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Research Article

STATUS OF DRINKING WATER AND SANITATION IN DISTRICTS OF RAJASTHAN

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ABSTRACT

Adequate supply of drinking water and sanitation is a burning issue in our society. About 1/7th of the world's population still defecate in the open in absence of toilets, of which 60% lives in India. 18% of world's population which reside in India only has access to 4% of usable water.

Rajasthan is a dry state. 90% of population is dependent on ground water. But now ground water is depleting and day by day requirement is increasing. In this paper a attempt is made to find out the status of districts of Rajasthan with the help of drinking water and sanitation indicators.

Key Words:

Sanitation, Defecate

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INTRODUCTION

The world has been experiencing continuous growth in population. Though the growth rate has declined to 1.18% between 2010 and 2017 but the pressure on facilities and amenities has increased in multiplication. Approximately 37% of world population go for open defecate due to lack of adequate facilities for sanitation. Potable water, sanitation facilities, healthy hygiene practices, solid waste and liquid waste management are necessary for each human being for their existence. India is far behind many developing countries. In India most of the cities facing problems and issues such as dense settlements, insufficient fresh water supply, underdeveloped drainage and sewerage system, etc. In India it is a big challenge to provide proper sanitation and drinking water facilities in urban and rural areas.

Before freedom in 1947 Mahatma Gandhi told that "Sanitation is more important than independence". The importance of this statement grasped in 2014 by the prime minister and reiterating as "toilet first and temple next". WHO defines "sanitation as the provision of facilities and services for the safe disposal of human urine and feces". The United Nations World health Organization Joint Monitoring Program for Water Supply and Sanitation defines "improved" sanitation as: "the means that hygienically separate human excreta from human contact and hence reduces health risks to humans". In last six decades India achieved 50% sanitation scope. Five to six decade will be

required for the complete sanitation from current rate of sanitation facilities development. According to WHO only 34% population have a proper sanitation facilities and 97 million out of 1.2 billion individuals don't have enhanced drinking water facilities, 814 million individuals don't have adequate sanitation facilities.

Study Area

Rajasthan is the largest state in India in term of area (3.42 Lac. Sq. km.) and also possess 7th rank in population. It lies between 23°3' to 30°12' north latitude and 69°30' to 78°17' east longitude. Punjab in north, Haryana and Delhi in north-east, Gujarat in south and Pakistan in west are borders of Rajasthan. The shape of Rajasthan is rhombus. The length from north to south is 826 km. and from east to west is 869 km. Geographical expansion and Aravali mountain range plays a big role in climate of Rajasthan.

Objectives

The main objective of the study is to find out the status of drinking water and sanitation status in districts of Rajasthan and also find out the challenges and issues of lower development of potable water and sanitation facilities.

METHODOLOGY

The secondary data is used for the study and data are collected from the census of Rajasthan and census of India. For the

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assessment of the drinking water and sanitation status, 15 indicators have taken and computed composite index value. To find out the composite index value, Mean and Standard Deviation of each indicator derived. For calculation following formula used.

Composite index = Gross Value/ N
 Gross Value = Sum of the Standardize value
 N = Total number of indicators
 Standardize value = $(X - \bar{x}) / SD$
 X = Actual value of each indicator
 \bar{x} = Mean of each indicator
 SD = Standard Deviation

On the basis of the amenities found in districts composite index value calculated and all district can be divided in three categories. (a) Average Level, (b) Poor Level and (c) Very Poor Level.

water and for irrigation but it is not sufficient in term of area and population. Tap water facilities with treated source is better in urban area. But in rural area of Jaipur and Nagaur tap water with treated source facilities is limited and generally people uses water direct from tubewell, open well and handpumps.

Jaipur has 9% household of Rajasthan and possess 46% piped sewer system facility and 9% septic tank facility. Thus Jaipur is the only district which is in better condition among all districts. Nagaur is also in good condition which has only 5% household possess 2% piped sewer system facility and 5% septic tank facility.

Poor Level

This category includes 15 districts; Alwar, Jodhpur, Udaipur, Sikar, Ajmer, Bikaner, Pali, Bhilwara, Jhunjhunun, Ganganagar, Barmer, Kota, Hanumangarh,

Table 1 Indicator of Drinking Water Sources and Sanitation Facilities

District	Total Number of Households	Tapwater from treated source	Tapwater from un-treated source	Covered well	Un-covered well	Handpump	Tubewell/Bor-chole	Piped sewer system	Septic tank	Other system	With slab/ventilated improved pit	Without slab/ open pit	Night soil disposed into open drain	Night soil removed by human	Night soil serviced by animal
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Ajmer	483,931	229,336	18,168	3,514	54,856	136,029	12,999	19,620	175,211	3,248	1,770	707	3,506	198	311
Alwar	628,913	126,454	62,634	3,967	40,306	179,594	196,407	21,259	125,005	8,210	15,886	909	1,170	12	468
Banswara	366,059	32,137	6,000	1,253	57,089	247,431	13,454	4,135	37,917	1,942	783	379	285	-	133
Baran	240,321	41,299	15,892	1,138	19,620	107,159	51,719	4,659	32,421	1,603	737	373	2,086	70	309
Barmer	447,776	69,772	26,013	13,785	50,702	11,963	54,551	9,817	35,003	8,005	5,660	600	7,370	-	142
Bharatpur	423,607	76,343	24,760	3,914	101,271	154,921	47,246	7,168	72,251	3,227	1,812	484	780	27	154
Bhilwara	493,597	148,848	34,519	3,093	72,387	181,778	37,066	9,262	97,828	2,867	3,166	1,376	756	63	422
Bikaner	375,970	190,166	34,034	10,933	2,717	5,522	37,355	52,086	73,331	16,149	18,615	16,060	18,386	143	418
Bundi	220,071	43,761	7,260	805	10,391	117,926	34,631	4,799	32,063	1,355	733	282	2,594	-	256
Chittaurgarh	326,449	97,272	39,311	994	12,138	115,979	54,549	8,580	56,506	996	917	215	431	-	175
Churu	347,351	198,281	70,270	9,432	9,512	2,248	22,958	17,255	125,520	18,618	29,736	9,340	230	27	79
Dausa	290,829	39,286	14,955	1,449	25,416	108,222	91,306	3,508	40,327	1,353	2,745	697	1,774	-	76
Dhaulpur	202,184	31,456	4,159	1,663	25,201	129,998	7,093	3,296	26,685	1,160	909	322	270	248	282
Dungarpur	283,556	31,855	12,587	1,257	48,397	163,758	21,374	2,202	33,118	850	1,269	278	155	70	101
Ganganagar	373,877	252,237	22,118	5,127	5,249	24,711	4,556	6,571	59,694	14,754	99,900	134,328	1,396	-	140
Hanumangarh	328,871	232,917	13,676	3,649	1,005	18,569	9,019	3,803	31,331	18,868	97,426	126,246	525	-	174
Jaipur	1,145,904	582,597	78,778	6,165	32,079	170,061	199,415	415,953	200,003	20,309	49,252	5,292	1,616	106	1,576
Jaisalmer	113,399	17,242	10,214	3,844	5,029	6,925	15,114	1,804	18,860	1,894	3,390	271	209	-	28
Jalor	329,516	91,144	45,372	5,203	39,607	6,727	58,639	5,412	26,892	1,915	12,194	863	3,746	55	76
Jhalawar	282,208	64,085	11,316	5,282	65,833	111,962	19,447	4,972	37,591	1,618	1,236	484	609	303	171
Jhunjhunun	383,664	123,257	108,144	6,562	17,774	16,762	87,590	9,601	151,764	24,802	18,554	455	148	13	234
Jodhpur	626,578	261,284	44,055	13,368	5,894	22,899	85,467	155,354	67,785	7,331	11,562	1,122	4,877	165	480
Karauli	262,659	34,722	19,606	2,253	47,230	91,833	55,000	3,539	30,475	1,826	4,149	716	603	179	267
Kota	379,825	205,599	19,752	1,105	4,748	111,916	32,662	45,606	133,063	4,373	1,232	661	9,880	147	324
Nagaur	583,941	157,375	79,954	16,249	43,217	21,030	44,579	21,209	128,522	16,974	30,807	1,828	9,556	159	256
Pali	428,992	152,231	45,596	8,785	52,682	79,541	17,013	12,636	68,982	8,130	19,973	863	13,426	75	218
Pratapgarh	178,046	16,803	7,125	923	45,188	91,152	13,099	1,941	17,019	458	276	72	280	23	215
Rajsamand	245,488	62,974	23,803	1,104	45,811	97,370	8,412	3,879	41,488	1,265	515	404	1,509	-	75
Sawai	253,987	43,710	11,236	2,015	43,743	112,577	35,191	5,203	39,552	1,224	3,045	687	2,310	12	442
Madhopur	445,713	133,335	115,298	6,036	18,835	46,870	101,296	11,891	125,414	30,124	52,260	2,630	250	175	211
Sikar	202,260	61,929	19,837	1,892	29,684	67,355	12,864	5,006	34,364	1,798	12,438	230	352	-	30
Sirohi	267,840	50,045	8,741	1,158	33,020	158,898	10,771	5,034	38,180	1,728	1,278	764	2,436	302	252
Tonk	617,921	131,360	19,582	3,861	143,281	258,401	45,044	17,680	126,483	3,193	1,770	786	540	-	286
Udaipur															

Source Census of India 2011

Average Level

Only two districts Jaipur and Nagaur stand in this category. Jaipur is the No. one district in Rajasthan in term of providing better sanitation and drinking water facilities. Jaipur has highest 9% households. Providing tap water from treated source, Jaipur and Nagaur respectively first (14%) and second (4%) in state. The second main source of drinking water is tubewell. Jaipur has highest 13% tubewells to provide drinking

Bharatpur and Churu. The composite index value of this category ranges from 0.97 to 0.02. In these 15 districts average household size is 3% to 5%. In these districts only urban areas are enjoying treated water. In rural area main source of water is tubewell and open well. Alwar, Sikar, Jodhpur and Kota has little high percentage of tubewell among these districts.

Table 2 Status of Drinking Water and Sanitation in District of Rajasthan Standardized Value

District	A	B	C	D	E	F	G	H	I	J	K	M	N	O	P	Gross value	Composite index
Ajmer	3.53	0.97	-0.50	-0.26	0.60	0.57	-0.71	-0.10	2.08	-0.47	-0.53	-0.28	0.15	1.29	0.17	6.51	0.43
Alwar	8.52	0.04	1.03	-0.15	0.12	1.19	3.19	-0.08	1.08	0.14	0.02	-0.27	-0.39	-0.71	0.76	14.48	0.97
Banswara	-0.52	-0.81	-0.91	-0.81	0.68	2.15	-0.70	-0.31	-0.66	-0.63	-0.57	-0.29	-0.60	-0.84	-0.50	-5.33	-0.36
Baran	-4.85	-0.73	-0.57	-0.84	-0.57	0.15	0.11	-0.30	-0.77	-0.67	-0.58	-0.29	-0.18	-0.09	0.16	-10.00	-0.67
Barmer	2.29	-0.47	-0.23	2.23	0.47	-1.20	0.17	-0.23	-0.72	0.12	-0.38	-0.28	1.06	-0.84	-0.47	1.51	0.10
Bharatpur	1.46	-0.41	-0.27	-0.17	2.14	0.84	0.01	-0.27	0.03	-0.47	-0.53	-0.28	-0.49	-0.55	-0.42	0.62	0.04
Bhilwara	3.86	0.24	0.07	-0.37	1.18	1.22	-0.20	-0.24	0.54	-0.51	-0.48	-0.26	-0.49	-0.16	0.59	4.98	0.33
Bikaner	-0.18	0.61	0.05	1.54	-1.13	-1.29	-0.20	0.33	0.05	1.12	0.13	0.21	3.65	0.70	0.57	6.16	0.41
Bundi	-5.54	-0.71	-0.87	-0.92	-0.87	0.31	-0.25	-0.30	-0.78	-0.70	-0.58	-0.29	-0.06	-0.84	-0.04	-12.44	-0.83
Chittaurgarh	-1.88	-0.22	0.23	-0.87	-0.81	0.28	0.17	-0.25	-0.29	-0.74	-0.57	-0.29	-0.57	-0.84	-0.34	-7.01	-0.47
Churu	-1.17	0.69	1.30	1.17	-0.90	-1.34	-0.50	-0.14	1.09	1.42	0.57	0.00	-0.62	-0.55	-0.70	0.33	0.02
Dausa	-3.11	-0.75	-0.61	-0.76	-0.37	0.17	0.95	-0.32	-0.61	-0.70	-0.50	-0.28	-0.25	-0.84	-0.71	-8.69	-0.58
Dhaulpur	-6.16	-0.82	-0.98	-0.71	-0.38	0.48	-0.84	-0.32	-0.88	-0.72	-0.57	-0.29	-0.61	1.83	0.06	-10.91	-0.73
Dungarpur	-3.36	-0.81	-0.69	-0.81	0.39	0.96	-0.54	-0.34	-0.76	-0.76	-0.55	-0.29	-0.63	-0.09	-0.62	-8.89	-0.59
Ganganagar	-0.25	1.17	-0.36	0.13	-1.04	-1.02	-0.89	-0.28	-0.22	0.95	3.33	3.98	-0.34	-0.84	-0.47	3.84	0.26
Hanumangarh	-1.80	1.00	-0.65	-0.23	-1.18	-1.11	-0.80	-0.31	-0.79	1.45	3.24	3.73	-0.55	-0.84	-0.35	0.81	0.05
Jaipur	26.30	4.15	1.59	0.38	-0.15	1.05	3.25	5.18	2.58	1.63	1.34	-0.13	-0.29	0.30	4.92	52.09	3.47
Jaisalmer	-9.21	-0.94	-0.77	-0.18	-1.05	-1.27	-0.67	-0.34	-1.04	-0.63	-0.47	-0.29	-0.62	-0.84	-0.89	-19.23	-1.28
Jalor	-1.78	-0.28	0.44	0.15	0.10	-1.28	0.26	-0.29	-0.88	-0.63	-0.12	-0.27	0.21	-0.25	-0.71	-5.34	-0.36
Jhalawar	-3.41	-0.52	-0.73	0.17	0.97	0.22	-0.58	-0.30	-0.67	-0.67	-0.56	-0.28	-0.53	2.42	-0.36	-4.82	-0.32
Jhunjhunun	0.08	0.01	2.60	0.48	-0.63	-1.13	0.87	-0.24	1.62	2.18	0.13	-0.29	-0.63	-0.70	-0.12	4.23	0.28
Jodhpur	8.44	1.25	0.39	2.13	-1.02	-1.05	0.83	1.71	-0.06	0.04	-0.15	-0.26	0.48	0.94	0.80	14.45	0.96
Karauli	-4.08	-0.79	-0.45	-0.57	0.35	-0.06	0.18	-0.32	-0.81	-0.64	-0.44	-0.28	-0.53	1.09	0.00	-7.34	-0.49
Kota	-0.05	0.75	-0.44	-0.85	-1.06	0.22	-0.30	0.24	1.24	-0.33	-0.56	-0.28	1.65	0.74	0.22	1.21	0.08
Nagaur	6.97	0.32	1.63	2.83	0.22	-1.07	-0.04	-0.08	1.15	1.22	0.61	-0.24	1.57	0.87	-0.04	15.91	1.06
Pali	1.64	0.27	0.45	1.02	0.53	-0.24	-0.63	-0.20	-0.04	0.13	0.18	-0.27	2.48	-0.03	-0.18	5.12	0.34
Pratapgarh	-6.99	-0.95	-0.87	-0.89	0.28	-0.07	-0.71	-0.34	-1.08	-0.81	-0.59	-0.30	-0.60	-0.59	-0.19	-14.71	-0.59
Rajsamand	-4.67	-0.53	-0.30	-0.85	0.30	0.02	-0.81	-0.31	-0.59	-0.71	-0.58	-0.29	-0.31	-0.84	-0.72	-11.20	-0.75
Sawai Madhopur	-4.38	-0.71	-0.73	-0.63	0.23	0.23	-0.24	-0.30	-0.63	-0.71	-0.48	-0.28	-0.13	-0.71	0.66	-8.80	-0.59
Sikar	2.22	0.10	2.84	0.35	-0.59	-0.70	1.16	-0.21	1.09	2.84	1.46	-0.22	-0.61	1.04	-0.21	10.57	0.70
Sirohi	-6.16	-0.54	-0.44	-0.66	-0.23	-0.41	-0.72	-0.30	-0.73	-0.64	-0.11	-0.29	-0.59	-0.84	-0.89	-13.55	-0.90
Tonk	-3.90	-0.65	-0.82	-0.84	-0.12	0.89	-0.76	-0.30	-0.65	-0.65	-0.55	-0.28	-0.10	2.41	-0.05	-6.37	-0.42
Udaipur	8.14	0.08	-0.45	-0.18	3.54	2.31	-0.03	-0.13	1.11	-0.47	-0.53	-0.28	-0.54	-0.84	0.08	11.80	0.79

Udaipur, Kota, Jodhpur and Ajmer has fresh water reservoirs and Ganganagar, Hanumangarh and Bikaner are getting fresh water from Indira Gandhi Canal.

In this category only Jodhpur has adequate piped sewer system (17%) and Ajmer (7%) has highest septic tank facilities but it is not sufficient. Bikaner (6%) and Kota (5%) are coming next to Jodhpur in piped sewer system. Rest of the districts have undeveloped piped sewer and septic tank system. Now every district is doing work on sanitation and giving their support to clean India and green India.

Very Poor Level

This category includes 16 districts which have the composite index value is negative (-0.3 to -1.2). This very poor status is directly related to the population. Physical features are also responsible for this status especially in Jaisalmer, Dhaulpur, Sawai Madhopur and in Bundi. Lack of awareness, education and financial support is playing a crucial role in these 16 districts. The quality of life is miserable in these district. Dungarpur district shows sudden growth in sanitation in last two year. The credit goes to Nagar Parishad, NGO and Government official who have taken big steps.

Challenges and Issues

Following major issues found during the study:

1. Government has launched several programs and policies but the awareness level among mass is insufficient to change their mindset to accord priorities to sanitation and conservation of water.
2. Less technological involvement to design cost effective and sustainable model.

3. Multilayer funding and delivery mechanism in sanitation programs should be minimized and grant subsidies on individual water conservation and harvesting systems.
4. Lack of financial support and target investments.
5. Less involvement of people at grass root level and insufficient implementation strategy.
6. There is a lack of incentive at individual level.

CONCLUSION

This paper attempts to investigate the status of drinking water and sanitation level in districts of Rajasthan. Financially Rajasthan is a deprived state but there are some districts which are doing very well in water conservation and in sanitation program. If sanitation and water conservation program align properly in the society with a strong political commitment it will certainly provide better benefits.

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