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Extended Summaries

Contributory Papers

College of Horticulture

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Thrissur - 680 656, Kerala

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Crop diversification and economics in rice based cropping system

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In Kerala, rice cultivation has been reduced to 40 percent of its area during last one decade alone and the farmers are compelled to convert rice fields for various agricultural non-agricultural purposes. Irrational use of chemical input for short term benefit has not only resulted in poor quality produce but also deteriorated the fragile wetland ecosystem. Hence an experiment was conducted at Cropping Systems Research Centre from 2001- 02 to 2002- 03. The experiment was conducted in a split plot design with three replications. Treatments comprised of four cropping systems in the main plots viz. Rice-rice-fallow, rice-rice-daincha, rice-rice-vegetable crop of bhindi and rice-banana in the first year and banana alone in the second year. The sub plot treatments comprised of three nutrient management options of 75 per cent, 100 per cent and 125 per cent of each crop as per the Package of Practices (POP) recommendations of crops of Kerala Agricultural University.

The rice yield was influenced by the systems of cropping and nutrient management. After summer green manure or vegetable crop the succeeding rice crop was significantly improved than sequential cropping of rice-rice fallow. The nutrient management registered higher response of nutrients over POP recommendations during kharif season alone.

The rice equivalent of 28 605 kg/ha per annum was noticed in rice-banana system followed by 14 348 kg/ha per annum and 9543 kg/ha per annum in rice- rice –bhindi and rice – rice –daincha as compared to 8094 kg/ha per annum in rice –rice –fallow.

Though the expenditure was high in rice-banana cropping system, it also registered a concomitant increase in net returns and cost - benefit ratio. The net income of all the three cropping systems tried gave an appreciable increase over the traditional system of rice-rice - fallow. The net income of Rs.12 167/- per hectare per annum was obtained in the traditional system and was enhanced to Rs.20 801/-ha. in rice - rice - green manure, Rs 32 433/ha.in rice-rice- bhindi and Rs.77 107/ha. in rice-banana cropping systems. The nutrient management above the present POP recommendation of individual crops also registered an increase in net income. However in rice-banana cropping system the highest cost benefit ratio was obtained in the POP recommendation of nutrient management. Hence in this cropping system enhancement of nutrients above the present POP recommendations for individual crops was not economically advantageous. Looking to the economics it may be inferred that rice-banana cropping system with the present POP recommendations was the best among the treatments. The rice-rice-vegetable (bhindi) also gave an appreciably high net returns and cost: benefit ratio.

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Soil site suitability evaluation for paddy (*Oryza sativa*) in some selected river alluvial plain soils in the northern region of Karnataka

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Proper land resources management requires initial investigation of the land potentialities and their shortcomings. The potentialities and problems of soils play a vital role in scientifically deciding the crop choice for achieving the best land use in addition to protecting the health of soils for the future generations. The performance of any crop is largely dependent on soil parameters like depth, texture, drainage *etc* as conditioned by climate and topography. Since the climate and soil are interrelated, both are combined in Soil Taxonomy. The Soil Taxonomy and Land Evaluation have the best potential for identifying the agricultural land and consequently transfer of technology.

The study area was Kumta taluk of Uttara Kannada district, Karnataka. The study area receives a mean annual rainfall of 3521.7 mm. The area has ustic moisture regime and isohyperthermic temperature regime. The major river that drains the area is Aghanashini. The soils on this river alluvial plain was subjected to study with the objective to evaluate suitability of these soils for the cultivation of paddy. Three pedons were dug open at Kandrkona, Badal and Harkode and studied for their morphological, physical and chemical properties. These soils were classified following USDA Soil Taxonomy (Soil survey staff, 1999). FAO methodology (FAO, 1976) for land evaluation was adopted to compute the soil suitability classes such as S1, highly suitable; S2, moderately suitable land having slight limitations causing moderate severity; S3, marginally suitable land having aggregation of severe limitations; N1, currently not suitable land having the limitations which cannot be overcome at the current level of technology or at the currently acceptable costs and N2, permanently un suitable land. The soil site suitability criteria for paddy were developed by referring the available literature. The existing climatic and soil characteristics at each site in the study area were compared with the criteria and the soils have been evaluated for their suitability through limitation approach.

The soils were classified based on the morphological and physico-chemical properties. Kandrakona pedon was classified into Oxyaquic Ustifluvent, Badal pedon to Inceptic Haplustalf and Harkode pedon to Typic Fluvaquent. The factors affecting the suitability for paddy is physical characteristics of soils, climatic factors and water resources. A rainfall of more than 1200-1500 mm, a temperature of 26-30°C , a depth of more than 100 cm, a coarse fragment content of less than 15% and pH of 5.5-6.5 with a base saturation of more than 80% are optimum conditions for paddy. Under these conditions all the pedons under study was rated as moderately suitable land for paddy cultivation (S2). The overall rating was S2 c(2) s(2) f(2). All the soils posed moderate limitations with respect to texture organic carbon and cation exchange capacity. The maximum average temperature (31.7 °C) experienced in this terrain also caused moderate limitations.

References

FAO. 1976. A frame work for land evaluation. Soils Bulletin 32, FAO, Rome.

Soil Survey Staff. 1999. Soil Taxonomy- A basic system of soil classification for making and interpreting soil surveys. 2nd edition, Agricultural Hand book No. 36, USDA, Washington, DC, USA.

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Soil fertility enhancement in integrated farming system through resource recycling

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Different farming systems have been developed independently and being practiced by farmers indigenously in India without any rationale for utilizing the waste/ residue arising out of cropping and other related activities. The present study was undertaken to explore the resource recycling potential to sustain soil productivity for wetlands through integrated farming system.

Field experiments on Integrated farming systems were conducted at the Tamil Nadu Agricultural University, Coimbatore during 1998-2001 involving cropping, poultry, pigeon, goat and fishery enterprises in all possible combinations, with a view to recycle the residue and by-products of one component over the other. In one hectare farm, an area of 0.75 ha was assigned for crop activity, 0.10 ha for growing fodder grass to feed the goat unit (20+1), 0.03 ha allotted to goat shed and remaining 0.12 ha allotted to 3 fish ponds. Three integrated farming systems viz., crop + fish + poultry (20 Bapkok layer birds), crop + fish + pigeon (40 pairs) and crop + fish + goat (Tellicherry breed of 20 female and 1 male maintained in 0.03 ha deep litter system) were tried for three years.

Polyculture fingerlings of 400 numbers (catla, rohu, mrigal / common carp and grass carp) in the ratio of 40:20:30:10, respectively, reared in 3 ponds of size 0.04 ha (depth of 1.5 m) each. Fishes were fed with droppings of poultry, pigeon (700 kg poultry / pigeon obtained from 20 Bapkok layers / 40 productive pairs of pigeon) sheltered over two fish ponds and goat droppings (3 animals – 800 kg droppings) to assess the feasibility of rearing fish by using different manures as feed. Under integrated farming system, cropping sequence includes (i) sugarcane (planted) – sugarcane (ratoon) – banana (3 years) (ii) banana – turmeric – rice – banana (3 years) and (iii) maize - rice – sesame – sunnhemp (annual) each in 0.25 ha and bajra –