

Sorghum agronomy research (Rabi 2013-14)

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Executive summary

Field experiments were conducted during rabi 2013-14 at different AICSIP centres to evaluate advance sorghum genotypes for fertility response and to develop agronomic practices for higher sorghum productivity and profitability.

1R. Evaluation of advanced sorghum genotypes to fertility levels

Test hybrid 'SPH 1721' was significantly superior to check CSH 15R at Rahuri and Tandur with 17.46 and 34.97% increase in grain yield, and was on a par at Parbhani and Dharwad. Test variety 'SPV 2144' was significantly superior to M 35-1 (15.98% increase) and CSV 29R (52.4% increase) at Rahuri, and to CSV 22R (8.6% increase) and M35-1 (41.07% increase) at Tandur.

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 produced 36.6% higher grain yield and conserved more soil moisture than that of flat sowing; and gave the highest net returns (Rs 65811/ha) and B: ratio (3.13).

3R. Integrated nutrient management in rabi sorghum

Inclusion of *Dhaincha* or greengram (after pod harvest) as green manure and application of 40 kg N/ha enhanced the productivity and profitability of succeeding rabi sorghum.

4R. Assessing the performance of sorghum genotypes with increased sowing window

Interaction effect between dates of planting and cultivars indicated that the performance of cultivars varies with dates of planting at different locations. At Parbhani, crop should be sown during first week -3rd week of October whereas at Rahuri 3rd week of Sep sowing was found. At Dharwad, first week of October was the optimum for *rabi* sorghum planting.

5R. Evaluation of plantozyme and plantogranules in *rabi* sorghum

Foliar spraying of plantozyme @2ml/l water at 35 and 60 days after sowing significantly increased (20% increase) the grain yield of *rabi* sorghum compared to RDF alone.

Detailed report

Agro-climatic situation at different AICSIP centers

Rabi sorghum productivity mainly depends on rainfall received and conserved during preceding *Kharif* season. The total rainfall received during July 2013 to Feb. 2014 ranged from 404 at Rahuri to 695 mm at Hyderabad (Fig 1). However, the rainfall distribution varied at different location (Fig 2). At most of the Centres, rainfall received during September and October was adequate for germination and early crop establishment. However, moisture stress and cold at reproductive phase resulted in poor grain yield, especially at Bijapur and Solapur. There was no rainfall after first week of October at Bijapur and the crop faced severe drought. Hailstorm during maturity stage in Maharashtra caused severe damage to *Rabi* sorghum crop at Parbhani and adjoining areas.

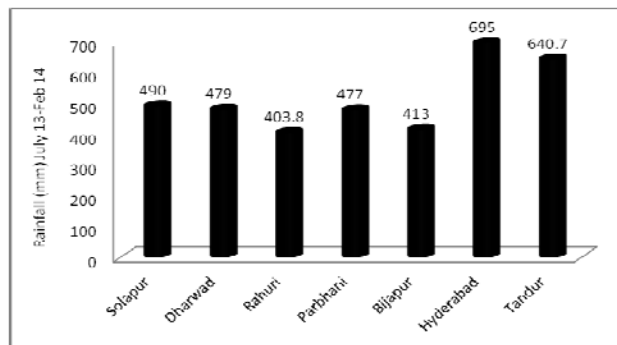


Fig 1. Total rainfall (mm) received during July 2013-Feb 2014 at various AICSIP centres

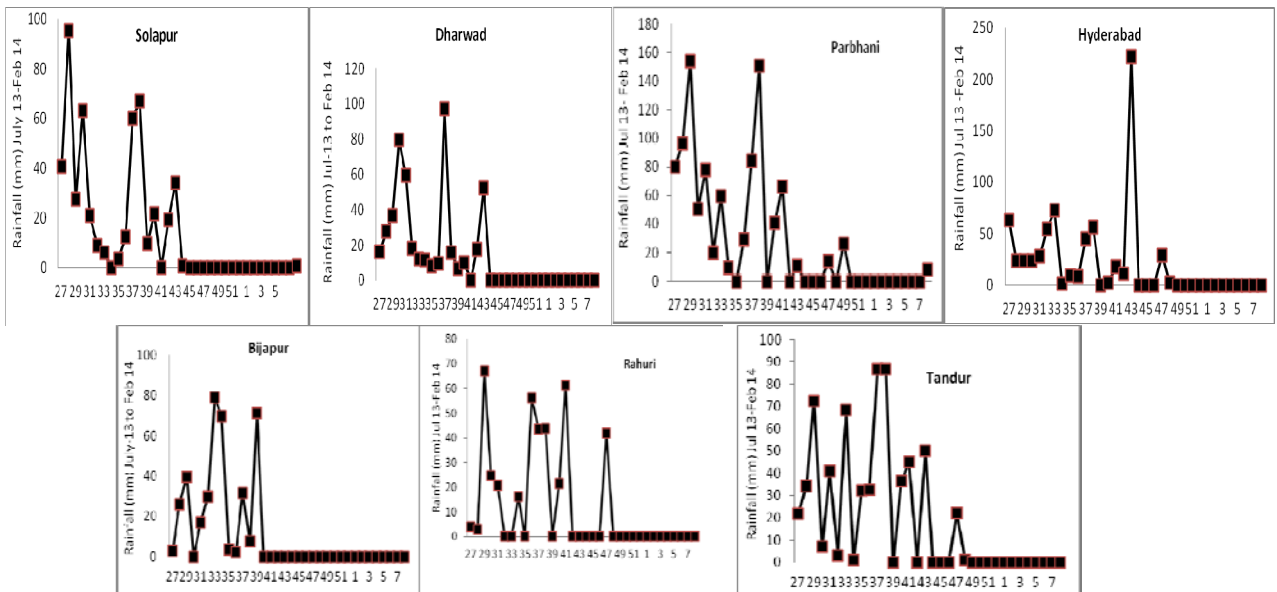


Fig 2. Rainfall distribution during *rabi* season at different Centres

Experimental results

1R. Evaluation of advanced sorghum genotypes to fertility levels

Field experiments were conducted at Parbhani, Rahuri, Dharwad, Solapur and Tandur to evaluate the response of advanced sorghum genotypes to fertility levels. Results revealed that the grain yield varied with locations (Table 1R-1). Yield levels at Parbhani and Dharwad were similar (2603-2650 kg/ha) followed by Rahuri and Tandur (2281-2361 kg/ha) and the lowest at Solapur (932 kg/ha). Increasing fertility levels increased the grain yield by 17.37, 26.06, 1752 and 58.69%, respectively at Parbhani, Rahuri, Dharwad and Tandur, whereas at Solapur, the differences were not significant. Test hybrid 'SPH 1721' was significantly superior to Check CSH 15R at Rahuri and Tandur with 17.46 and 34.97% increase in grain yield, and was on a par at Parbhani and Dharwad. Test variety 'SPV 2144' was significantly superior to M 35-1 (15.98% increase) and CSV 29R (52.4% increase) at Rahuri, and to CSV 22R (8.6% increase) and M35-1 (41.07% increase) at Tandur. Interaction between genotypes and fertility levels were not significant. On Location mean basis, test hybrid 'SPH 1721' showed 10.52% increase in grain yield over CSH 15R, whereas test variety 'SPV 2144' yielded on a par with checks (Table 1R-2). Test hybrid (195 cm) was significantly taller than the check (182 cm). Test hybrid and variety was more remunerative than the respective checks.

Conclusion: Test hybrid 'SPH 1721' was significantly superior to check CSH 15R at Rahuri and Tandur with 17.46 and 34.97% increase in grain yield, and was on a par at Parbhani and Dharwad. Test variety 'SPV 2144' was significantly superior to M 35-1 (15.98% increase) and CSV 29R (52.4% increase) at Rahuri, and to CSV 22R (8.6% increase) and M35-1 (41.07% increase) at Tandur.

Table. 1R-1. Effect of fertility levels and genotypes on grain yield (kg/ha) at different locations

Treatment	Parbhani	Rahuri	Solapur	Dharwad	Tandur
Fertility levels					
50% RDF	2481	2068	819	2409	1767
75% RDF	2415	2407	1002	2709	2272
100%RDF	2912	2607	974	2831	2804
LSD (P=0.05)	293	245	NS	160	136
Genotypes					
SPH 1721	2588	2745	918	2665	2640
SPV 2144	2665	2606	869	2385	2504
CSH 15R	2775	2337	768	2617	1956
CSV 22R	2737	2520	1150	2341	2307
M 35-1	2399	2247	1144	3331	1775
CSV 29R	2450	1710	741	2558	2503
Location mean	2603	2361	932	2650	2281
LSD (P=0.05)	414	346	442	226	192
C.V. (%)	16.62	15.31	49.49	8.92	8.77

Table 1R-2. Effect of fertility levels and genotypes on grain and stover yields, growth and yield attributes and economics (mean of 5 locations)

Treatment	Grain yield (kg/ha)	Stover yield (kg/ha)	Plant ht (cm)	Days to 50% flowering	Days to maturity	100-seed weight (g)	HI (%)	Net Returns (Rs/ha)	B:C ratio
Fertility levels									
50% RDF	1909	5484	189	70	108	3.11	28.19	33561	1.97
75% RDF	2161	6305	196	71	110	3.23	27.94	42006	2.33
100%RDF	2426	6665	200	71	110	3.23	28.52	50453	2.65
LSD (P=0.05)	194	572	6	1	2	0.12	2.54	5591	0.25
Genotypes									
SPH 1721	2311	5646	195	69	110	3.20	32.52	44384	2.44
SPV 2144	2206	6515	198	73	111	3.22	26.73	47212	2.56
CSH 15R	2091	5696	182	70	108	3.29	29.90	37974	2.11
CSV 22R	2211	6493	205	73	108	3.02	26.96	42813	2.36
M 35-1	2179	6398	190	70	108	3.22	26.95	40741	2.18
CSV 29R	1992	6159	201	72	110	3.18	26.23	38916	2.24
LSD (P=0.05)	274	808	9	2	2	0.17	3.59	7906	0.36
C.V. (%)	17.37	18.03	6.17	3.67	2.75	7.45	17.44	22.96	18.9

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

Field experiments were conducted (Rahuri, Dharwad and Tandur) to find out the effect of moisture conservation practices followed during *kharif* season on the 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 locations (Table 1R.1). On mean basis, Maximum grain yield was recorded under compartmental bunding (3315 kg/ha) which was 36.59% higher than that of flat sowing (2464 kg/ha). Similar trend was observed with respect to stover yield. The compartmental bunding treatment produced taller plants, maximum number of grains/panicle, HI, and 100-seed weight compared to other methods of moisture conservation and flat sowing (1R.2). The net returns (Rs 65,811/ha) and B:C ratio (3.13) were also higher under compartmental bunding treatment. The higher yields under compartmental bunding was due to higher soil moisture content at sowing (28.3%) and also at subsequent critical growth stages (Table 1R.3).

Conclusion: Compartmental bunding during *kharif* season followed by flat sowing of *rabi* sorghum was the most productive and cost-effective. It produced 36.6% higher grain yield and conserved more soil moisture than that of flat sowing; and gave the highest net returns (Rs 65811/ha) and B: ratio (3.13).

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

Treatments	Grain yield (kg/ha)				Stover yield (kg/ha)			
	Rahuri	Dharwad	Tandur	Mean	Rahuri	Dharwad	Tandur	Mean
T1	2832	3488	3624	3315	7585	9219	7083	7962
T2	2205	3222	2967	2798	5773	9531	6583	7296
T3	2041	2776	2464	2427	5020	8170	5218	6136
T4	2433	2790	2617	2613	6455	7448	5843	6582
T5	1936	2988	3190	2705	4774	8391	6837	6667
T6	1738	3099	2925	2588	4154	8540	6136	6277
Mean	2198	3060	2965	2741	5627	8550	6283	6820
CD (P=0.05)	582	144	642	436	1628	473	713	1393
CV (%)	17.6	3.1	14.4	8.7	19.2	3.7	7.5	11.2

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 3Week 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 1R.2. Effect of moisture conservation practices on yield attributes and economics (mean of 3 loc.)

Treatments	Plant height (cm)	Grains/panicle*	100-seed wt (g)	HI (%)	Net returns (Rs/ha)	B:C ratio
T1	274	597	3.63	36.17	65811	3.13
T2	263	533	3.51	33.67	55847	2.74
T3	212	468	3.43	33.59	44478	2.45
T4	250	487	3.46	34.95	45287	2.49
T5	263	557	3.52	34.05	54571	2.52
T6	250	513	3.44	34.18	52991	2.58
CD (P=0.05)	41	47	0.12	2.01	11761	0.42
CV (%)	9.0	5.9	1.93	3.20	8.6	8.8

*Tandur

Table 1R.3. Effect of moisture conservation practices on soil moisture content (mean of Tandur & Dharwad)

Treatments	Soil moisture content (%)						
	At sowing	At 35 DAS*		At 55DAS*		At 75 DAS	
	(0-30 cm soil depth)	0-15 cm	15-30 cm	0-15 cm	15-30 cm	0-15 cm	15-30 cm
T1	28.3	23.6	28.8	20.8	26.5	13.0	18.6
T2	26.3	22.6	27.6	19.3	25.3	12.3	17.3
T3	23.6	19.7	25.7	16.7	22.4	11.2	15.2
T4	25.8	21.3	26.4	18.1	23.7	11.8	15.9
T5	27.1	23.1	28.1	19.7	25.8	12.8	18.3
T6	26.3	22.2	27.2	18.8	24.6	12.3	17.2
CD (P=0.05)	0.90	1.30	0.70	0.90	0.80	0.80	0.70
CV (%)	2.03	2.22	1.72	3.2	2.21	7.35	7.86

*Tandur

3R. Integrated Nutrient Management in rabi sorghum

To improve the productivity and N-use efficiency of *rabi* sorghum, field experiments were conducted at Dharwad and Tandur on integrated nutrient management. Main plot treatments consisted of 2 green manuring (*Dhaincha* and Greengram/blackgram), cowpea as fodder and *Kharif* 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 *rabi* sorghum grown after incorporation of *kharif Dhaincha* gave the highest grain yield at and Tandur (3100 kg/ha), whereas at Dharwad, incorporation of greengram was the best (3502 kg/ha). On mean basis, *rabi* sorghum after incorporation of *Dhaincha* produced 21.8% higher grain yield (3230 kg/ha) than that of *kharif* fallow (2651kg/ha). Similar trend was observed with respect to stover yield. Response of N was significant up to 60 kg/ha at Tandur, however, at Dharwad, significant response was up to 40 kg N/ha. On location mean basis, significant response of N was noticed up to 40 kg N/ha. The interaction effect of preceding crops and N level was found to be non significant.

Conclusion: Inclusion of *Dhaincha* or greengram (after pod harvest) as green manure and application of 40 kg N/ha enhanced the productivity and profitability of succeeding *rabi* sorghum.

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

Treatments	Grain yield (kg/ha)			Stover yield (kg/ha)		
	Dharwad	Tandur	Mean	Dharwad	Tandur	Mean
Kharif season (main plots)						
Cowpea fodder- <i>rabi</i> sorghum	3001	2735	2868	7873	4659	6266
Greengram/blackgram- <i>rabi</i> sorghum	3502	2565	3034	8351	4440	6396
<i>Dhaincha-rabi</i> sorghum	3359	3100	3230	8164	5084	6624
Fallow- <i>rabi</i> sorghum	3300	2001	2651	8243	3753	5998
CD (P=0.05)	220	257	NS	286	385	1473
Rabi season (N levels (kg/ha))						
0	2917	1929	2423	7321	3619	5470
20	3152	2272	2712	7938	4239	6089
40	3506	2941	3223	8444	4706	6575
60	3588	3260	3424	8928	5372	7150
CD (P=0.05)	171	280	259	326	319	300

Table 3R.2. Effect of moisture conservation practices on yield attributes and economics (mean of 2 loc.)

Treatments	Plant height (cm)	Grains/p anicle*	100-seed wt (g)	HI (%)	Net returns (Rs/ha)	B:C ratio
Kharif season (main plots)						
Cowpea fodder- <i>rabi</i> sorghum	248	580	3.58	37.56	53281	3.60
Greengram/blackgram- <i>rabi</i> sorghum	244	520	3.60	39.32	55868	3.67
<i>Dhaincha-rabi</i> sorghum	252	603	3.73	39.42	60629	3.75
Fallow- <i>rabi</i> sorghum	236	525	3.57	36.91	46869	3.21
CD (P=0.05)	31	29	NS	NS	NS	NS

Treatments	Plant height (cm)	Grains/p anicle*	100-seed wt (g)	HI (%)	Net returns (Rs/ha)	B:C ratio
Rabi season (N levels (kg/ha))						
0	234	490	3.55	37.10	41037	2.77
20	239	544	3.59	37.11	48580	3.23
40	250	582	3.66	40.00	60720	3.95
60	255	613	3.69	39.00	66310	4.28
CD (P=0.05)	13	31	0.05	1.73	8198	0.64

*Tandur

4R. Assessing the performance of sorghum genotypes with increased sowing window

Field experiments were conducted at Parbhani, Rahuri and Dharwad to evaluate the relative performance of 5 sorghum cultivars with varying sowing dates (1st week of Sep, 3rd week of Sep, 1st week of Oct, 3rd week of Oct and 1st week of Nov.) (Table 4R-1). Results revealed that on location mean basis, sowing of *rabi* sorghum during 1st week of Oct recorded the maximum grain yield (2911 kg/ha) followed by 3rd week of Oct (2502 kg/ha) and 3rd week of Sep (2490 kg/ha), both dates were on a par with each other. Among the genotypes, CSH 15R at Parbhani, Phule Revati at Rahuri and CSV 22 at Dharwad produced the maximum yields. Interaction effect between planting dates and genotypes for grain yield was found significant at Dharwad. First week of October was optimum for sowing at Parbhani and Dharwad and first week of September at Rahuri. Maximum net returns (Rs. 50,701/ha) was obtained with planting *rabi* sorghum cultivar P. Revati during 1st week of October.

Conclusion: Interaction effect between dates of planting and cultivars indicated that the performance of cultivars varies with dates of planting at different locations. At Parbhani, crop should be sown during first week -3rd week of October whereas at Rahuri 3rd week of Sep sowing was found. At Dharwad, first week of October was the optimum for *rabi* sorghum planting.

Table 4R-1. Interaction effect of dates of planting and sorghum cultivars on grain yield

Treatments	Dates of planting					
	1 st week of Sep	3 rd week of Sep	1 st week of Oct	3 rd week of Oct	1 st week of Nov	Mean
PARBHANI						
Cultivars						
CSH 15R	1652	2175	3028	2450	1290	2119
CSV 22	1399	2016	2535	2406	1159	1903
P. Anuradha	1074	1519	2387	2116	1304	1680
P. Vasudha	1382	2232	1940	2115	973	1728
P. Revati	1545	2409	2482	2445	1254	2027
Mean	1410	2070	2475	2306	1196	
CD (P=0.05)	Dates (D)=235	Cultivars (C)=235	D x C=NS			
RAHURI						
CSH 15R	3084	2775	2621	2466	2251	2639
CSV 22	3595	3236	3057	2877	2625	3078
P. Anuradha	2817	2535	2394	2254	2057	2411
P. Vasudha	3869	3482	3289	3095	2824	3312
P. Revati	4161	3745	3537	3329	3038	3562
Mean	3505	3155	2979	2804	2559	
CD (P=0.05)	Dates (D)=287	Cultivars (C)=287	D x C=NS			
DHARWAD						
CSH 15R	1759	2330	3086	2130	1404	2142
CSV 22	1782	2515	3333	2469	1991	2418
P. Anuradha	1296	1682	3356	2176	1721	2046
P. Vasudha	1420	2608	3310	2685	1520	2309
P. Revati	1466	2091	3310	2523	1806	2239
Mean	1542	2245	3279	2397	1688	
CD (P=0.05)	Dates (D)=72	Cultivars (C)=72	D x C=162			

5R. Evaluation of plantozyme and plantogranules in rabi sorghum

Field experiments were conducted at Rahuri, Tandur, Dharwad, Hyderabad and Bijapur to evaluate the effect of plantozyme and plantogranules (bacterial and algal extracts) on productivity of rainfed rabi sorghum. These compounds were applied as soil application, foliar spray and seed treatment. Results revealed that application of these compounds along with RDF improved the grain yield of rabi sorghum. However, the response varied at different locations (Table 5R-1). On location mean basis, foliar spraying of plantozyme @2ml/l water at 35 and 60 days after sowing (2798 kg/ha) being on a par with seed treatment with plantozyme (2748 kg/ha), foliar spray at 35 DAS (2675 kg/ha), soil application of plantogranules (2636 kg/ha) significantly increased (20% increase) the grain yield of rabi sorghum compared to RDF alone (2332 kg/ha). Compared to RDF alone, maximum response (30% increases) was observed at Tandur followed by Dharwad (19.5%) with seed treatment.

Conclusion: Foliar spraying of plantozyme @2ml/l water at 35 and 60 days after sowing significantly increased (20% increase) the grain yield of *rabi* sorghum compared to RDF alone.

Table 5R. Effect of plantozyme and plantogranules on grain and stover yields of rabi sorghum

Treatments	Grain yield (kg/ha)					
	Rahuri	Dharwad	Bijapur	Tandur	Hyderabad	Mean
RDF (60:30 NP kg/ha) + plantogranules @ 20 kg/ha	2537	3096	1827	3082	2546	2636
RDF (60:30 NP kg/ha) + plantozyme spraying @ 2 ml/lit. water at 35 DAS	2902	3008	1812	2977	1841	2675
RDF (60:30 NP kg/ha) + plantozyme spraying @ 2 ml/lit. water at 60 DAS	2802	2833	1610	2536	2066	2445
RDF (60:30 NP kg/ha) + plantozyme spraying @ 2 ml/lit. water at 35 and 60 DAS	3031	3222	2020	2918	1982	2798
RDF (60:30 NP kg/ha) + plantozyme @ 2 ml/lit. water as seed treatment	2664	3393	1674	3262	1394	2748
RDF alone	2415	2838	1570	2506	1822	2332
Location mean	2725	3065	1752	2880	1942	2606
CD (P=0.05)	344	279	432	476	-	261

Annexure I: Physico-chemical properties of soils at different centers

S.No	Particulars	Rahuri	Bijapur	Dharwad	Parbhani	Solapur	Tandur
1	Soil texture	Fine	Clay	Medium deep black (Clay)	Medium black (Clay loam)	Shallow and medium	Clay loam
2	Soil depth (cm)	60		Deep	30-45	30-75	100
3	Soil pH value (1:2.5 soils: water)	8.37	8.3	7.8	8.26	8.61	6.5
4	Field capacity (%)	35-37		32			38
5	Wilting point (%)	14-16.5	18	15			17
6	Bulk density(g/cc)	1.49		1.31			
7	EC (1:2.5 soils: water) (d/Sm)	0.30	0.20		0.26		
8	Soil organic carbon (%)	0.50	0.50	0.57			
9	Available Nitrogen (kg/ha):	163	187	194.8	138	181	225
10	Available P ₂ O ₅ (kg/ha)	15.0	27	33.5	10.26	23	20-25
11	Available K ₂ O (kg/ha)	706	410	454.2	445	295	350
12	Available Fe (ppm)					3.72	
13	Available Zn (ppm)					0.44	
14	Available Mn (ppm)					18.15	
15	Available Cu (ppm)					1.28	

Annexure II: Weekly weather data at different centres

Solapur :Lat: 17°04' N Long:75°54' E: Altitude: 476.5 m above MSL								Dharwad						
Std week	Dates	Rainy days	Rain fall (mm)	RH (%)		Temperature (°C)		Solar radiation	Rainy days	Rain fall (mm)	Temperature (°C)		RH (%)	
				AM	PM	Max	Min				Max.	Min.	AM	PM
27	Jul 02-08	4	40.6	59	85	32.6	21.6		2	16.2	26.65	20.57	94.71	74.42
28	09-15	4	95.2	70	89	29.1	20.9		4	27.8	25.47	20.25	94.57	81.00
29	16-22	2	27.2	82	94	27.4	20.9		3	36.8	25.65	20.71	36.80	94.57
30	23-29	2	63.0	65	87	29.9	21.1		6	79.6	23.94	20.08	95.42	87.85
31	30-05Aug	1	20.8	68	89	29.3	20.7		6	59.6	24.98	20.11	94.57	84.85
32	Aug 6-12	2	8.8	58	86	31.1	20.7		1	18.4	27.20	19.97	93.71	78.28
33	13-19	1	6.0	62	87	30.4	21.3		1	12	26.30	20.48	94.71	79.00
34	20-26	0	0.0	50	82	32.1	20.5		3	11.6	26.25	19.52	91.85	78.85
35	27-02	1	3.6	45	83	33.3	21.1		-	8	26.64	19.85	93.03	77.06
36	Sep 3-9	2	12.4	44	84	34.6	21.3		2	9.4	28.55	20.00	93.71	73.14
37	10-16	5	59.8	69	95	31.8	21.0		6	97	27.97	20.97	94.85	72.85
38	Sep17-23	5	67.2	65	93	30.9	20.7		3	15.8	27.15	20.38	95.14	75.42
39	24-30	1	9.4	54	88	32.3	20.1		1	6.4	26.47	19.74	93.71	76.57
40	Oct 01-07	1	21.8	54	87	32.1	21.4		1	10.2	27.47	19.98	92.71	73.00
41	08-14	0	0.0	51	87	32.6	20.9		-	-	29.24	19.37	92.71	59.14
42	15-21	1	19.0	42	84	33.0	19.6		1	17.6	30.32	19.41	90.40	50.14
43	22-28	3	34.2	73	87	30.7	20.6		4	52.6	27.84	29.02	92.42	73.14
44	29-04 Nov	0	0.4	41	81	32.4	19.0		0	0	29.28	17.74	86.57	49.57
45	Nov 5-11	0	0.0	41	81	31.3	16.6		0	0	28.81	15.78	85.71	51.00
46	12-18	0	0.0	33	74	30.5	13.5		0	0	28.00	14.02	72.85	49.85
47	19-25	0	0.0	39	78	30.5	13.7		0	0	29.38	15.24	72.28	39.85
48	26-2 Dec	0	0.0	39	78	31.0	14.1		0	0	29.62	17.54	85.57	49.71
49	Dec. 3-9	0	0.0	40	73	31.2	13.1		0	0	28.54	13.25	74.14	36.28
50	10-16	0	0.0	28	77	32.6	15.8		0	0	28.68	11.71	59.71	28.71
51	17-23	0	0.0	28	70	31.5	14.4		0	0	28.30	11.17	66.42	28.42
52	24-31	0	0.0	32	72	31.0	13.4		0	0	28.05	13.01	76.00	37.14
1	Jan, 1-7	0	0.0	28	69	33.5	16.4		0	0	28.9	13.2	77.6	35.3
2	8-14	0	0.0	27	68	31.2	13.4		0	0	30.4	14.3	71.3	32.1
3	15-21	0	0.0	28	66	33.1	13.4		0	0	30.3	15.8	74.1	45.4
4	22-28	0	0.0	32	67	32.2	17.2		0	0	28.7	15.5	68.3	33.8
5	29-4	0	0.0	30	75	32.3	18.2		0	0	29.1	14.7	64.8	30.7
6	Feb , 5-11	0	0.0	33	68	35.2	19.1		0	0	32.6	15.2	45.7	18.7
7	12-18	0	0.0	27	64	31.8	20.2		0	0	29.4	14.8	60.1	31.4
8	19-25	0	0.6	26	65	34.8	17.6		0	0	31.5	17.6	69.3	29.0
Total		35	490						44	479				

Rahuri : Latitude :19°24 N ; Longitude :74°39 E ; Ailtitude : 657 mts. (above MSL)										Parbhani: Lat 19°08'N; Long 76, 50°E					
Std week	Dates	Rainy days	Rain fall (mm)	RH (%)		Temperature (°C)		Sunshine (hrs)	Evap. (mm)	Rainy days	Rain fall (mm)	Temperature (°C)		RH (%)	
				AM	PM	Max	Min					Max.	Min.	AM	PM
27	Jul 02-08	1	4	77.7	61.1	31.4	23.1	3.4	5.1		80.1	32.1	22.6	92	62
28	09-15	1	3	78.1	69.1	29.9	22.7	1.2	4.5		96.4	29.2	22.7	90	79
29	16-22	4	67.2	90.3	85.3	25.8	21.9	0.3	2.1		154	26.7	22	93	84
30	23-29	2	24.6	84.1	66.7	29	22.6	2.3	4.4		50.5	29.4	22.6	86	65
31	30-05Aug	2	20.6	81	70.6	28.2	21.9	3	4.1		77.5	28.3	21.8	91	75
32	Aug 6-12	0	0	78.7	64	29.7	21.9	2.5	4.3		19.7	29.8	22.5	89	67
33	13-19	0	0	78.1	59	30.2	22.1	3.3	4.3		59.8	30.5	22.7	91	65
34	20-26	1	16.2	78.7	63.9	29.2	21.8	4.3	5.6		9.3	28.5	21.7	89	71
35	27-02	0	0	78.3	50	31.5	20.4	5.9	5.9		0	31.0	22.9	82	59
36	Sep 3-9	1	56.2	79.3	49.9	32.3	19.7	6.8	5.8		29.1	33.8	22.6	85	61
37	10-16	5	43.6	81.7	60.1	31.4	22	5.8	3.8		84.5	32.0	22.2	92	63
38	Sep17-23	2	43.8	83.7	60.6	29.6	21.5	3.1	3.5		150.6	30.2	22.4	93	67
39	24-30	0	0	80	56	30.5	21.1	4.3	4.9		0	32.2	22.0	86	52
40	Oct 01-07	3	21.40	81.86	49.43	31.90	22.03	6.39	4.9		40.8	31.5	22.8	89	64
41	08-14	3	61.2	76.3	56.4	31.0	17.1	6.3	4.1		66.2	30.7	21.7	93	70
42	15-21	0	0.0	74.4	46.0	30.3	20.3	8.5	4.5		0	32.5	19.5	83	46
43	22-28	0	0.0	71.7	56.2	31.1	20.2	8.2	3.8		10.3	30.8	21.2	85	56
44	29-04 Nov	0	0.0	52.6	40.4	27.2	13.6	8.0	3.3		0	31.7	15	78	37
45	Nov 5-11	0	0.0	65.0	35.6	30.9	14.6	8.0	4.1		0	30.4	13.3	71	36
46	12-18	0	0.0	60.4	30.7	29.4	11.5	8.8	3.7		0	29.2	12.1	79	35
47	19-25	1	42	61.2	31.2	29.5	11.8	8.8	3.5		14	30.4	14.5	81	41
48	26-2 Dec	0	0	75.14	54	29.35	16.85	6.6	3.3		0	30.7	15.9	75	43
49	Dec. 3-9	0	0	72.28	38.14	28.94	13.5	7.41	3.8		26.6	29.0	12.3	84	35
50	10-16	0	0	74.57	25.57	28.72	7.4	9.42	3.62		0	28.9	7.5	80	28
51	17-23	0	0	55.57	28.14	29.54	9.65	9.51	4.22		0	29.5	9.3	71	30
52	24-31	0	0	67.37	29.87	29.15	13.87	7.98	4.23		0	28.5	11.3	75	38
1	Jan, 1-7	0	0	50.6	31.9	30.6	11.7	9.1	3.5		0	29.2	11.5	79.1	36.9
2	8-14	0	0	61.9	32.4	30.2	13.5	7.6	3.3		0	30	13.1	78.6	36
3	15-21	0	0	68.6	33.1	31.7	15.8	6.6	3.8		0	31.2	14.7	78.4	36.3
4	22-28	0	0	58.7	35.6	31.1	15.3	7.9	4.1		0	29.5	13.8	79.9	39.9
5	29-4	0	0	59.1	30.9	31.9	12.2	7.5	4.1		0	29.3	10.2	75.1	23
6	Feb , 5-11										0	32.4	12.1	79.3	23.7
7	12-18										0	30.1	12.1	75.1	27.7
8	19-25										8	31.6	15.6	78.1	35.6
Total											977.4				

Bijapur (16° 49' N latitude; 75° 43' E longitude; 593 m amsl.)										Hyderabad							
Std week	Dates	Rainy days (No)	Rain fall (mm)	Temperature (°C)		RH (%)		Evaporation (mm)	Sun shine (hrs)	Rainy days (no)	Rain fall (mm)	Temperature (°C)		RH (%)		Sun shine (hrs)	Evaporation (mm)
				Max.	Min	Max	Min.					Max.	Min.	AM (7.30h)	PM (14.30h)		
27	Jul 02-08	0	2.6	28.6	21.0	87.9	61.0	4.2	3.7	4.2	63.0	34.3	23.7	84.1	57.4	6.5	5.2
28	09-15	1	26.0	30.6	20.5	89.1	57.3	4.5	5.0	4.5	23.8	30.9	23.0	85.3	63.7	2.6	4.3
29	16-22	3	39.6	29.6	21.3	90.1	62.4	3.8	2.0	3.8	23.4	33.5	24.2	78.6	46.0	5.0	4.7
30	23-29	0	0.0	31.0	20.2	90.0	48.3	5.2	7.0	5.2	24.0	30.9	25.0	81.4	60.6	3.9	4.3
31	30-05Aug	1	16.9	32.6	20.7	90.3	46.6	5.3	5.8	5.3	28.5	27.8	21.6	86.1	77.9	3.5	4.4
32	Aug 6-12	3	29.5	31.1	20.7	90.0	61.0	3.8	4.2	3.8	54.4	29.0	22.2	89.0	66.1	5.7	4.9
33	13-19	4	79.1	30.3	21.4	93.3	65.6	3.8	5.7	3.8	72.8	28.1	22.1	89.7	77.6	2.2	3.6
34	20-26	4	69.6	29.4	20.9	93.1	66.4	3.9	4.2	3.9	1.4	29.2	22.0	91.7	77.3	3.4	3.6
35	27-02	0	3.5	31.5	20.3	89.7	49.7	5.1	8.2	5.1	9.0	30.2	21.4	90.6	80.4	3.6	3.5
36	Sep 3-9	0	2.0	30.9	21.1	88.7	56.4	3.9	5.0	3.9	8.6	31.5	21.2	87.6	61.0	4.8	5.0
37	10-16	2	31.6	31.3	20.3	91.4	53.7	4.3	6.7	4.3	45.5	31.4	20.7	87	62	6.0	4.9
38	Sep17-23	1	7.6	31.5	20.1	86.9	41.4	4.1	8.7	4.1	56.5	29.9	20.5	90	70	2.9	4.0
39	24-30	3	71.3	29.2	21.0	91.0	71.3	2.9	3.9	2.9	0.0	31.5	19.9	84	60	9.0	5.1
40	Oct 01-07	0	0.0	30.0	19.0	87.1	51.1	3.0	8.7	3.0	2.0	30.5	22.0	84	63	4.8	4.5
41	08-14	0	0.0	28.9	16.3	88.7	46.1	3.2	8.0	3.2	18.0	31.1	20.8	87	62	6.4	4.4
42	15-21	0	0.0	28.1	13.2	80.7	42.0	3.4	8.6	3.4	11.2	31.8	17.7	87	53	8.1	5.1
43	22-28	0	0.0	30.3	15.3	78.7	37.0	3.5	9.2	3.5	222.0	26.3	19.4	96	81	1.4	1.5
44	29-04 Nov	0	0.0	29.6	17.2	85.7	47.6	3.1	6.8	3.1	0.0	30.1	17.5	87	56	7.4	3.3
45	Nov 5-11	0	0.0	29.2	12.5	84.6	32.4	3.5	8.4	3.5	0.0	28.5	14.3	84	49	7.2	3.0
46	12-18	0	0.0	29.3	9.0	71.4	24.7	4.1	10.1	4.1	0.0	27.8	11.4	84	37	8.1	2.9
47	19-25	0	0.0	29.2	9.9	75.3	31.9	3.6	10.0	3.6	28.8	28.4	15.1	89	58	5.8	2.5
48	26-2 Dec	0	0.0	28.3	12.9	85.3	46.5	3.6	9.2	3.6	2.2	28.4	14.8	90	51	6.3	1.9
49	Dec. 3-9	0	0.0	29.2	12.5	84.6	32.4	3.5	8.4	0	0.0	27.6	11.2	77	37	8.5	2.8
50	10-16	0	0.0	29.3	9.0	71.4	24.7	4.1	10.1	0	0.0	29.1	7.5	86	27	9.6	2.8
51	17-23	0	0.0	29.2	9.9	75.3	31.9	3.6	10.0	0	0.0	28.1	8.8	81	35	9.3	2.9
52	24-31	0	0.0	28.3	12.9	85.3	46.5	3.6	9.3	0	0.0	27.1	11.0	87	40	8.5	2.5
1	Jan, 1-7, 2014	0	0.0	29.5	12.8	84.4	36.0	3.8	9.6	0.0	0.0	28.4	11.1	86.3	41.3	8.5	2.7
2	8-14	0	0.0	30.5	15.2	76.4	32.3	4.1	9.4	0.0	0	29.4	12.8	81	35	8.6	3.2
3	15-21	0	0.0	30.7	17.0	77.9	36.7	4.4	8.6	0.0	0	29.1	13.8	87	41	8.3	3.3
4	22-28	0	0.0	28.8	16.6	76.6	40.0	4.1	6.1	0.0	0	27.9	14.4	83	46	7.5	3.0
5	29-4 Feb	0	0.0	29.3	13.6	80.0	37.6	4.3	8.4	0.0	0	200.4	93.9	594	279	8.2	3.4
6	5-11 Feb	0	0.0	33.0	15.2	55.0	25.0	5.6	9.9	0.0	0	28.3	14.4	86	35	8.6	3.5
7	12-18Feb	0	0.0	30.2	14.5	61.4	34.7	5.6	8.7	0.0	0	32.7	14.5	83	26	9.5	4.0
8	19-25Feb	0	0.0	32.2	18.7	70.6	35.9	5.5	8.3	0.0	0	31.7	17.4	77	30	8.6	4.6
9	26 Feb-4 Mar	2	15.4	32.2	17.5	75.3	40.0	5.7	8.7								
10	5-11 Mar	1	18.4	30.1	18.1	91.1	44.6	4.1	8.0								
11	12-18 Mar	0	0.0	34.4	20.1	59.3	27.0	7.2	8.8								
12	19-25Mar	0	0.0	36.9	21.3	43.1	20.6	8.1	9.0								
13	26 Mar-1Apr	0	0.0	38.2	22.5	48.3	19.1	8.5	9.2								
14	2-8 Apr	0	0.0	38.1	23.0	40.5	21.0	10.8	9.1								
Total			413.1							34	695						

Tandur									
Std week	Dates	Rainy days (No)	Rain fall (mm)	Temperature (°C)		RH (%)		Evaporati on (mm)	Sunshine (hrs)
				Max.	Min	Max	Min.		
27	Jul 02-08	2	21.5	31.2	22.7	91.4	52.1		
28	09-15	6	34.2	27.7	21.9	95.9	71.8		
29	16-22	5	72.5	25.7	22.1	95.7	77.1		
30	23-29	1	7	28.8	22.5	89.7	68		
31	30-05Aug	6	41	27.8	22.3	93.4	65.3		
32	Aug 6-12	1	3	30	22.6	92.3	57.4		
33	13-19	6	68.5	27.9	22.4	97.4	71.6		
34	20-26	0	1	29.2	21.2	92.3	57.6		
35	27-02	2	32	31.3	22.4	96.6	53		
36	Sep 3-9	2	32.5	29.6	22.2	96.7	62.7		
37	10-16	3	86.5	30.4	22.9	99	62.9		
38	Sep17-23	3	86.5	29	21.6	97.7	67.9		
39	24-30	0	0	30	22.3	95.6	58.9		
40	Oct 01-07	1	36.5	29.5	22.8	96.4	65.3		
41	08-14	4	45	29.8	21.8	98.6	63.1		
42	15-21	0	0	31.3	20.4	99	45.6		
43	22-28	5	50	27.9	21.9	98.7	70.4		
44	29-04 Nov	0	0	29.8	19	98.9	50.7		
45	Nov 5-11	0	0	28.7	15.6	97.6	45.4		
46	12-18	0	0	28.8	15.1	91.9	40.7		
47	19-25	2	22	29.3	14.6	97.4	40.4		
48	26-2 Dec	0	1	28.5	16.2	98.9	50		
49	Dec. 3-9	0	0	28.5	11.7	97.9	32.9		
50	10-16	0	0	29	7.5	95	25		
51	17-23	0	0	27.9	10.1	94.9	30.9		
52	24-31	0	0	27.7	12	96.6	37.3		
1	Jan, 1-7	0	0	28.3	12.4	97.3	38.9		
2	8-14	0	0	29.9	100.3	67.8	22.3		
3	15-21	0	0	29.1	107.6	66.1	25.0		
4	22-28	0	0	28.8	104.3	65.4	25.2		
5	29-4 Feb	0	0	29.9	105	62.2	21.3		
6	5 th -11	0	0	32.9	95.1	56.8	13.6		
7	12-18 Feb	0	0	29.9	112.2	58.9	19.8		
8	19-25 Feb	0	0	30.9	122.5	57.7	23.8		
Total		49	640.7						