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Production potential and economics of rice-based cropping systems in hill zone of Karnataka, India

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ABSTRACT

A field experiment was conducted during the year 2002-03 and 2003-04 on red sandy loam soil at Mudigere, hill zone of Karnataka, to study the productivity, profitability and energetic of different rice-based cropping systems under low land rice eco-system. Treatments comprised eight different cropping sequences with five varying fertility levels. Rice-soybean cropping sequence recorded the sustainable rice yield on long term basis. However, rice-bell pepper (181.0 q/ha) followed by rice-marigold (Rs.165.6 q/ha) registered the highest rice grain equivalent yield (RGEY). The highest net profit on per hectare investment was recorded with rice-marigold crop sequence (Rs.66573/ha). The production use efficiency (PUE) of rice-fodder maize was higher (111.0 kg/ha/day) than other cropping sequences. The highest land use efficiency (LUE)) was observed in rice-bell pepper cropping sequence (75.20%) over other treatments. Rice-rice or rice-fodder maize sequence had an adverse impact on yield sustainability as it decreased the yield. Rice-bell pepper and rice-marigold cropping sequences proved to be more remunerative over other cropping sequence.

Key words : Production potential, Profitability, Rice, Succeeding crops, RGEY, Net profit.

INTRODUCTION

Rice is the principal rainy season crop grown under rice-fallow in hill zone of Karnataka. The existing mono-rice cropping in low land is becoming less remunerative as only one crop of rice is being cultivated in a year. The need therefore, is to intensify agricultural production through increasing the cropping intensity that can be achieved through rice-based cropping system, as the rice being the main crop of the hill zone of Karnataka. The information on performance of different rice-based cropping sequences viz. cereal-cereal, cereal-legume, cereal-vegetable and cereal-flowers with regard to suitability, profitability and productivity are meagre. Hence, a study was carried out to assess the possibility of increasing the cropping intensity in low land rice by introducing short duration crops like, soybean, cowpea, radish, bell pepper, fodder maize and marigold in the cropping system to increase the productivity and profitability of the farmers of the zone through suitable cropping system.

MATERIALS AND METHODS

The field experiment was conducted for two years during rainy (*Kharif*) and post rainy (summer) seasons of 2002-03 and 2003-04 at Mudigere (Karnataka), situated in hill zone of Karnataka at a fixed site and layout. The soil of experimental site was red sandy loam soil having soil pH 5.50, organic carbon (1.57 %), available nitrogen, phosphorus and potassium 408.96, 20.85 and 248.96 kg/ha, respectively. The annual rainfall was 1875 and 1760 mm with mean maximum and minimum temperatures 26.53 and 17.43^{0}C, respectively during cropping years. The treatments comprised eight main plot treatments of cropping systems, *viz*. C_1: Rice-fallow; C_2: Rice- rice; C_3: Rice-soybean; C_4: Rice-cowpea; C_5: Rice-radish; C_6: Rice-bell pepper; C_7: Rice-fodder maize and C_8: Rice-marigold. Five sub plot treatments of fertility levels were F_1: Control; F_2: 50 per cent recommended dose of fertilizer; F_3: 75 per cent recommended dose of fertilizer; F_4: 100 per cent recommended dose of fertilizer and F_5: 50 per cent recommended dose of fertilizer + 5.0 tones of well decomposed *Chromoleana odorata* compost (on nutrient equivalent basis). The experiment was laid out in split-plot design with three replications. The crops included in different sequences were raised with recommended agronomic practices. Rice seedlings of 30 days were transplanted each year by the second week of July (*Kharif*) and crop was harvested during first week of December. The succeeding crops were sown after *Kharif* rice by the last week of December to second week of January during the post-rainy season. The details of varieties used, seed rate, fertilizer used and mean duration of crop sequence are given in Table 1. For comparison between crop sequences, the yields of all crops were converted into rice grain equivalent yield (RGEY) on prevailing prices (Yadav and Newaj, 1990). Land use efficiency (LUE) was calculated by dividing the total duration of crop sequences by 365 and expressed

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