

PRODUCTION POTENTIAL AND ECONOMICS OF HIGH INTENSITY CROPPING SYSTEMS UNDER BHAVANISAGAR CONDITIONS

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ABSTRACT

Experiments were conducted at the Agricultural Research Station, Bhavanisagar, Tamil Nadu Agricultural University, for a period of three years (1979 - 1980 to 1981 - 1982) to evaluate four rice based crop sequence in a sandy loam soil with assured irrigation facilities. Three crop sequence of rice - rice - rice recorded maximum grain yield and highest net return, followed by rice - fingermillet - sorghum sequence. The day⁻¹ productivity was also maximum under rice - rice - rice sequence (32.1 kg.ha⁻¹ day⁻¹) followed by rice - fingermillet - sorghum and rice - fingermillet - greengram sequences (23.7 kg.ha⁻¹ day⁻¹).

KEYWORDS: Cropping System, Rice, Finger millet, Greengram, Economics.

There is tremendous potential for increasing the cropping intensity, especially in command areas with good irrigation facilities, to 300 or 400 per cent by adopting high intensity cropping systems involving short duration, photo and thermo insensitive and high yielding crops/varieties. Research conducted under the All India Co-ordinated Agronomic Research Project has helped to identify high intensity cropping systems with production potential of more than 10 t. ha⁻¹.yr⁻¹ suitable for the various agroclimatic regions of the country (AICARP 1984). By introducing new crops, varieties and suitable management techniques, it is possible to realise very high yields from these crop sequences and also to maintain the productivity on a long term basis without any deterioration of the agro-eco system. Hence the present study was undertaken to identify the cropping sequence with the high production potential and maximum net returns under Bhavanisagar conditions.

MATERIALS AND METHODS

The experiments were conducted at the Agricultural Research Station, Bhavanisagar, during the period 1979-1980 to 1981-1982. Four crop sequences with 300 per cent cropping intensity viz., rice during *kharif*, rice/fingermillet during *rabi* and rice/sorghum/groundnut/greengram during summer were tested in randomised

block design with six replications. Details of crop sequences and varieties are furnished in Table.1.

The soil was red sandy loam in texture and low in available N, P and K. The recommended package of practices were followed for each crop. Data on the grain and straw yield of crops and cost of inputs and labour employed were collected to work out the economics.

RESULTS AND DISCUSSION

Data on the productivity and economics of the four crop sequence for the three years of experimentation and the mean values are presented in Table 2.

Rice-rice-rice sequence performed better and recorded higher grain yield compared to all other sequences during the three years of experimentation. This system yielded 82.8, 70.2 and 109.7 q.ha⁻¹ yr⁻¹ during 1979-1980, 1980-1981 and 1981-1982, respectively. The total grain yield obtained in rice-rice-rice sequence was about 20 q. more than the yield obtained in the next best sequence of rice-fingermillet-sorghum. Mahapatra *et al.* (1981) reported still higher production ranging from 108.6 to 158.9 q.ha⁻¹.yr⁻¹ from rice based cropped system tested in differ-

ent centres in India. A multiple cropping system of rice-rice-rice with a total field duration of 344 days tested at Coimbatore yielded 139.3 q.ha⁻¹ of grain (Palaniappan *et al.* 1978). Hence, there is scope for further improving the productivity of these three crop sequences by optimising the management practices. Rice-rice-rice sequence also recorded the highest day⁻¹ production of 32.1 kg.ha⁻¹ followed by 23.7 kg.ha⁻¹ in rice-fingermillet-greengram and rice-fingermillet-sorghum sequences. The yield of groundnut crop was not upto the expectation probably because of high soil moisture status as a result of seepage from adjoining rice fields.

The rice-rice-rice sequence, which recorded maximum grain yield, gave the highest mean net return of Rs.5740 ha⁻¹.y⁻¹, which was 57.5 per cent more than that obtained from rice-fingermillet-sorghum sequence, which was the next best. Rice-rice-rice sequence also recorded the highest B:C ratio of 1.8 and there was no difference in the B:C ratio of the other three sequence (1.5).

From the study, it appeared under Bhavanisagar conditions, Rice-rice-rice sequence would be profitable where assured irrigation facilities are available throughout the year.

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Table 1. Details of cropping systems tested.

Crop sequences	Crop, variety and duration			Total duration (days)
	<i>Kharif</i>	<i>Rabi</i>	Summer	
S ₁	Rice Co 41 (105)	Rice Bhavani (135)	Rice Co 41 (105)	345
S ₂	Rice Co 41 (105)	Fingermillet Co 11 (95)	Greengram Co 3 (85)	285
S ₃	Rice Co 41 (105)	Fingermillet Co 11 (95)	Groundnut POL 2 (110)	310
S ₄	Rice Co 41 (105)	Fingermillet Co 11 (95)	Sorghum Co 23 (110)	310

Note : Figures in parenthesis indicate the duration of the crop/variety.

Table 2.: Yield and economics of different cropping system

Year	Kharif		Rabi		Summer		Total grainyield (kg.ha ⁻¹)	Grain yield cropped day ⁻¹ (kg.ha ⁻¹) (Rs.ha ⁻¹)	Gross returns (Rs.ha ⁻¹)	Cost of production (Rs.ha ⁻¹)	Net returns (Rs.ha ⁻¹)	B.C ratio
	Grain (kg.ha ⁻¹)	Straw (kg.ha ⁻¹)	Grain (kg.ha ⁻¹)	Straw (kg.ha ⁻¹)	Grain (kg.ha ⁻¹)	Straw (kg.ha ⁻¹)						
1979-1980	S ₁	3230	8470	1800	7005	3250	11785	29.57	12076	7000	6076	1.87
	S ₂	3510	8740	750	4185	1630	3550	22.22	10044	6044	4004	1.66
	S ₃	3625	8735	400	4161	530	3110	16.25	8121	6200	1921	1.31
	S ₄	3430	9450	765	4302	1625	17935	20.10	10252	6700	3552	1.53
1980-1981	S ₁	2690	6839	1695	5892	2630	2782	27.51	10320	6200	4120	1.67
	S ₂	2736	8112	1010	1461	671	2850	16.67	7685	6050	1635	1.27
	S ₃	2900	7341	1085	1473	749	1157	16.32	7954	5560	2394	1.43
	S ₄	2805	6944	1120	1753	1456	1695	18.56	8965	6110	2855	1.47
1981-1982	S ₁	3753	3700	5050	4679	2151	7000	39.20	15256	8230	7026	1.85
	S ₂	3718	3630	3505	2085	1344	6900	32.33	12102	7385	4717	1.64
	S ₃	3915	4050	3436	2031	769	8230	28.0	13606	7840	5766	1.74
	S ₄	3648	3850	3573	2204	2190	10150	32.50	12490	7960	4530	1.57
Mean	S ₁	3224	6336	2848	5858	2677	7189	32.09	12884	7143	5740	1.80
1979-1980 to 1981-1982	S ₂	3321	6827	1755	2577	1215	4433	23.74	99433	6491	3452	1.53
	S ₃	3480	6708	1640	2555	682	4165	20.19	9893	6533	3360	1.51
	S ₄	3294	6748	1819	2753	1757	14680	23.72	10569	6923	3645	1.53

Note: Cost of cultivation and gross returns were worked out based on the prevailing rate for different items during the respective year.