

(1) Yield gap between Frontline Demonstrations (FLDs) yield and State Average Yield (SAY) of Sorghum

(a) Kharif season

Sl. No.	State	Factor	Year wise yield in Kg/ha					Mean
			09-10	10-11	11-12	12-13	13-14	
1	Andhra Pradesh	FLD	3500	2930	-	-	-	3215
		SAY	995	1000	-	-	-	998
		Yield Gap	2505	1930	-	-	-	2218
		% Yield gap	252	193	-	-	-	222
2	Gujarat	FLD	2160	3010	-	-	-	2585
		SAY	1063	1066	-	-	-	1065
		Yield Gap	1097	1944	-	-	-	1521
		% Yield gap	103	182	-	-	-	143
3	Madhya Pradesh	FLD	2330	2250	-	-	-	2290
		SAY	1267	1426	-	-	-	1347
		Yield Gap	1063	824	-	-	-	944
		% Yield gap	84	58	-	-	-	70
4	Maharashtra	FLD	2360	2320	-	-	-	2340
		SAY	1083	1325	-	-	-	1204
		Yield Gap	1277	995	-	-	-	1136
		% Yield gap	118	75	-	-	-	94
5	Rajasthan	FLD	1640	1980	-	-	-	1810
		SAY	145	700	-	-	-	423
		Yield Gap	1495	1280	-	-	-	1388
		% Yield gap	1031	183	-	-	-	328
6	Tamilnadu	FLD	1220	1200	-	-	-	1210
		SAY	856	804	-	-	-	830
		Yield Gap	364	396	-	-	-	380
		% Yield gap	43	49	-	-	-	46

NB: FLDs programme not implemented by the Implementing Institute during 2011-12 to 2013-14. Accordingly, mean value calculated for two years.

Constraints related to kharif sorghum

- Non-availability of seed of improved cultivars in local markets at proper time, place and price.
- Scarcity of labours in peak crop season and their high wages which are not economical.
- Severe birds' damage due to sporadic cultivation of this crop. It is very difficult them to scare birds manually during peak season.
- Delayed monsoon could not allow them sowing of the crop in time. Erratic rainfall pattern affected the production and quality.
- Infestations of shoot fly at early stage and grain mould disease affected the production and quality.
- Due to drought conditions, fertilizers application and inter cultivation could not be done timely.
- Sorghum is less remunerative than other cash crops like cotton, soybean, oilseeds, vegetables, etc.
- Most of the farmers' priority is to fodder followed by grain yields
- Young generation do not prefer sorghum as food due to easily available fine cereals (wheat and rice) and bit cooking difficulties.

(b) Rabi season

Sl. No.	State	Factor	Year wise yield in Kg/ha					Mean
			09-10	10-11	11-12	12-13	13-14	
1	Andhra Pradesh	FLD	2230	2190	@	1660	1640	1930
		SAY	1265	1386	-	1467	1944	1516
		Yield Gap	965	804	-	193	-304	415
		% Yield gap	76	58	-	13	-16	27
2	Andhra Pradesh*	FLD	6830	7310	8620	7410	@	7543
		SAY	1265	1386	1671	1671	-	1498
		Yield Gap	5565	5924	6949	5739	-	6044
		% Yield gap	440	427	416	343	-	403
3	Karnataka	FLD	1375	1270	@	1080	1450	1294
		SAY	1019	1093	-	1014	1025	1038
		Yield Gap	356	177	-	66	425	256
		% Yield gap	35	16	-	7	41	25
4	Maharashtra	FLD	1540	1138	@	1280	1650	1402
		SAY	776	689	-	379	693	634
		Yield Gap	764	449	-	901	957	768
		% Yield gap	98	65	-	238	138	121

* Crop season is neither *kharif* nor *rabi*. The crop is sown in rice-fallows in December in Guntur district of Andhra Pradesh, it can be named as late *rabi*.

@ FLDs programme not implemented.

Constraints related to *rabi* sorghum

- The improved *rabi* varieties were superior with respect to grain and fodder yields in optimum moisture condition, not getting expected yields under dry spell.
- Scarcity of labours in peak crop season and their high wages which are not economical.
- Farmers are demanding for sorghum harvester machines.
- Non-availability of fertilizers and herbicides at proper time with reasonable rates in local places.
- The costs of inputs are higher than the profits.
- Farmers do not follow the plant spacing in interest of getting more fodder yield.
- Infection of aphids, shoot bug and powdery mildew was more on the latest *rabi* varieties than the farmers varieties.

(2) Yield gap between Frontline Demonstrations (FLDs) yield and State Average Yield (SAY) of Pearl millet

Sl. No.	State	Factor	Year wise yield in Kg/ha					Mean
			09-10	10-11	11-12	12-13	13-14	
1	Haryana	FLD	2635	2990	2680	2480	2208	2599
		SAY	1593	1793	2040	1910	2057	1879
		Yield Gap	1042	1197	640	570	151	720
		% Yield gap	65	67	31	30	7	38
2	Gujarat	FLD	2201	2033	1938	1848	2358	2076
		SAY	1232	1250	1419	1743	1869	1503
		Yield Gap	969	783	519	105	489	573
		% Yield gap	79	63	37	6	26	38
3	Maharashtra	FLD	2174	2021	1542	2000	1879	1923
		SAY	741	1085	982	637	932	875
		Yield Gap	1433	936	560	1363	947	1048
		% Yield gap	193	86	57	214	102	120
4	Tamil Nadu	FLD	2127	2166	1551	1445	1235	1705
		SAY	1512	1564	2452	1326	1782	1727
		Yield Gap	615	602	-901	119	-547	-22
		% Yield gap	41	38	-37	9	-31	-1
5	Madhya Pradesh	FLD	2015	2509	2990	@	@	2505
		SAY	1495	1898	1924	-	-	1772
		Yield Gap	520	611	1066	-	-	732
		% Yield gap	35	32	55	-	-	41
6	Rajasthan	FLD	1406	1935	2155	1922	2308	1945
		SAY	394	832	915	972	857	794
		Yield Gap	1012	1103	1240	950	1451	1151
		% Yield gap	257	133	136	98	169	145
7	Uttar Pradesh	FLD	@	1926	2349	2748	@	2341
		SAY	-	1665	1839	1951	-	1818
		Yield Gap	-	261	510	797	-	523
		% Yield gap	-	16	28	41	-	29
8	Karnataka	FLD	@	1266	1170	1150	1475	1265
		SAY	-	1081	972	1036	1080	1042
		Yield Gap	-	185	198	114	395	223
		% Yield gap	-	17	20	11	37	21

@ FLDs programme not implemented.

Constraints of pearl millet:-

1. Rajasthan

- Non-availability of seed of improved cultivars in local markets.
- Delayed monsoon could not allow them sowing of the crop in time. Erratic rainfall pattern affected the production and quality.
- Due to drought conditions, fertilizers application and inter cultivation could not be done timely.
- Pearl millet is less remunerative than other crops like cotton, soybean, oilseeds, guar, vegetables, etc.
- Most of the farmers' priority is to fodder followed by grain yields

- Young generation do not prefer pearl millet as food due to easily available fine cereals (wheat and rice), but cooking difficulties and low shelf life of pearl millet flour.

2. Haryana

- As per onset of monsoon, sometimes it is too early and there is timely non-availability of quality seed.
- Inadequate soil moisture at sowing time results in poor germination and thereby finally gives poor crop stand.
- Improper plant population.
- Use of inadequate and imbalanced dose of fertilizers specially the phosphatic fertilizers
- Use of *biomix*/ biofertilizers is almost negligible where it can supplement 8-16 Kg of N/ha.

3. Madhya Pradesh

- Selection of wrong cultivars
- Crop suffers from either early/ terminal stresses or excessive rains at blooming stage.
- Poor management (No use of weedicide)
- Not use of balance fertilizers
- Crust formation in soil after immediate rains.
- Mostly adopted broadcasting method of sowing
- Post harvest losses due to pest (birds/termite)
- Occurrence of frequent disease like Blast, Rust, Smut and D.M.

4. Gujarat

- Generally, the crop is grown in marginal land by the farmers
- Lack of adoption of recommended package of practices by the farmers
- Usually, farmers are not practicing thinning and gap filling practices in this crop
- Little use of weedicides
- Erratic rainfall during monsoon.

5. Uttar Pradesh

- Delayed planting (after 15th of July)
- Imbalance use of fertilizer
- Improper plant population
- Broadcasting method of sowing
- Lack of thinning/gap filling
- Weed infestation during initial crop stage

6. Maharashtra

- Cultivation on lighter type of soils
- Erratic and uneven distribution of rainfall pattern.
- Non adoption of improved production technology
- Non or less application of fertilizers
- Inadequate plant population
- Unavailability of protective irrigation during terminal drought

7. Andhra Pradesh

- The front line demonstrations were conducted in Ananthapuram and Kurnool districts during the period *i.e.*, from 2011 to 2013, under rainfed conditions. Thus, due to this reason there is low yield in FLD.
- Ananthapuram and Kurnool districts are under scarce rainfall zone of the state, Andhra Pradesh.
- In these three years the actual rainfall received is less when compared to the normal rainfall of the concerned mandals or locations where the FLD's were conducted in the two districts.

8. Karnataka

- Cultivation of pearl millet on very shallow and marginal lands which are having low moisture holding capacity in majority cases
- Due to application of inadequate nutrients (fertilizers)
- Due to maintenance of very poor plant stand especially in shallow soils
- Growing of Pearl millet as an intercrop or mixed crop
- Occurrence of long dry spells in one or the other stage of crop growth since pearl millet is mainly grown in dry areas of the state

9. Tamil Nadu

- Annual rainfall was gradually reduced every year
- There is shortfall of rainfall almost in all the districts of Tamil Nadu
- Failure of the crop was observed in some of the districts
- Unequal distribution of rainfall.
- Less application of fertilizers.
- Non-adoption of improved production and production technology

(3) Yield gap between Frontline Demonstrations (FLDs) yield and State Average Yield (SAY) of Finger millet

Sl. No.	State	Factor	Year wise yield in Kg/ha					
			09-10	10-11	11-12	12-13	13-14	Mean
1	Andhra Pradesh	FLD	@	1690	1842	1749	2529	1953
		SAY	-	1190	952	1098	1068	1077
		Yield Gap	-	500	890	651	1461	876
		% Yield gap	-	42	93	59	137	81
2	Chhattisgarh	FLD	@	2490	1991	1981	1500	1991
		SAY	-	276	247	280	267	268
		Yield Gap	-	2214	1744	1701	1233	1723
		% Yield gap	-	802	706	608	462	644
3	Gujarat	FLD	@	@	1615	1937	1897	1816
		SAY	-	-	813	1000	1000	938
		Yield Gap	-	-	802	937	897	879
		% Yield gap	-	-	99	94	90	94
4	Jharkhand	FLD	@	2538	2495	@	2339	2457
		SAY	-	522	662	-	733	639
		Yield Gap	-	2016	1833	-	1606	1818
		% Yield gap	-	386	277	-	219	285
5	Karnataka	FLD	2747	2661	2061	1372	2962	2361
		SAY	1715	2015	1871	1512	1759	1774
		Yield Gap	1032	646	190	-140	1203	586
		% Yield gap	60	32	10	-9	68	33
6	Maharashtra	FLD	1770	1894	1615	2033	1907	1844
		SAY	908	975	1062	1112	1157	1043
		Yield Gap	862	919	553	921	750	801
		% Yield gap	95	94	52	83	65	77
7	Odisha	FLD	@	1810	2800	2290	2445	2336
		SAY	-	709	562	770	809	713
		Yield Gap	-	1101	2238	1520	1636	1624
		% Yield gap	-	155	398	197	202	228
8	Tamil Nadu	FLD	1291	2399	2425	1798	3072	2197
		SAY	1976	2260	2715	1967	2748	2333
		Yield Gap	-685	139	-290	-169	324	-136
		% Yield gap	-35	6	-11	-9	12	-6
9	Uttarakhand	FLD	1590	1707	1700	1653	1542	1638
		SAY	1235	1331	1392	1392	1375	1345
		Yield Gap	355	376	308	261	167	293
		% Yield gap	29	28	22	19	12	22

@ FLDs programme not implemented.

(4) Yield gap between Frontline Demonstrations (FLDs) yield and State Average Yield (SAY) of Small millets

Sl. No.	State	Factor	Year wise yield in Kg/ha					Mean
			09-10	10-11	11-12	12-13	13-14	
(1) Kodo millet								
1	Chhattisgarh	FLD	@	1444	1016	1450	1400	1328
		SAY	-	211	200	216	223	213
		Yield Gap	-	1233	816	1234	1177	1115
		% Yield gap	-	584	408	571	528	525
2	Karnataka	FLD	@	@	@	612	1387	1000
		SAY	-	-	-	500	625	563
		Yield Gap	-	-	-	112	762	437
		% Yield gap	-	-	-	22	122	78
3	Madhya Pradesh	FLD	946	1304	1579	1277	1590	1339
		SAY	274	347	331	364	479	359
		Yield Gap	672	957	1248	913	1111	980
		% Yield gap	245	276	377	251	232	273
4	Tamilnadu	FLD	3661	3593	1752	2634	2897	2907
		SAY	940	1043	1210	1010	986	1038
		Yield Gap	2721	2550	542	1624	1911	1870
		% Yield gap	289	244	45	161	194	180
(2) Foxtail millet								
1	Andhra Pradesh	FLD	@	1739	2628	1563	2323	2063
		SAY	-	967	1000	974	759	925
		Yield Gap	-	772	1628	589	1564	1138
		% Yield gap	-	80	163	60	206	123
2	Karnataka	FLD	@	1775	2016	1475	2158	1856
		SAY	-	510	500	500	625	534
		Yield Gap	-	1265	1516	975	1533	1322
		% Yield gap	-	248	303	195	245	248
(3) Barnyard millet								
1	Tamil Nadu	FLD	@	@	1752	1434	1123	1840
		SAY	-	-	1210	1010	986	500
		Yield Gap	-	-	542	424	137	368
		% Yield gap	-	-	45	42	14	34
2	Uttarakhand	FLD	1473	1615	1497	1517	1469	1436
		SAY	972	1210	1222	1258	1219	1069
		Yield Gap	501	405	275	259	250	338
		% Yield gap	52	33	23	21	21	29
(4) Proso millet								
1	Karnataka	FLD	@	@	@	1840	@	1840
		SAY	-	-	-	500	-	500
		Yield Gap	-	-	-	1340	-	1340
		% Yield gap	-	-	-	268	-	268
2	Tamil Nadu	FLD	@	@	@	1460	1320	1390
		SAY	-	-	-	1010	986	998
		Yield Gap	-	-	-	450	334	392
		% Yield gap	-	-	-	45	34	39

Sl. No.	State	Factor	Year wise yield in Kg/ha					Mean
			09-10	10-11	11-12	12-13	13-14	
(5) Little millet								
1	Chhattisgarh	FLD	@	@	@	@	600	600
		SAY	-	-	-	-	223	223
		Yield Gap	-	-	-	-	377	377
		% Yield gap	-	-	-	-	169	169
1	Gujarat	FLD	@	@	@	@	1554	1554
		SAY	-	-	-	-	1079	1079
		Yield Gap	-	-	-	-	475	475
		% Yield gap	-	-	-	-	44	44
2	Karnataka	FLD	@	1590	1405	1465	1661	1530
		SAY	-	510	500	500	625	534
		Yield Gap	-	1080	905	965	1036	997
		% Yield gap	-	212	181	193	166	187
3	Madhya Pradesh	FLD	677	1060	492	1234	969	886
		SAY	274	347	331	364	479	359
		Yield Gap	403	713	161	870	490	527
		% Yield gap	147	205	49	239	102	147
4	Maharashtra	FLD	@	@	1363	@	982	1173
		SAY	-	-	507	-	526	517
		Yield Gap	-	-	856	-	456	656
		% Yield gap	-	-	169	-	87	127
5	Orissa	FLD	@	1250	1150	1310	1115	1206
		SAY	-	462	520	510	502	499
		Yield Gap	-	788	630	800	613	708
		% Yield gap	-	171	121	157	122	142
6	Tamilnadu	FLD	1908	1647	1441	1211	1388	1519
		SAY	940	1043	1210	1010	986	1038
		Yield Gap	968	604	231	201	402	481
		% Yield gap	103	58	19	20	41	46

@ FLDs programme not implemented.

Constraints of Finger millet and small millets:-

Karnataka:

- Mono Cropping
- Traditional mixed cropping
- Imbalance use of fertilizers

Uttarakhand

- Lack of availability of HYV
- Non optimum plant stand
- Imbalance use of fertilizers

Tamil Nadu/Odisha

- Lack of availability of improved variety
- Mono cropping
- Establishment of the crop through broadcasting improper plant stand
- Imbalance use fertilizers

Odisha / AP / Maharashtra /Chhattisgarh / Jharkhand / Gujarat

- Lack of availability of improved practice
- Improper plant stand establishment of the crop by broadcasting
- Imbalance use of fertilizer