



The Growth of Farm Mechanization in India after Independence and the Status of Andhra Pradesh

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ABSTRACT

The study of growth of Farm Mechanization in India after Independence and the status of Andhra Pradesh was studied in College of Agricultural Engineering, Bapatla, during the year 2011-12. Mechanization has been well received in India as one of the important elements of modernization of agriculture. Mechanization refers to interjection of improved tools, implements and machine between farm workers and materials handled by them. Irrigation pump sets, power threshers, tractors, power tillers and matching implements including for 65 Million draft animals have become popular. Seed and seed-cum fertilizer drills, planters, mechanical rice transplanters, vertical conveyor reapers, and combines soon followed. In Andhra Pradesh Karimnagar district has a highest number of power tillers (1835) and lowest was Guntur district (65). Karimnagar district has highest number of wheeled tractors (9061) and lowest was observed in Vishakhapatnam (467). Guntur district has highest number of crawler tractors (1795). Telangana Region has highest number of tractors (5250) compared to Andhra Region (5019) and Rayalaseema Region (1895). And also large number of power tillers is available in Andhra Region (1522) compared to Rayalaseema (110) and Telangana Regions (574). Combine harvesters are more in Andhra Region (75). Warangal district has highest number of wooden ploughs and Hyderabad has lowest number of wooden ploughs since it was an urban area. Chittoor district has highest number of soil stirring and turning ploughs and lowest number in Hyderabad.

Key words : Mechanization, matching implements, seed-cum fertilizer drill, planter etc.

Farm mechanization is the application of engineering and technology in agricultural operations to do a job in a better way to improve productivity. This includes development, application and management of all mechanical aids for field production, water control, material handling, storing and processing. Mechanical aids include hand tools, animal drawn equipments, power tiller, tractor, oil engines, electric motors, processing and hauling equipments. Indian Tractor Industry developed in 1945 to 1960 because of the war surplus tractors and bulldozers were imported for land reclamation and cultivation in mid 1940's. In 1947 Central and State Tractor Organizations were set up to develop and promote the supply and use of tractors in agriculture and up to 1960, the demand was met entirely through imports. In 1951 there were 8,500 tractors in use, 20,000 in 1955 and 37,000 by 1960. Local production begins with five manufacturers in 1961 producing a total of 880 units per year. Eicher, Gujarat Tractors, TAFE, Escorts, Mahindra & Mahindra are the major tractor manufacturers. Benefits of farm mechanization are timeliness of

operation, precision of operation, improvement of work environment, enhancement of safety, reduction of drudgery of labour, reduction of loss of crops and food products, increased productivity of land, increased economic return to farmer, improved dignity of farmer, progress and prosperity in rural areas. Higher productivity is the major contribution in farm mechanization (Singh *et al.*, 2011) studied the determinants of tractorization in Punjab using both rank correlation analysis as well as functional analysis. The study concluded that variables such as farm size distribution, agricultural productivity, irrigation, rural literacy, and wages of agricultural labour were positively correlated with tractor density and tractor price, labour density and draft animal density. (Anwar Alam, 2012) studied the determination of tractorization in arid areas of Western Rajasthan and found that the agricultural productivity, size of holding, labour density, draught animal density and literacy were important factors that had positive impact on the tractorization in the area. It was suggested that a concrete policy to provide sufficient tractors would help to increase

agricultural productivity without replacing human labour and draught animal power. (Srivastava, 2012) observed growth in tractors during 1967-72 attributed to up rise of wheat high yielding variety in Punjab; however, the latest increase in tractors was due to the steady adoption of mechanized field ploughing by small and marginal farmers by hiring-in tractors.

MATERIAL AND METHODS

The present data related to the farm mechanization was collected from the various resources such as Department of Agriculture, RARS Guntur, CRIDA Govt. of Andhra Pradesh, and Hyderabad and along with some renowned websites like WWW. Indian statistics.com, familiar referred and non-referred Journals.

RESULTS AND DISCUSSION

The level of mechanization in India in various field operations is given in Fig. 1. During last 50 years the average power availability in India has been increased from 0.30 Kw ha⁻¹ in 1960-61 to 1.73 Kw ha⁻¹ in 2009-10.

The source of farm power includes workers, animals, tractors, power tillers, diesel engines, electrical motors. Out of these more shares was of tractors, as shown in Table. 2 and evident from the Fig. 2. It shows the trend of increase in the farm mechanization.

There was reduction of draught animal percentage from 1971-72 to 2009-10 which might be the urbanization. These was an increase of about 33 per cent of tractors from 1971-72 to 2009-10. This is a gradual and sustained change of power available per hectare of the Indian farms, which varied from 0.424 Kw ha⁻¹ in 1971-72 to 1.73 Kw ha⁻¹ in 2009-10.

The manufacture of tractors and power tillers started in 1960. Tractors are the part of agricultural machinery industry. From Table. 3, it is evident that sales of tractors as well as power tillers were increasing every year. There is a drop in the tractor sales during 2007-08 when compared to 2006-07 and sales were also reduced in 2008-09 compared to 2007-08. From 2009-10 onwards there is an increasing trend in sales of tractors. But there was

Table 1. Agricultural machinery and implements in Andhra Pradesh.

Particulars	1983	1987	1993	1999	2003	2007
Wooden	3317222	2675256	2600282	2534705	1874352	2149499
Iron/Steel	246817	438686	384118	724258	772509	1013723
Total	3564039	3113942	2984400	3258963	2646861	3163222
Oil operated Engines	250649	216168	165705	138824	151337	N.A.
Electrical engines	437583	663878	933988	1115452	131622	N.A.
Total	688232	880046	1099693	1254276	1467556	N.A.
Tractors						
Total	21450	32537	56887	90333	92384	N.A.
Water Lifting Devices (Manual)	-	-	-	13850	20090	-
Water Lifting Devices (Animal)	-	-	-	6750	8050	178315
Total	-	-	-	20600	28140	-
Worked by Power	7775	14070	15148	22576	15499	-
Worked by Bullocks	19568	20457	10537	18416	35651	-
Total	27343	34527	25685	40992	51150	-
Oil Ghanies	-	4713	3041	4280	12580	-
Total	-	4713	3041	4280	12580	-

Source: Directorate of Economics and statistics, Govt, of Andhra Pradesh, (10559)

Table 2. District-Wise Agricultural Machinery and Implements in Andhra Pradesh-2011.

S.NO	District	Ploughs			Sugarcane crushers
		Wooden	Steel Ploughs	Total	
1	Srikakulam	1,09,535	41,424	1,50,959	272
2	Vizianagaram	39,263	18	39,281	1
3	Visakhapatnam	1,06,643	7,065	1,13,708	1,801
4	East Godavari	12,884	3,266	16,150	129
5	West Godavari	14,401	5,859	20,260	442
6	Krishna	13,496	10,913	24,409	351
7	Guntur	17,308	22,156	39,464	151
8	Prakasam	30,694	22,339	53,033	940
9	Nellore	10,455	8,464	18,919	91
10	Chittoor	1,24,451	1,11,867	2,36,318	4,324
11	Cuddapah	35,085	21,365	56,450	529
12	Anantapur	1,24,825	73,942	1,98,767	1,422
13	Kurnool	72,173	63,492	1,35,665	1,347
14	Mahabubnagar	1,88,333	36,800	2,25,133	2,959
15	Ranga Reddy	55,266	25,274	80,540	146
16	Hyderabad	0	0	0	0
17	Medak	74,217	37,270	1,11,487	1,901
18	Nizamabad	53,135	13,042	66,177	1,840
19	Adilabad	4,50,669	79,211	5,29,880	3,953
20	Karimnagar	1,76,371	1,27,415	3,03,786	55,457
21	Warangal	2,08,547	1,45,634	3,54,181	695
22	Khammam	1,11,258	71,669	1,82,927	548
23	Nalgonda	1,20,490	85,238	2,05,728	2,180
	Andhra Pradesh	21,49,499	10,13,723	31,63,222	81,479

Source: Department of Agriculture, Govt. of Andhra Pradesh.

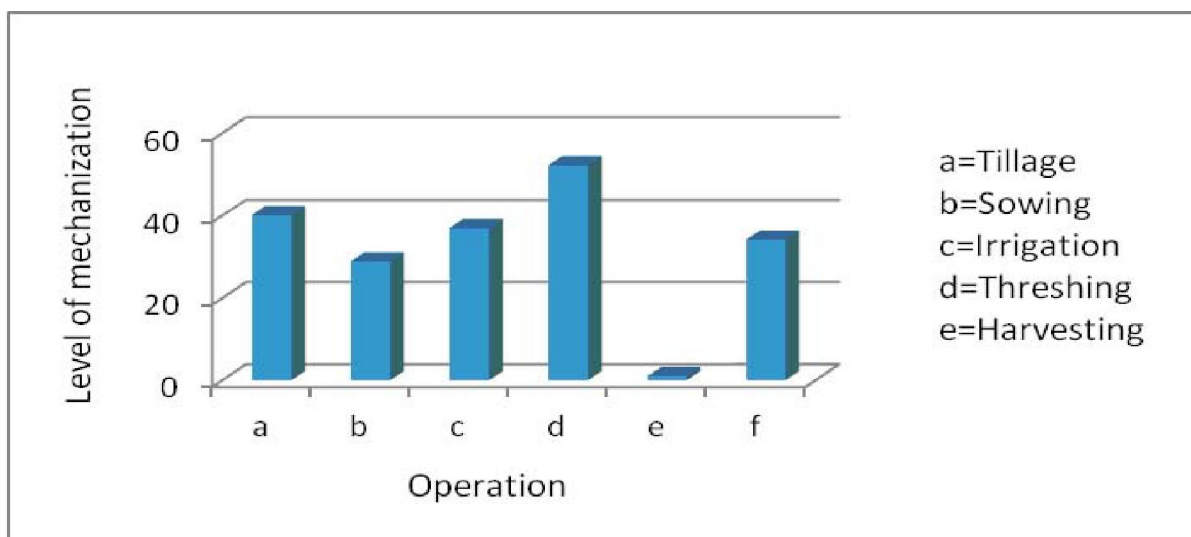


Fig. 1: Level of farm mechanization in India
(Source: www. Indianstats.com)

Table 3. District/location wise numbers of tractor and other power operated agricultural implements in Andhra Pradesh (2003).

District	Location	Number of Agricultural Implements Machinery						
		Tractor and other Power Operated Implements						
		Agricultural Power Tillers	Agricultural Tractors (Wheeled)	Crawler Tractor	Mould Board Plough	Cultivator	Disc Harrow	Rotavator
Adilabad	Rural	85	852	525	346	577	93	59
	Urban	0	223	1	1	4	0	0
	Total	85	1075	526	347	581	93	59
Ananthapur	Rural	1223	2892	783	1171	4578	757	293
	Urban	19	74	3	14	72	4	0
	Total	1242	2966	786	1185	4650	761	293
Chittoor	Rural	361	4908	330	931	2084	555	112
	Urban	15	92	23	12	30	1	0
	Total	376	5000	353	943	2114	556	112
East Godavari	Rural	420	4590	481	722	69	759	61
	Urban	1	40	8	2	0	12	0
	Total	421	4630	489	724	69	771	61
Guntur	Rural	62	3917	1786	1027	1332	1480	250
	Urban	3	576	9	75	47	55	12
	Total	65	4493	1795	1102	1379	1535	262
Hyderabad	Rural	0	0	0	0	0	0	0
	Urban	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0
Kadapa	Rural	164	2324	265	635	1852	476	72
	Urban	0	66	0	22	66	11	0
	Total	164	2390	265	657	1918	487	72
Karimnagar	Rural	1828	8779	586	2446	6093	2004	91
	Urban	7	282	0	0	48	0	0
	Total	1835	9061	586	2446	6141	2004	91
Khammam	Rural	571	3874	1384	1824	2417	1758	813
	Urban	0	5	2	2	3	2	0
	Total	571	3879	1386	1826	2420	1760	813
Krishna	Rural	326	4696	807	2415	1814	2422	326
	Urban	1	48	33	55	0	44	0
	Total	327	4744	840	2470	1814	2466	326
Kurnool	Rural	986	2739	661	1569	2687	823	232
	Urban	26	100	25	48	104	53	5
	Total	1012	2839	686	1617	2791	876	237
Mahaboobnagar	Rural	438	4534	948	2270	3457	566	163
	Urban	429	4229	838	2155	3327	520	159
	Total	867	8763	1786	4425	6784	1086	322
Medak	Rural	494	3772	987	1291	1857	696	1394
	Urban	4	29	0	0	0	0	0
	Total	498	3801	987	1291	1857	696	1394

Table 3. Cont.....

District	Location	Number of Agricultural Implements Machinery						
		Tractor and other Power Operated Implements						
		Agricultural Power Tillers	Agricultural Tractors (Wheeled)	Crawler Tractor	Mould Board Plough	Cultivator	Disc Harrow	Rota vator
Nalgonda	Rural	0	73	0	2	2	0	0
	Urban	224	7804	1372	2670	3459	1779	562
	Total	224	7877	1372	2672	3461	1779	562
Nellore	Rural	250	5117	380	1668	2161	1086	247
	Urban	15	46	0	31	40	39	0
	Total	265	5163	380	1699	2201	1125	247
Nizamabad	Rural	247	2219	782	1261	1465	669	198
	Urban	32	52	2	27	29	4	0
	Total	279	2271	784	1288	1494	673	198
Prakasam	Rural	5	18	21	8	18	6	2
	Urban	271	4442	577	1392	2756	863	112
	Total	276	4460	598	1400	2774	869	114
Rangareddy	Rural	177	1916	646	921	1628	500	220
	Urban	0	0	0	0	0	0	0
	Total	177	1916	646	921	1628	500	220
Srikakulam	Rural	67	814	165	264	41	131	44
	Urban	1	7	3	3	0	2	0
	Total	68	821	168	267	41	133	44
Visakhapatnam	Rural	0	2	0	0	0	0	0
	Urban	147	465	65	144	172	88	16
	Total	147	467	65	144	172	88	16
Vizianagaram	Rural	46	989	28	220	745	94	14
	Urban	0	115	0	0	74	0	0
	Total	46	1104	28	220	819	94	14
Warangal	Rural	431	3239	828	1176	3031	938	731
	Urban	8	4	0	0	25	0	0
	Total	439	3243	828	1176	3056	938	731
West Godavari	Rural	360	5811	536	1658	639	1608	377
	Urban	8	99	32	3	7	2	0
	Total	368	5910	568	1661	646	1610	377
Andhra Pradesh	Rural	8541	68075	12929	23825	38547	17421	5699
	Urban	1211	18798	2993	6656	10263	3479	866
	Total	9752	86873	15922	30481	48810	20900	6565

Source: Compiled From statistics Released by: Department Of Animal Husbandry And Dairy,

Ministry Of Agriculture, Govt Of India

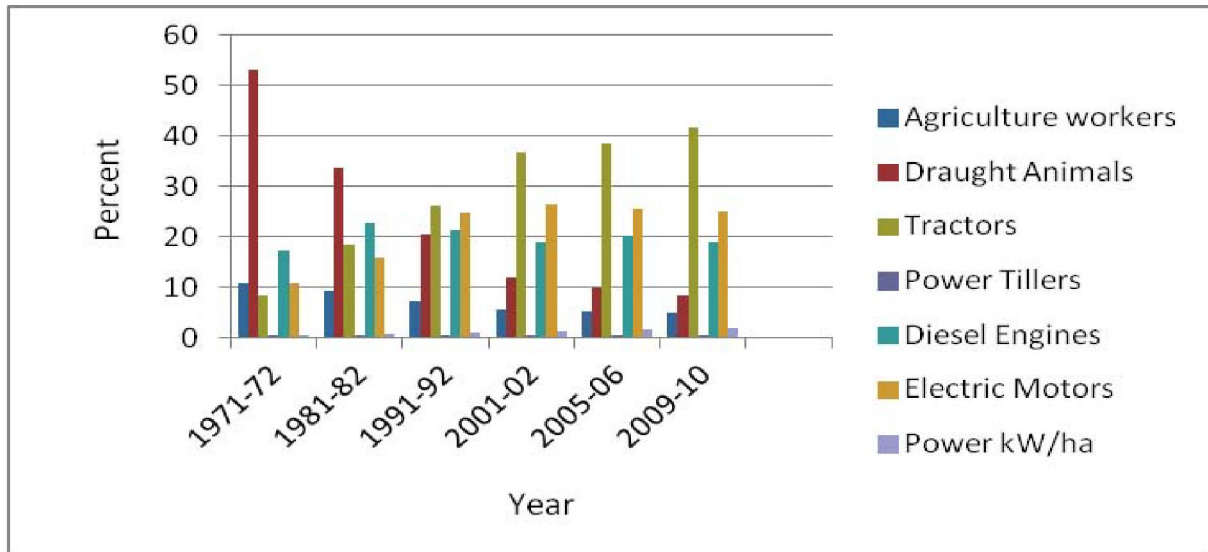


Fig. 2: Percentage share of different farm power sources in Indian agriculture (Source: www. Indianstats.com)

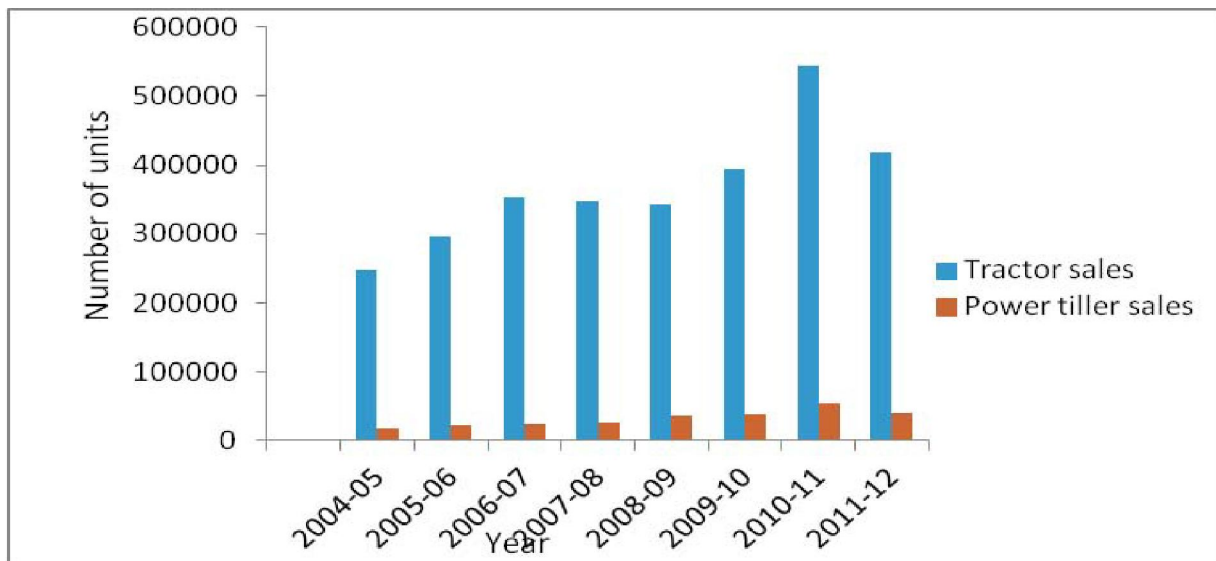


Fig. 3 Sales of tractors and power tillers in India

no any decreasing trend observed in the sales of power tillers from 2004-05 to 2010-11.

The level of mechanization in terms of number of units o tractors, power tillers, combine harvesters during 2009-10 is shown in Fig 2. Maximum numbers of tractor are present in Prakasam district about 1159 units in Andhra Region. Least numbers of tractors are present in Vizianagaram and Vishakhapatnam, whereas the Telangana region is equipped with maximum number of tractors during 2009-10. Power tillers are

maximum (1522) in Andhra Region and less in Rayalaseema region (110). Nearly 75 number of combine harvesters are present in Andhra region and 11 in Telangana region. Tractors are more in number when compared to power tillers and combine harvesters. Source: Directorate of Economics and statistics, Govt, of Andhra Pradesh, (10559) Agricultural machinery and implements in Andhra Pradesh such as, ploughs, tractors, electrical motors, water lifting devices during 1983-2007 is shown in Table 1. The data depicts that

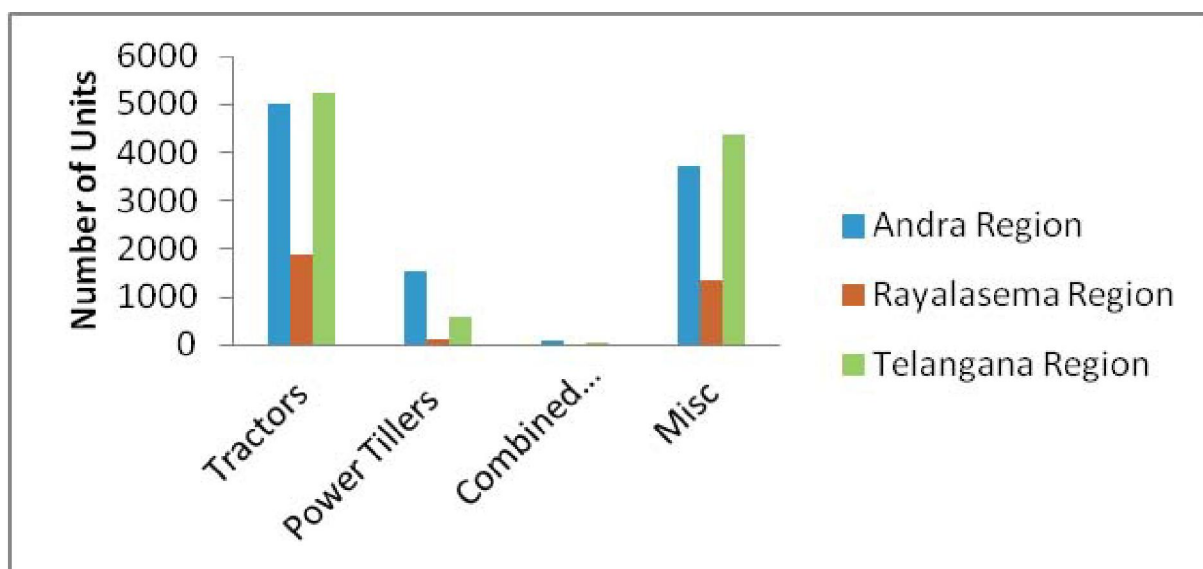


Fig.4: Farm mechanization in Andhra Pradesh (District wise) (2009-2010)

number of ploughs (wooden and Iron) has been slightly decreased from 35, 64, 039 in 1983. Andhra Pradesh occupies the fourth place in the tractor sales in India. District wise ploughs and sugarcane crushers' data is shown in the Table 2. Adilabad district has highest and Hyderabad has lowest number of wooden ploughs. Warangal district has highest number of steel ploughs and Hyderabad has lowest number of steel ploughs. Karimnagar district has highest number of sugarcane crushers and Hyderabad has lowest number of sugarcane crushers

Location wise number of tractor and other power operated agricultural inputs such as mould board plough, cultivators and disc harrows are shown in Table 3. In Andhra Pradesh Karimnagar district has a highest number of power tillers (1835) and lowest was Guntur district (65). Karimnagar district has highest number of wheeled tractors about, 9061. And lowest was observed in Vishakhapatnam (467). Guntur district has highest number of crawler tractor (1795) and lowest was observed in vizianagaram with 28. Mahaboobnagar district has highest number of mould board plough observed about 4425 and lowest was observed as 347 in Adilabad.

CONCLUSIONS

During last 50 years the average power availability in India has increased from 0.30 Kw

ha⁻¹ in 1960-61 to 1.73 Kw ha⁻¹ in 2009-10. There was reduction of draught animal percentage from 1971-72 to 2009-10, which might be the urbanization. These is an increased of about 33 per cent of tractors from 1971-72 to 2009-10. In Andhra Pradesh karimnagar district has a highest number of power tillers (1835) and lowest was Guntur district (65). Karimnagar district has highest number of wheeled tractors (9061) and lowest was observed in Vishakhapatnam (467). Guntur district has highest number of crawler tractor (1795) and lowest was observed in vizianagaram was about 28. Mahaboobnagar district has highest number of mould board plough about 4425 and lowest was observed about 347. Telangana Region has highest number of tractor (5250) compared to Andhra Region (5019) and Rayalaseema Region (1895). And also large number of power tillers is available in Andhra Region (1522) compared to Rayalaseema (110) and Telangana Regions (574). Combine harvesters are more in Andhra Region (75). Andhra Pradesh occupies the fourth place in the tractor sales in India. Adilabad district has highest and Hyderabad has lowest number of wooden ploughs. Warangal district has highest number of steel ploughs and Hyderabad has lowest number of steel ploughs. Karimnagar district has highest number of sugarcane crushers and Hyderabad has lowest number of sugarcane crushers.

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