Sorghum Agronomy - Rabi 2011-12

JS Mishra, MS Raut, AD Pawar, VS Khubsad, C Sudhakar, OG Lokhande

Contents

~ ## ~

Executive summary

Field experiments were conducted during rabi 2011-12 at different AICSIP centres to evaluate the response of pre-released sorghum genotypes to fertility levels, and to develop improved agronomic practices for higher sorghum productivity and profitability.

1 R. Response of advanced/pre-released sorghum genotypes to fertility levels under different soils and moisture conditions: Pre-released sorghum genotypes that were promoted to the second year of testing in AVHT under the breeding programme were evaluated for their response to fertility [Control, 50% RDF, 100%RDF (60:30:00 kg NPK/ha), and 150% RDF)] across the rabi sorghum growing regions of the country. The salient findings have been summarized as under (Table 1).

Table 1. Response of promising pre-released sorghum genotypes to fertility levels.

S. No.	Situation	Test entries	Checks	Locations	Promising treatments/entries
1.1R	Rainfed deep soil	SPH-1663, SPH-1666, SPV 2033, SPV, 2034, SPV 2035, SPV 2049	CSH-15R, M35-1, CSV-22	Parbhani, Rahuri, Dharwad and Tandur	Test hybrids 'SPH 1663 and SPH 1666' were on a par with check 'CSH 15R' , however, at Rahuri and Tandur, SPH 1666 gave 17 and 19% higher grain yield than the check. Among the test varieties, SPV 2034 gave 18% and 5% higher grain yields over M 35-1 and CSV 22.
1.2R.	Rainfed shallow to medium soil	SPH 1663, SPH 1665, SPV 2029, SPV 2031, SPV 2034, SPV, 2048	CSH-15R, M35-1, and Phule Mauli and P. Anuradha	Solapur	Test hybrids (SPH 1663 and SPH 1665) were on a par with check (CSH 15R) for grain and stover yields. Test variety SPV 2034 gave 32% higher yield than P. Mauli and SPV 2034 and SPV 2048 were superior to P. Anuradha for stover yields.
1.3R.	Irrigated conditions	SPH-1620,	CSH-15R, M35-1, CSV-22	Rahuri, Solapur	Test hybrid 'SPH 1620' gave 17.6% higher grain yield at Rahuri (4011 kg/ha) and 13.7% higher at Solapur (2956 kg/ha) as compared to check 'CSH 15R' Test

S. No.	Situation	Test entries	Checks	Locations	Promising treatments/entries
		SPV-1830, SPV-1833			variety, 'SPV 1830 yielded 54% more than M 35-1 and 19.5% higher than CSV 22. Test hybrid SPH 1620 and variety SPV 1830 with 100% RDF were more promising.

2R. Enhancement of *kharif*-fallow *rabi* sorghum productivity through in-situ moisture conservation: Compartmental bunding during kharif season followed by flat sowing of rabi sorghum was the most productive and cost-effective. It gave 20.6% higher grain yield than that of flat sowing, conserved more soil moisture and gave maximum net returns and B: ratio.

3R. Integrated Nutrient Management in *rabi* sorghum: Green manuring with Dhaincha gave 37% higher grain yield (2634 kg/ha) of rabi sorghum than that sown after kharif fallow (1918 kg/ha).

4R. Scheduling of irrigation in *rabi* sorghum: For maximum yield of rabi sorghum, it should be irrigated thrice at 35, 55 and 75 days after sowing. However, in case of 2 irrigations, it should be given at 55 and 75 DAS and if only one irrigation is available, it should be given at 55 DAS.

5R. Effect of INM practices of *kharif* sorghum on yield of subsequent chickpea in sorghum-chickpea system: Maximum chickpea yield (2004 kg/ha) was recorded with application of FYM 2.5t + vermin-compost 1.25 t/ha in combination with 100%RDF to preceding sorghum

Detailed report

Agro-climatic situation at different AICSIP centers

Rabi sorghum growing regions received very less rains during rabi season (September 2011 to February 2012). It ranges from 113.9 mm at Rahuri to 280.2 mm at Dharwad (Fig 1). Most of the rainfall was received during September to October months which facilitated sowing and enough for early sorghum growth (Fig 2). However, moisture stress at reproductive phase resulted in poor grain yield in all the rabi sorghum growing areas.

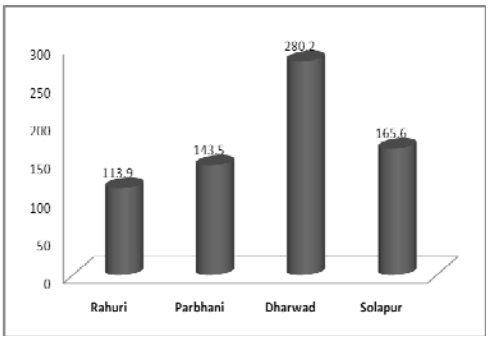

Fig. 1. Total rainfall (mm) received during crop season (Sep-Feb) at various AICSIP centres

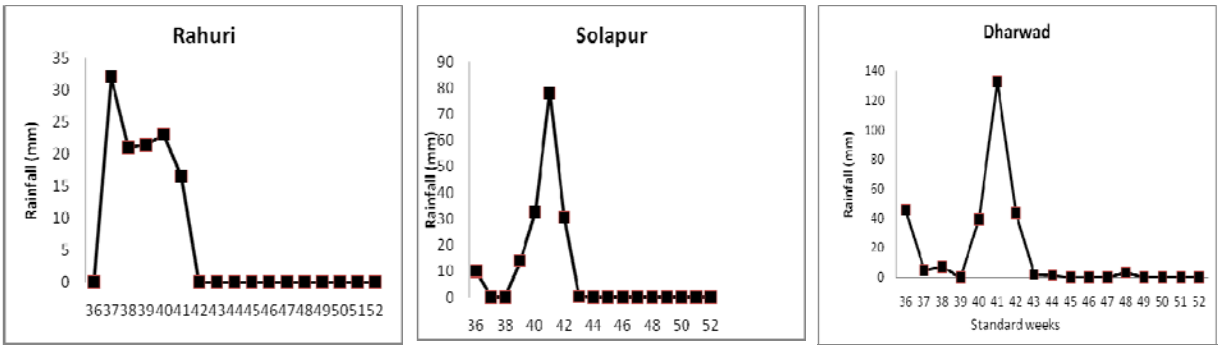

Fig. 2. Rainfall distribution during rabi season at different Centres

Experimental results

1.1R. Response of promising pre-released sorghum genotypes to fertility levels under rainfed conditions (Deep soils)

The experiment was conducted at 4 locations (Parbhani, Rahuri, Dharwad and Tandur) to find out the response of 7 pre-released genotypes (SPH-1663, SPH-1666, SPV 2033, SPV, 2034, SPV 2035, SPV 2049) to fertility levels. The checks were CSH-15R, M35-1, CSV-22. Grain yield varied widely with locations. The grain yields at Parbhani, Rahuri and Tandur varied from 2317-2515 kg/ha, but it was the lowest at Dharwad (1214 kg/ha) (Table 1.1R-1). Increasing fertility levels up to 150% of RDF (90:45:0) significantly increased the grain yield at Parbhani and Tandur, whereas at Rahuri, and Dharwd, the significant response was noticed up to 100% RDF (60:30:00). The performance of the test genotypes also varied with locations. At Parbhani, both the test hybrids (SPH 1663 and SPH 1666) gave significantly lower grain yield over check CSH 15R. At Rahuri SPH 1666 (2671 kg/ha) yielded 17.56% higher than the check CSH 15R (2272 kg/ha) at RDF and 19.2% at 150% RDF. At Tandur, SPH 1663 and SPH 1666 were superior to check by margin of 10 and 19% respectively. On mean grain yield basis, test varieties SPV 2034 (2238 kg/ha) and SPV 2035 (2218 kg/ha) were significantly superior (9-10%) to M 35-1 (2018 kg/ha), but all the test varieties were on a par with CSV 22 (2285 kg/ha). At Rahuri, SPV 2034 with RDF gave the maximum grain yield (3466 kg/ha), which was 59 and 11% higher over M 35-1 and CSV 22. Fertility x genotype interaction for grain yield was found to be the non significant. On mean location basis, SPV 2034 gave 18% and 5% higher grain yields over M 35-1 and CSV 22, respectively at RDF.

Conclusion: On mean basis, both the test hybrids 'SPH 1663 and SPH 1666' were on a par with check 'CSH 15R' however, at Rahuri and Tandur, SPH 1666 gave 17 and 19% higher grain yield than the check. Among the test varieties, SPV 2034 gave 18% and 5% higher grain yields over M 35-1 and CSV 22.

Table 1.1R-1 Grain and dry fodder yields (kg/ha) of promising rabi sorghum genotypes as influenced by different fertility levels

Treatment	Grain yield (Kg/ha)					Dry fodder yield (kg/ha)				
	Parbhani	*Rahuri*	*Dharwad*	*Tandur*	*Mean*	*Parbhani*	*Rahuri*	*Dharwad*	*Tandur*	*Mean*
Fertility levels										
Native fertility	1888	1827	1345	1507	1642	3884	4231	4767	3555	4109
50% RDF	2293	2140	1082	1904	1855	4854	4932	5747	3902	4859
100% RDF (60:30:0)	2745	2626	1193	2845	2353	6009	5880	5991	6666	6136
150% RDF	3134	2674	1238	3173	2555	7155	6215	6664	6798	6708
CD (P= 0.05)	61	433	101	151	554	197	1024	337	447	862
CV (%)	3.63	28.08	12.51	9.63	49.41	5.40	28.94	8.73	12.84	29.64
Genotypes										
SPH 1663	2258	2048	1252	2062	1905	4998	4325	5414	4743	4870
SPH 1666	2344	2041	1204	2307	1974	4814	4345	4855	5121	4784
SPV 2033	2352	2210	1178	2760	2125	5340	5243	6154	5765	5625
SPV 2034	2513	2774	1307	2356	2238	5761	6587	6713	5114	6044
SPV 2035	2646	2553	1119	2553	2218	6034	5757	6321	5903	6004
SPV 2049	2620	2279	1369	2432	2175	6234	5705	5684	5281	5726
CSH 15R	2692	2055	1149	1991	1972	5103	4376	5285	4150	4729
M 35-1	2498	2127	1168	2277	2018	4998	5044	6226	5396	5416
CSV 22	2715	2765	1183	2475	2285	5997	6448	5478	5601	5881
C.D. (5%)	199	276	111	288	162	431	539	440	601	448
C.V. (%)	9.71	14.61	11.16	15.00	11.02	9.65	12.43	9.31	14.09	11.71
Location mean	2515	2317	1214	2357	2101	5475	5315	5792	5230	5453

Table 1.1R -2. Phenology, yield components and economics of rabi sorghum as influenced by fertility levels and genotypes (Mean of 4 locations)

Treatment	Days to 50% flowering	Plant ht. (cm)	Number of panicles/m^2	Number of grains/panicle	100-seed wt (g)	Harvest index (%)	Net returns (Rs/ha)	B:C ratio
Fertility levels								
Native fertility	74	182	11.54	1174	3.35	28.73	55045	3.04
50% RDF	74	187	11.57	1380	3.48	27.18	64981	3.26

Treatment	Days to 50% flowering	Plant ht. (cm)	Number of panicles/m^2	Number of grains/panicle	100-seed wt (g)	Harvest index (%)	Net returns (Rs/ha)	B:C ratio
Fertility levels								
100% RDF (60:30:0)	75	190	11.89	1567	3.62	26.54	86893	4.20
150% RDF	76	196	12.01	1761	3.77	26.26	92552	4.31
CD (P= 0.05)	2	14	1.14	601	0.26	4.64	34815	1.48
Genotypes								
SPH 1663	74	180	11.67	1238	3.59	27.54	57833	2.96
SPH 1666	75	175	11.78	1478	3.41	28.85	59845	3.12
SPV 2033	77	193	11.72	1709	3.54	26.99	78384	4.06
SPV 2034	76	196	11.67	1600	3.52	26.28	92435	4.26
SPV 2035	75	201	11.89	1828	3.54	25.96	84012	4.11
SPV 2049	76	198	11.69	1267	3.52	27.02	81256	4.04
CSH 15R	73	181	11.81	1575	3.77	28.71	56995	2.87
M 35-1	74	187	11.72	1330	3.53	26.48	71849	3.67
CSV 22	74	187	11.83	1209	3.59	26.77	91198	4.24
CD (P= 0.05)	1	10	0.34	306	0.13	2.13	13696	0.35

1.2R. Response of promising pre-released sorghum genotypes to fertility levels under rainfed conditions (Shallow to medium soils)

The field experiment was conducted at Solapur to evaluate the response of pre-released sorghum genotypes (SPH 1663, SPH 1665, SPV 2029, SPV 2031, SPV 2034, SPV, 2048) to fertility levels. The checks were CSH-15R, M35-1, and Phule Mauli and P. Anuradha. Results (Table 1.2R) revealed that increasing fertility levels had no effect on grain yield, however, fodder yield improved significantly. There was 25.6% increase in stover yield due to RDF (2433 kg/ha) over control (1937 kg/ha). Both the test hybrids (SPH 1663 and SPH 1665) were on a par with check (CSH 15R) for grain and stover yields. Test variety SPV 2034 (528 kg/ha) was yielded significantly superior (32% higher) to P. Mauli (400 kg/ha). SPV 2034 (2491 kg/ha) and SPV 2048 (2630 kg/ha) were significantly superior to P. Anuradha for stover yields.

Conclusion: Test hybrids (SPH 1663 and SPH 1665) were on a par with check (CSH 15R) for grain and stover yields. Test variety SPV 2034 gave 32% higher yield than P. Mauli and SPV 2034 and SPV 2048 were superior to P. Anuradha for stover yields.

Table 1.2R. Yields and phenology of rabi sorghum as influenced by fertility levels and genotypes

Treatment	Grain yield (kg/ha)	Stover yield (kg/ha)	Days to 50% flowering	Plant ht (cm)	Harvest index (%)
Fertility levels					
Native fertility	602	1937	76	125	20.06
50% RDF	492	2233	75	113	14.54
100% RDF (40:20:0)	555	2433	74	123	15.00
150% RDF	480	2548	75	113	13.11
CD (P= 0.05)	150	576	2	20	2.84
Genotypes					
SPH 1663	641	2444	72	128	17.38
SPH 1665	638	2185	74	130	19.05
SPV 2029	422	2222	80	116	13.22
SPV 2031	462	1907	76	98	16.17
SPV 2034	528	2491	82	125	14.18
SPV, 2048	475	2630	83	116	13.08
CSH-15R	640	2120	67	120	17.87
M35-1	525	2583	74	119	13.97
Phule Mauli	400	2370	84	114	12.41
P. Anuradha	592	1926	60	119	19.48
CD (P= 0.05)	127	375	2	10	3.03

1.3R. Response of promising pre-released sorghum genotypes to fertility levels under irrigated conditions

The field experiment was conducted at Rahuri and Solapur to evaluate the response of pre-released rabi sorghum genotypes (SPH-1620, SPV-1830, SPV-1833,) to fertility levels. The checks were CSH-15R, M35-1, CSV-22. Results (Table 1.3R-1) revealed that response of increasing fertility levels to grain yield was significant up to RDF (80: 40 kg NP/ha) at Rahuri and up to 150% RDF at Solapur. Test hybrid 'SPH 1620' gave 17.6% higher grain yield at Rahuri (4011 kg/ha) and 13.7% higher at Solapur (2956 kg/ha) as compared to check 'CSH 15R' (3410 and 2600kg/ha). At both the locations, test varieties (SPV 1830 and SPV 1833) gave higher grain yields than checks M 35-1 and CSV 22. On mean basis, 'SPV 1830 yielded 54% more than M 35-1 and 19.5% higher than CSV 22. SPV 1833 (3813 kg/ha) yielded on a par with CSV 22 (3447 kg/ha) but significantly higher than M 35-1 (2669 kg/ha). SPH 1620 and SPV 1830 with 100% RDF were more promising.

Conclusion: Test hybrid 'SPH 1620' gave 17.6% higher grain yield at Rahuri (4011 kg/ha) and 13.7% higher at Solapur (2956 kg/ha) as compared to check 'CSH 15R' Test variety, 'SPV 1830 yielded 54% more than M 35-1 and 19.5% higher than CSV 22. Test hybrid SPH 1620 and variety SPV 1830 with 100% RDF were more promising.

Table 1.3R-1. Grain and dry fodder yields (kg/ha) of promising rabi sorghum genotypes as influenced by different fertility levels.

Treatment	Grain yield (kg/ha)			Dry fodder yield (kg/ha)		
	Rahuri	*Solapur*	*Mean*	*Rahuri*	*Solapur*	*Mean*
Fertility levels						
Native fertility	3280	2572	2926	7129	3454	5291
50% RDF	3546	2892	3219	7614	3654	5634
100% RDF (80:40:0)	4343	2944	3644	9775	4065	6920
150% RDF	4670	3137	3904	10454	3988	7221
CD (P= 0.05)	417	179	1029	959	554.4	3042
CV (%)	12.91	7.61	23.14	13.44	17.93	37.37
Genotypes						
SPH 1620	4011	2956	3484	8895	3389	6142
SPV 1830	4808	3434	4121	10244	4606	7425
SPV 1833	4408	3217	3813	10132	4824	7478
CSH 15R	3410	2600	3005	7469	2829	5149
M 35-1	2814	2523	2669	6071	3759	4915
CSV 22	4308	2587	3447	9645	3333	6489
CD (P= 0.05)	347	439	435.1	1302	391.7	1114
CV (%)	10.62	18.44	12.19	18.05	12.53	17.05
Location mean	3960	2886	3423	8743	3790	6267

2R. Enhancement of kharif-fallow rabi sorghum productivity through in-situ moisture conservation

Field experiments were conducted at four locations (Tandur, Solapur, Rahuri, Dharwad) to find out the effect of moisture conservation practices followed during kharif season on productivity of *rabi* sorghum. Results revealed that compartmental bunding during *kharif* season followed by flat sowing of rabi sorghum significantly improved the grain yields at all the centres except Solapur, where this treatment gave the lowest yield. On mean basis, Maximum grain yield was recorded under compartmental bunding (2609 kg/ka) which was 20.6% higher than that of flat sowing (2163 kg/ha) followed by in-situ mulching with *dhaincha* during *kharif* (2572 kg/ha). Tide ridging (2395 kg/ha) and opening furrows during *kharif* and flat sowing (2392 kg/ha) were the next best treatments. Almost similar trend was noticed with respect to stover yield (Table 2R.1). The compartmental bunding treatment also recorded maximum net returns (Rs 64,003/ha) and B:C ratio (3.98). The higher yields under compartmental bunding was due to higher soil moisture content at sowing (31.53%) and also at subsequent critical growth stages (Table 2R.3).

Conclusion: Compartmental bunding during *kharif* season followed by flat sowing of *rabi* sorghum was the most productive and cost-effective. It gave 20.6% higher grain yield than that of flat sowing, conserved more soil moisture and gave maximum net returns and B: ratio.

Table 2R.1. Effect of moisture conservation practices on grain and stover yields of rabi sorghum

Treatments	Grain yield (kg/ha)					Stover yield (kg/ha)				
	Rahuri	*Solapur*	*Dharwad*	*Tandur*	*Mean*	*Rahuri*	*Solapur*	*Dharwad*	*Tandur*	*Mean*
T1	3128	1152	3039	3114	2609	7441	2991	7691	6575	6175
T2	2847	1453	2994	2285	2395	6789	3380	8247	5585	6000
T3	2625	1368	2815	1845	2163	6270	3931	7222	4260	5421
T4	2395	1451	2893	2067	2201	5701	3479	7639	4742	5390
T5	2856	1537	3017	2879	2572	6827	4525	8351	6249	6488
T6	2866	1267	2987	2448	2392	6840	3148	7726	5683	5849
Mean	2786	1371	2957	2440	2389	6645	3576	7813	5516	5887
CD (P=0.05)	410	330	248	653	377	1526	718	808	828	818
CV (%)	9.8	16	5.6	17.8	10.5	15.2	13.3	6.9	10	9.2

T1: Compartmental bunding during *kharif* (3.60x3.60m2) and flat sowing
T2: Tide ridging during *kharif* at 3.60m and flat sowing during *rabi*
T3: Flat bed method sowing
T4: Flat bed sowing and opening furrows in alternate rows at 3 Week after sowing
T5: In-situ mulching with *dhaincha* during *kharif* and flat sowing at 45cm during *rabi*
T6: Opening furrows at 45cm during *kharif* and flat sowing at 45cm

Table 2R.2. Effect of moisture conservation practices on yield attributes and economics

Treatments	Panicles/m2	Grains/panicle*	100-seed wt (g)	HI (%)	Net returns (Rs/ha)	B:C ratio
T1	13.00	577	3.36	28.21	64003	3.98
T2	12.88	487	3.26	27.73	53324	3.53
T3	12.88	430	3.26	27.59	47211	3.38
T4	13.13	517	3.12	28.04	45995	3.23
T5	13.00	555	3.32	27.19	58264	3.64
T6	13.38	505	3.24	27.96	55345	3.66
CD (P=0.05)	1.39	82	0.20	1.72	12413	0.32
CV (%)	12.26	10.7	2.51	4.12	8.9	3.55

**Tandur*

Table 2R.3. Effect of moisture conservation practices on soil moisture content (at Tandur)

Treatments	Soil moisture content (%)						
	At sowing	*At 35 DAS*		*At 55DAS*		*At 75 DAS*	
	(0-15 cm soil depth)	*0-15 cm*	*15-30 cm*	*0-15 cm*	*15-30 cm*	*0-15 cm*	*15-30 cm*
T1	31.53	22.93	29.88	21.43	26.90	15.03	22.23
T2	29.05	19.80	28.10	18.33	24.78	14.93	20.10
T3	28.00	18.70	26.68	17.25	23.90	13.85	19.23
T4	28.85	19.55	28.10	18.10	24.58	14.70	19.83
T5	30.93	22.18	28.70	20.73	26.05	14.33	21.35
T6	29.80	20.88	27.98	19.43	25.30	14.03	20.53
CD (P=0.05)	0.94	0.70	1.06	0.65	1.00	0.92	1.59
CV (%)	2.11	2.24	2.48	2.24	2.63	4.21	5.13

3R. Integrated Nutrient Management in rabi sorghum

Field experiments were conducted at Parbhani, Dharwad and Tandur to see the effect of integrated nutrient management on productivity of rabi sorghum. Main plot treatments consisted of 3 green manuring along with fallow were imposed during kharif season and 4 nitrogen levels (0, 20, 40, 60 kg/ha) along with recommended P and K during rabi sorghum (Table 3R.1). Results revealed that at parbhani and Tandur rabi sorghum sown after incorporation of kharif Dhaincha gave the highest grain yield (2907 and 2476) kg/ha and was at par with greengram at Dharwad. On mean basis, rabi sorghum after incorporation of Dhaincha gave 37% higher grain yield (2634 kg/ha) than that of kharif fallow (1918 kg/ha).Similar trend was observed with respect to stover yield. Response of N was significant up to 60 kg/ha at all the locations except Dharwad, where significant response was observed up to 40 kg/ha. The interaction effect of preceding crops and n level was significant at Dharwad (Table 3R.2). There was no response of application of N in rabi sorghum grown after *Dhaincha* incorporation or poor response after Greengram, where as it responded up to 60 kg N/ha incase of cowpea and kharif fallow.

Conclusion: Green manurig with Dhaincha gave 37% higher grain yield (2634 kg/ha) of rabi sorghum than that sown after kharif fallow (1918 kg/ha).

Table 3R.1. Effect of INM on grain and stover yields of rabi sorghum

Treatments	Grain yield (kg/ha)				Stover yield (kg/ha)			
	Parbhani	*Dharwad*	*Tandur*	*Mean*	*Parbhani*	*Dharwad*	*Tandur*	*Mean*
Kharif season (main plots)								
Cowpea fodder-rabi sorghum	1927	2346	2167	2147	3751	7744	3681	5059
Greengram/blackgram-rabi sorghum	2449	2679	2044	2391	4004	8207	3564	5258
Dhaincha-rabi sorghum	2907	2518	2476	2634	4877	8025	4179	5693
Fallow-rabi sorghum	1532	2355	1868	1918	3346	7948	3678	4990
CD (P=0.05)	153	64	291	575	186	813	283	679
Rabi season (N levels (kg/ha)								
0	1586	2416	1465	1822	3351	7807	2993	4717
20	1894	2458	1927	2093	3651	8403	3587	5214
40	2375	2490	2365	2410	4156	7842	4105	5368
60	2960	2535	2799	2764	4819	7870	4416	5702
CD (P=0.05)	193	65	362	291	267	478	417	552
CD (P=0.05)	G=64	N=65	GxN=130					

Table 3R.2. Interaction effect of kharif crops (Green manures) and N levels on grain yield at Dharwad

N-levels (kg/ha in rabi)	Kharif crops (Green manures)				
	Cowpea	*Greengram*	*Dhaincha*	*Fallow*	*Mean*
0	2177	2684	2644	2158	2416
20	2399	2648	2475	2308	2458
40	2344	2639	2573	2403	2490
60	2463	2744	2380	2552	2535
Mean	2346	2679	2518	2355	
CD (P=0.05)	G=64	N=65	GxN=130		

4R. Scheduling of irrigation in rabi sorghum

Field experiments were conducted at Solapur and Tandur to find out critical stages of rabi sorghum for irrigation with respect to water availability. Results revealed that 3 irrigations each at 35, 55 and 75 days after sowing (T4) gave the maximum grain (3663 kg/ha) at both the locations (Table 4R.1). In case of only one irrigation, it should be given either at 55 DAS (1950 kg/ha), though it was on a par with that of 35 DAS (1733 kg/ha).In case of 2 irrigations, it should be applied at 55 and 75 DAS (3137 kg/ha) than that of applying at 35 and 55 DAS (2423 kg/ha) and 35 and 75 DAS (2196 kg/ha).

Conclusion: For maximum yield of rabi sorghum, it should be irrigated thrice at 35, 55 and 75 days after sowing. However, in case of 2 irrigations, it should be given at 55 and 75 DAS and if only one irrigation is available, it should be given at 55 DAS.

Table 4R.1. Effect of number of irrigations and stages on yields, yield attributes and economics.

Treatments	Grain yield (kg/ha)			Stover yield (kg/ha)			Plant height (cm)	Grains/ panicle	100 seed wt (g)	HI (%)	Net returns (Rs/ha)	B:C ratio
	Solapur	*Tandur*	*Mean*	*Solapur*	*Tandur*	*Mean*						
T1	1517	1949	1733	7387	3540	5463	163	512	3.62	25.15	39505	2.90
T2	1646	2254	1950	4198	3878	4038	173	529	3.68	30.40	47380	3.48
T3	2277	2569	2423	6626	4240	5433	189	534	3.75	29.65	54549	3.74
T4	3951	3375	3663	5597	4417	5007	198	579	3.96	39.75	72879	4.67
T5	1580	2811	2196	8107	4209	6158	158	537	3.77	27.23	60180	4.12
T6	3195	3079	3137	4403	4026	4214	183	553	3.82	40.13	66096	4.53
T7	1158	1147	1153	5206	2889	4048	136	449	3.31	22.40	20305	1.61
CD (P=0.05)	1093	338		827	657	2584	50	49	0.18	12.14	9077	0.65
C V (%)	28.1	7.8		7.8	9.5	21.5	11.9	5.2	2.69	16.18	9.9	10.18

T1-One irrigation at 35 DAS (Flower primodia initiation stage); T2- One irrigation at 55 DAS (flag-leaf or boot stage)
T3-Two irrigations each at 35 and 55 DAS; T4- Three irrigations each at 35, 55 and 75 (flowering stage) DAS
T5-Two irrigations each at 35 and 75 DAS; T6-Two irrigation each at 55 and 75 DAS; T7-Control (rainfed)

5R. Effect of INM practices of kharif sorghum on yield of subsequent chickpea in sorghum-chickpea system

Chickpea was grown with recommended package of practice to see the carryover effect of the treatments applied to preceding sorghum crop. Results revealed that addition of nutrients through different organic sources in kharif sorghum did not influence the grain yield of subsequent chickpea crop (Table 5R.1). However, addition of 100% RDF through inorganic fertilizers (1882 kg/ha) being on a par with 75% RDF (1624 kg/ha) significantly increased the seed yield of subsequent chickpea crop as compared to control (1233 kg/ha). On mean basis, the interaction effect on grain yield was not significant. But the maximum chickpea yield (2004 kg/ha) was recorded with application of FYM 2.5t + vermin-compost 1.25 t/ha in combination with 100%RDF to preceding sorghum. However, at Dharwad and Indore, maximum chickpea yield was recorded with FYM 5t/ha in combination with 100%RDF.

Conclusion: Maximum chickpea yield (2004 kg/ha) was recorded with application of FYM 2.5t + vermin-compost 1.25 t/ha in combination with 100%RDF to preceding sorghum

Table 5R-1. Interaction effect of organic sources and inorganic fertilizer doses on grain yield (mean of Parbhani, Dharwad, and Indore)

Treatments	Organic sources				
Inorganic sources	*FYM 5t/ha*	*Vermicompost 2.5 t/ha*	*FYM 2.5t + vermicompost 1.25 t/ha*	*Control*	*Mean*
Control	1118	1212	1336	1233	1225
50%RDF	1209	1290	1506	1366	1343
75%RDF	1438	1472	1684	1624	1555
100%RDF	1568	1575	2004	1882	1757
Mean	1333	1387	1632	1526	
CD (P=0.05) for Organic sources	667		CD (P=0.05) for Inorganic sources	303	
C.D. (P=0.05) AiBi-AiBj	NS		C.D. (P=0.05) AiBi-AjBi	NS	