops in Konkan region of Maharashtra. The fertilizer needs of a crop in a cropping system mainly depend upon the characteristics of the preceding crops and kind and quantities of fertilizers applied to them. Continuous unbalance use of fertilizers in intensive cropping system leads to decreases in crop yields, imbalance of nutrients in soil and adverse effect on soil. Thus, there is a vast scope for increasing nutrient supply through use of organic manures, green manures and adoption of proper crop sequences and these together can contribute significantly to the required nutrient pool.

Therefore, there is a need for systematic approach of nutrient supply to the system as a whole to increase the fertilizer use efficiency and economizing the use of costly mineral fertilizers by accounting the residual effect of the applied fertilizers and preceding crops. An experiment was therefore, conducted to evaluate the productivity and economics of rice-groundnut crop sequence under integrated nutrient supply system and its influence on fertility dynamics of soil.

### MATERIALS AND METHODS

The field experiment was conducted during the rainy (*kharif*) and winter (*rabi*) seasons of 1998-99 and 1999-2000 at Agronomy farm, College of Agriculture, Dapoli,

dist. Ratnagiri. The soil of experimental plot was clay loam in texture with pH 6.36, organic carbon 1.30 g kg<sup>-1</sup>; and the available nitrogen 295.22 kg<sup>-1</sup>, phosphorus 12.96 kg<sup>-1</sup> and potassium 105.03 kg<sup>-1</sup>. There were 11 treatment combinations (Table 1) replicated thrice in Randomized Block Design. Rice (var. Sahyadri) and groundnut (var. Konkan tapora) were grown as the test crop. The recommended dose of fertilizer was 100:50:50 N, P and K kg ha<sup>-1</sup> for rice and 25:50:0 N, P and K kg ha<sup>-1</sup> for groundnut. The treatment comprised application of different combinations of inorganic and organic sources of nutrients to rice and inorganic sources to groundnut. The grain and straw of rice and haulm, kernel and shell of groundnut samples were analyzed for their N content by Kjeldahl method. The samples were digested in diacid (HNO<sub>3</sub>, HClO<sub>4</sub>, 4:1) mixture. Phosphorus was estimated in diacid digest by vanadomolybdo phosphoric yellow colour method. The extract was used for determination of potassium by flame photometer. The soil samples collected were analyzed for available N by alkaline permanganate method, P by Brays method and K by flame photometer after extraction with 1 N NH<sub>4</sub>OAC (pH 7.0). Data on grain and straw yield, total productivity/ha/year (grain and biomass), gross monetary returns, net monetary returns and benefit: cost ratio were obtained from the cropping sequence during two years and their mean. Economics of fertilizer application in the cropping system was worked out.

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