

ECONOMICS OF PHOSPHORUS MANAGEMENT IN A RICE BASED CROPPING SYSTEM

An experiment was laid out at the College of Agriculture, Vellayani to study the economics of phosphorus management in a rice based cropping system involving rice-rice-cowpea/sesamum. The experiment was laid out in a randomized block design with three replications. There were eight treatments. The treatments comprised of continuous phosphorus application to all three crops in the system (T_1), phosphorus application to the first and second crops of rice (T_2), phosphorus application to the first crop of rice and third crop of cowpea/sesamum (T_3), phosphorus application to the first crop of rice only (T_4), phosphorus applica-

tion to the second crop of rice and third crop of cowpea/sesamum (T_5), phosphorus application to the second crop of rice only (T_6), phosphorus application to the third crop of cowpea/sesamum only (T_7) and control plot with no addition of phosphorus to any of the crops in the system (T_8). Phosphorus was applied according to the treatments, based on the package of practices recommendations of the Kerala Agricultural University (KAU, 1983). The recommended doses of nitrogen and potassium for respective crops in respective seasons were applied uniformly to all plots.

Table 1. Economics of phosphorus management for rice-rice-cowpea and rice-rice-sesamum systems

Treat-ments	Cost of cultivation, Rs/ha				Total return, Rs/ha		Benefit cost ratio
	I Crop	II Crop	III Crop	Total	Gross	Net	
<i>Rice-rice-cowpea</i>							
T1	5000	5000	2400	12400	19967	7567	1.61
T2	5000	5000	2223	12223	19642	7419	1.60
T3	5000	4794	2400	12194	18887	6693	1.54
T4	5000	4794	2223	12017	19475	7458	1.62
T5	4794	5000	2400	12194	20589	8395	1.69
T6	4794	5000	2223	12017	19122	7105	1.59
T7	4794	4794	2400	11988	22279	10291	1.85
T8	4794	4794	2223	11811	17116	5306	1.45
<i>Rice-rice-sesamum</i>							
T1	5000	5000	2356	12356	21536	9180	1.74
T2	5000	5000	2268	12268	21079	8811	1.71
T3	5000	4794	2356	12150	20648	8498	1.70
T4	5000	4794	2268	12062	20792	8730	1.72
T5	4794	5000	2356	12150	20632	8482	1.70
T6	4794	5000	2268	12062	20984	8922	1.74
T7	4794	4794	2356	11944	22669	10725	1.90
T8	4794	4794	2267	11855	18792	6937	1.58

Cost price in Rs per kg: Paddy grain 2.0, paddy straw 0.8, cowpea grain 7.0, sesamum 10.0, N 5.1, P2O5 5.9 and K2O 2.15

The economics of different treatments in terms of net return and benefit-cost ratio (Table 1) revealed that highest net return of Rs 10291 per ha and benefit-cost ratio of 1.85 for rice-rice-cowpea system and a net return of Rs 10725 per ha and benefit-cost ratio of 1.90 for rice-rice-sesamum system were obtained where phosphorus was applied only to the third crop of cowpea/sesamum and residual effect of phosphorus being utilized by succeeding rice crops (T_7). Since there was no response of rice to the direct application of phosphorus, it is enough that phosphorus need be applied only to the third crop of cowpea/sesamum so that residual phosphorus could be utilized by succeeding rice crops successfully. This is in agreement with the result obtained by Purushothaman (1979) who observed that

in a rice based multiple cropping experiment, application of P to summer upland crop gave similar yield as application of recommended level of NPK to each crop. Venkateswarlu and Rao (1979) pointed out that if a legume crop is taken up as the first crop in sequence all the phosphate for the system can be applied to the legume. When comparing rice-rice-cowpea and rice-rice-sesamum systems, an additional net return of Rs 1255 per ha was obtained from rice-rice-sesamum system over rice-rice-cowpea in one year.

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