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Madras agric. J.78 (9-12) Sep-Dec-1991

https://doi.org/10.29321/MAJ.10.A01880

CROPPING SYSTEM STUDIES IN SANDY LOAM SOILS OF THE CAUVERY NEW DELTAIC AREAS

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ABSTRACT

A field trial was conducted at Agricultural Research Station, Pattukkottai with ten different systems during 1984-1986 to evolve a suitable cropping system for the sandy loam soils of new delta of Thanjavur District. The results indicated that there is a possibility to introduce a four crop sequence (rice-blackgram-gingelly-greengram within a field duration of 340 days) with highest net profit (Rs. 21, 457 ha^{-1}) and high cost benefit ratio (3.61). The existing rice-groundnut-maize may be improved by intercropping groundnut with blackgram or soybean. Gingelly and blackgram can be cultivated either in the second season (Dec.-Apr.) or in the third season (May-Aug.).

KEYWORDS: Cropping System, Sandy Loam Soil, Cauvery Delta.

The entire sandy loam soils of Thanjavur (Cauvery new delta or CMP canal area) is not only a rice belt but also a potential cash crop area. Though there are double rice crop area, growing of single medium duration rice followed by cash crops are gaining momentum. Crops like groundnut, gingelly and maize are extensively cultivated (IADP 1980). But yet there is scope to intensify the pattern with newer crops/varieties and intercrops.

MATERIALS AND METHODS

A study was undertaken during 1984-1986 at Agricultural Research Station, Pattukkottai to envolve suitable cropping system with

high monetary benefit and to improve the existing system with intercrops. The soil was sandy loam with 12% clay andlow in N status with very low moisture holding capacity. Rice (medium duration) was grown as the main crop in the months of September to December (nursery sowing in August). Other crops like groundnut, gingelly, maize, blackgram, soybean, greengram and cotton were tried in two distinct seasons one in between December and April and a second in between May and August. Groundnut was tried with intercrops like blackgram, greengram, soybean and redgram. Ten different combinations were formulated (Table 1) in a randomized block design. The second year treatments were modified (Table 2). All the main crops were raised with the recommended package of practices under assured irrigation. A minimum period of five days to a maximum of 30 days were allowed as turn periods in these treatments.

RESULTS AND DISCUSSION

The results of grain yield, cropping intensity and economics of the cropping systems for 1984-1985 and 1985-1986 are furnished in Table 1 and 2 respectively. It was found that four crop sequence viz., rice-blackgram-gingelly-greengram gave consistently the highest net annual return (Rs. 18,500 to 21,450 ha^{-1}) with high benefit cost ratio (3.26-3.61). The existing rice-groundnut-maize was found as next best system. Intercropping of groundnut with blackgram in the existing system improved the net profit (about Rs.800 ha) and cost benefit ratio of the system. Systems involving cotton as one of the components fetched low net return and low cost benefit ratio. Cost benefit ratio increased wherever the system involved gingelly or blackgram or both as system components. The four crop sequence had 400 per cent cropping intensity with 340 days field duration in an year followed by rice-groundnut + intercrop-maize.

The efficiency of the systems improved upto 66.2 per cent by intercropping of soybean, blackgram and redgram with groundnut. Maximum additional yields of 0.62 t of soybean, 0.32 t of blackgram and 0.23 t of redgram were obtained ha^{-1} which in turn improved the net profit and cost benefit ratio.

In the second season (December to April) groundnut Co1 produced a pod yield of 2.13 to 2.53 $t.ha^{-1}$. Groundnut pod yield was affected (1.29 to 1.5 $t.ha^{-1}$ only) by paired row sowing. Sowing of intercrops without altering the groundnut normal spacing, but in between the rows with a definite proportion has not affected the groundnut pod yield (Treatments 1,3 and 4 in 1985-1986). Gingelly gave an yield of 1.17 $t.ha^{-1}$ (1985-1986). Soybean produced 1.29 t and blackgram gave its' highest yield of 1.29 t and maize (CoH 1) recorded grain yield equal to rice (4.9 t) in this season.

In the third season (May to August) maize registered grain yields of 3.04 to 3.82 $t.ha^{-1}$. Gingelly also produced grains equal to earlier sowing (0.85 to 1.14 t). Blackgram and greengram gave the maximum yield at this season and (1.31 t) it was in conformity with the results of Ramasamy *et al.* (1980). But groundnut yield came down to 1.7 t. Maize + soybean intercrops did not associate well. The soybean produced only 0.18 t as intercrop.

In general, cotton yield was very low (1.1 t) in this type of soil. Intercrops like groundnut, blackgram and greengram in the paired row of cotton produced grain yield of 1.21 t (dry pods), 0.55 t and 0.47 $t.ha^{-1}$ respectively. The profit can be increased in the existing system by sowing a pulse, blackgram/soybean as intercrops in the interspace without altering the geometry of groundnut plant. Groundnut and maize yields were more in December-April sowing than May-August sowing. This was in conformity with the results of TNAU (1985). It was also found that gingelly with very minimum input cost can effectively be fitted either in the second season or in the third season. The blackgram (AB 920) which performing well both in the second as well in the third season can be fitted according to the needs and conditions.

Table 1. Grain yield, cropping intensity, and economics of different cropping system. (1984-1985)

Cropping system	Grain yield t.ha^{-1} I	II	III	IV	Cropping intensity %	Field duration (days)	Net profit (Rs.ha^{-1})	Benefit/cost ratio
1. Rice-groundnut-maize	4.90	2.13	3.04	-	300	304	12,713	2.22
2. Rice-groundnut+soybean-maize+soybean	4.90	1.29	3.15	-	385	309	13,472	2.32
3. Rice-groundnut+redgram-maize+redgram	4.90	1.50	3.11	-	350	335	12,107	2.19
4. Rice-soybean-gingelly	4.90	1.29	1.14	-	300	300	14,726	2.83
5. Rice-gingelly-blackgram	4.90	1.17	1.31	-	300	276	14,727	2.83
6. Rice-blackgram-gingelly-greengram	4.90	1.29	1.10	1.31	400	342	18,502	3.61
7. Rice-cotton	4.90	1.24	-	-	300	325	6,614	1,88
8. Rice-cotton+groundnut	4.90	1.12 1.21	-	-	250	269	10,554	2.33
9. Rice-cotton+greengram+blackgram	4.90	0.11 0.55	0.17	-	300	325	9,658	2.30
10. Rice-cotton+blackgram+greengram	4.90	1.12 0.47	0.22	-	300	325	9,603	2.26

* Groundnut was raised in paired rows 20cm between rows and 40cm between 2 pairs.

Table 2. Grain yield, cropping intensity, and economics of different cropping system (1985-1986).

Cropping system	Grain yield t.ha^{-1} I	II	III	IV	Cropping intensity %	Field duration (days)	Net profit (Rs.ha^{-1})	Benefit/cost ratio
1. Rice-groundnut-maize	4.12	2.53	3.82	-	300	310	19,934	2.72
2. Rice-groundnut-gingelly	4.08	2.22	0.99	-	300	313	19,532	3.04
3. Rice-groundnut+soybean-maize	4.21	0.50 2.22	3.59	-	316.6	310	19,676	2.68
4. Rice-groundnut+blackgram-maize	4.15	0.32 2.43	3.64	-	333.2	310	20,715	2.77
5. Rice-gingelly-groundnut	4.07	1.15	1.70	-	300	308	17,830	2.86
6. Rice-gingelly-blackgram	4.16	1.14	0.98	-	300	281	15,342	3.00
7. Rice-maize-gingelly	4.10	4.90	0.85	-	300	307	16,287	2.80
8. Rice-blackgram-gingelly-greengram	4.00	1.18	1.18	1.25	400	339	21,457	3.26
9. Rice-cotton-blackgram	4.01	1.20	0.79	-	300	34	7,890	1.78
10. Rice-thaladi rice-groundnut	Kurvai rice could not be raised because of no water in the canal.							

* Groundnut was raised in regular spacing. Intercrops of soybean/blackgram were raised in the alternate interspace of two groundnut rows. In the intercrops the spacing between the plants were adopted as 30cm and 15cm for soybean and blackgram.

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Madras agric. J.78 (9-12) Sep-Dec-1991

RESPONSE OF WHEAT (HD 1467) TO BASAL AND FOLIAR APPLICATION OF NITROGEN

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ABSTRACT

Field experiments in Nipaniya, Rewa (M.P.) were conducted on rainfed wheat (HD 1467) during 1980-1981 and 1981-1982, with levels of N (10, 20, 30 and 40 kg.ha^{-1} N) and six methods of N application (no application, full basal, full spray, 1/4th basal + 3/4th spray, 1/2 basal + 1/2 spray and 3/4th basal + 1/4th spray) revealed that 40 kg.ha^{-1} N increased the maximum grain yield and net income in both years.

KEYWORDS: Wheat, Nitrogen Application, Basal, Foliar spray

Wheat is the second important cereal crop next to rice. The average yields of wheat in India, M.P. and Rewa region of M.P. are 14.78 q, 9.11 q and 6.55 q.ha^{-1}, respectively which are very low. Among several factors of crop production, use of fertilizers increased the yield. During recent years, foliar application of N, through urea has been widely used (Vyas 1982, Khajanchi 1982, Jaiswal *et al.* 1984).

MATERIALS AND METHODS

The field experiments were conducted during 1980-1981 and 1981-1982 at Nipaniya, Rewa (M.P.) situated in the Northern-Eastern part of M.P. at latitude 24^0 31' N, longitude 81^{0}15' E at an altitude of 240 above the mean sea level. The treatments consisted of four levels of N (N_1-10 kg, N_2-20 kg, N_2-30 kg and N_4-40 kg.ha^{-1} N and six methods N application (M_0-No application, M_1-full basal, M_2-full spray, M_3-1/4th basal + 3/4th spray, M_4-1/2 spray + 1/2 basal, M_5-3/4th basal + 1/4th spray), were laid out in a randomized block design with three replications. The quantity of N through urea was applied as foliar spray.

The rainfall varied from 1492.80 mm in 1980-1981 to 1227.80 mm in 1981-1982, the maximum temperature rose upto 30.5°C and minimum temperature fell to 8.90° C in 1980-1981, whereas during 1981-1982 maximum temperature rose upto 29.1° C and minimum fell to 6.9° C, the maximum humidity of 98 per cent