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STATUS OF GROUNDWATER AVAILABILITY AND QUALITY IN MASUDA BLOCK OF AJMER DISTRICT RAJASTHAN

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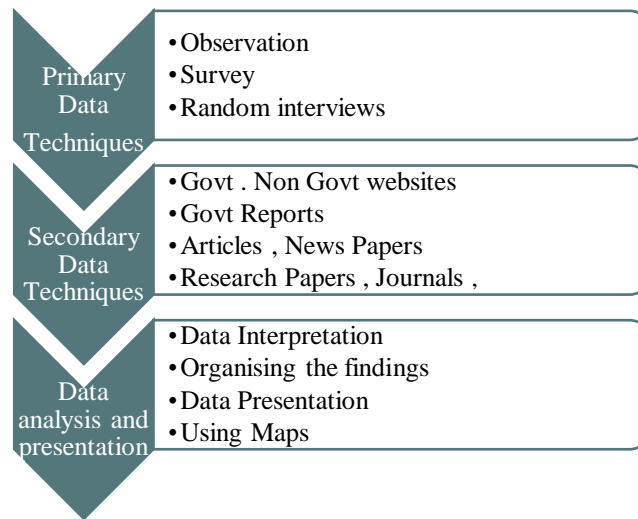
Abstract – This study is to understand the existing scenario of ground water level and condition of water quality and availability in the Masuda block of Ajmer district in the state of Rajasthan. In this study the Author took various papers and studies to understand the regional topography and the water condition in the block which are discussed below. The water is essential for every living kind so it is important to know the condition of water in our surroundings. Masuda block is a major town in Ajmer district which has so many cultural and geographical features mainly the temples and the topography. The study found the block in a critical condition in terms of water level and quality.

Keywords – Ground water status, water quality, water availability, Masuda block, Critical condition. Etc.

INTRODUCTION

Rajasthan is a state with diverse geographical and climatic conditions which is also topographically uneven. Western parts are full of sand and eastern part is hot and semi-arid region. Most of the population is mainly dependent on agriculture which is also depends on rainfall. It is also the Primary source of surface and groundwater water recharge.

Water in any form of availability is a very important resource for all the living organisms. Despite the good volume of rainfall in past few years Rajasthan is still in the phase where drinking water is always a challenge to fight. In India rainfall is always uneven. data shows that in past 10 year's rainfall wasn't good enough. In 2021 rainfall was 1236.1 mm before that it was 1020.80 mm in 2018 and 1073 mm in 2012. Rajasthan being a very large state area wise have different topographical characteristics like western parts have sandy nature where's eastern part is partly plain and partly plateau. In 2021 rainfall was 117% over the Rajasthan state in the monsoon season July to September 2021 as on LPA (Long period average) and monthly rainfall was maximum in august month 176% (LPA). South west monsoon is the major source of rainfall. Variability in this causes negative impacts like drought, floods crop failure etc.



Source –State Gis Fig. 1

Results / Findings and Discussion.

The regional geological characteristics are represented by Bhilwara and Delhi super groups which are further divided in many Groups and Formations. The rocks of Bhilwara Super Group occur from Arain block in northeast through Bhinay up to Bhinay block area, underlying the plains and comprised of Meta sedimentary sequences with associated magmatic complex and igneous rocks.

Regional Geology

The Aravalli range running in North and North East to-South and South West direction is occupied by the rocks of Delhi Super Group in the southern part which comprises of calcareous, argillaceous and erinaceous Meta sedimentary sequences with associated volcanic and igneous rocks. The rocks of the district have been complexly folded and faulted, metamorphosed and migmatized during organic episodes related to different geological cycles.

Table no. 1.

Age	Super group	Group	Lithology
Quaternary			Alluvium, sand and soil
	Intrusive	I. Sendara-Ambaji Granite II. Phulad Ophiolite Suite III. Kishangarh syenite	Granite and granite gneiss • amphibolite's, Hornblende schist, • Pyroxene granulite ultramafic rock • Nepheline and soda syenites
Lower to middle Proterozoic	Delhi super group	Ajabgarh Kumbhalgarh Group	❖ Muscovite-biotite schist ❖ quartzite camphylite ❖ mylonite, cataclasite ❖ dolomite
			Magmatic gneiss calc-gneiss calc-gneiss, calcitic marble mica schist; quartzite; • calc-gneiss, calc-schist; • calc-gneiss, impure marble; • calcitic marble; • quartzite;



FIG.2



FIG .3

Water composition / Quality

The table 1 shows the physiochemical composition of groundwater. The samples were collected during the pre-monsoon season of year 2006 by the scholars from MDS University Ajmer. Dutta S. Chowhan Pinky. And Gupta Vinita.

The findings of water sample testing shows (table 1.) Ph of the samples varied between 7.1 to 9.0. the lowest found in site 1 and the highest in site 23. This means that water in some places is relatively less alkaline whereas at other places is more alkaline. The total dissolved solids (TDS) ranged from 635mg/L to 5140 mg /L it showed the highest desirable limits of 500 mg/L (WHO 1971) Hardness in water is caused by metallic ions dissolved in water. Calcium and magnesium is common constituents of natural waters. Water with high sodium content is not suitable. A chloride in excess imparts the salty taste to water and people who are not accustomed to high chlorides are subjected to laxative effect (Ravi Prakash & Krishna Rao 1989)

Table 1: Physicochemical parameters of groundwater samples of Masuda Thesil in Ajmer district, Rajasthan.

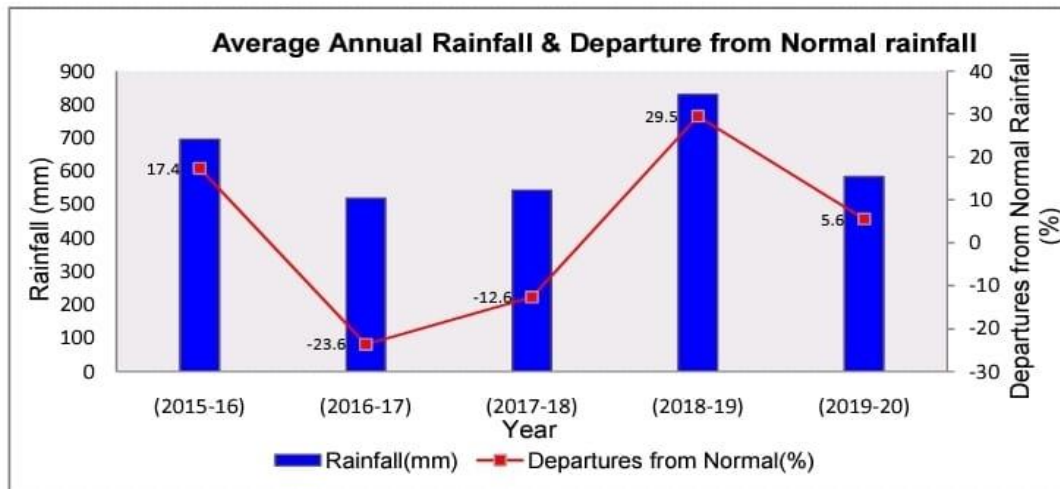
S. No.	Sampling sites	pH	EC	TDS	TH	Ca ⁺²	Mg ⁺²	Na ⁺	K ⁺	CO ₃ ⁻²	HCO ₃ ⁻	Cl ⁻	SO ₄ ⁻²	NO ₃ ⁻	F ⁻
1	S1	7.1	4.1	3003	230	84.1	48.60	150.7	5.25	Nil	431.2	120.7	330	300	0.7
2	S2	7.4	4.1	2690	140	50.46	134	225.5	9.85	Nil	451.1	71	360	250	0.66
3	S3	7.2	4.5	2770	190	71.48	27.9	124.14	5.75	14	100.5	113.6	8	200	0.53
4	S4	7.4	4.3	2450	210	79.89	25.5	142.53	3.45	18	122.6	127.8	10	150	0.51
5	S5	8.1	6.5	4380	310	42.05	49.83	423.01	5.25	20	880.8	653.2	140	60	0.88
6	S6	7.8	4	2940	130	46.25	135.02	308.06	2.15	12	925.2	369.2	160	25	6.11
7	S7	8.1	4.2	3260	140	50.46	34	809.5	2.2	42	490.8	106.5	275	30	0.74
8	S8	7.7	3.6	2800	350	105.1	21.27	326.45	7.2	Nil	550.2	397.6	120	30	3.61
9	S9	8	5	3440	875	29.43	44.72	375.5	9.3	Nil	175.6	99.4	130	60	2.36
10	S10	7.5	10.5	4580	210	37.84	28.07	188.51	6.5	8	371.5	958.5	118	30	5.42
11	S11	8.6	4.6	3180	90	29.43	24.01	386.23	9.2	10	825.2	350	108	30	2.93
12	S12	7.8	4.1	2850	1315	12.61	332	234.49	3.8	Nil	498.2	171	295	25	5.4
13	S13	8.9	3.1	2130	1435	16.82	252.2	202.31	10.5	Nil	580	749	850	25	2.6
14	S14	8.6	1.8	5140	1400	15.75	270.3	331.05	2.45	Nil	726	1010	900	30	2.5
15	S15	7.5	3.8	2360	140	50.46	34	110.5	8	Nil	285.4	100	63	25	1.4
16	S16	7.2	5.2	3840	50	16.82	19.4	142.53	2.55	10	240.2	57	16	25	0.8
17	S17	7.7	3.8	2820	260	96.72	44.9	151.73	2.75	16	240.2	43	120	30	0.3
18	S18	8	4.2	2700	220	84.1	24.3	142.53	3.25	18	285.4	78	180	25	0.64
19	S19	8	4.4	3180	180	67.28	29.1	220.7	3.9	18	600.5	100	65	20	1.1
20	S20	7.9	4.4	3350	190	71.48	27.9	165.52	5.5	12	315	71	52	20	0.72
21	S21	8	4.6	4590	120	42.05	36.4	160.93	3.5	Nil	550.2	252	115	25	0.8
22	S22	8.2	4.7	4220	190	71.48	27.9	514.97	9.8	Nil	575.3	241	125	25	0.72
23	S23	9	2.6	1970	160	67.28	57.1	155.6	8	Nil	580	114	50	20	0.14
24	S24	7.5	3.2	635	230	82.1	97.2	216.1	7.2	Nil	330.8	730	13	2	1.1
25	S25	7.6	2.8	3710	625	96.1	88.1	331.05	5.86	10	435.8	299	490	500	1.16

All the values are in mg/L except pH and conductivity (mS/cm).

Source - Research paper by scholars from MDS University Ajmer 2010

Water Availability in the region.

Rainfall is the major source of ground water recharge in the state. The state receives its 90% of rainfall from the south west monsoon from June to September. The average annual rainfall during the period of 2019-20 was 583 mm. Fig 1 shows the average annual rainfall and departure from normal rainfall. the highest departure was seen in the year 2018-19 and the lowest found in the year 2016-17. Fig 2 below shows the temporal rainfall changes during south west monsoon over the years. The highest recorded monsoonal rainfall was observed in 2011 which was much higher the normal rainfall in the state and the second highest rainfall was recorded in 2019. The lowest rainfall recorded in the year in 2018 which is much lower than the normal Rainfall over the past ten years.



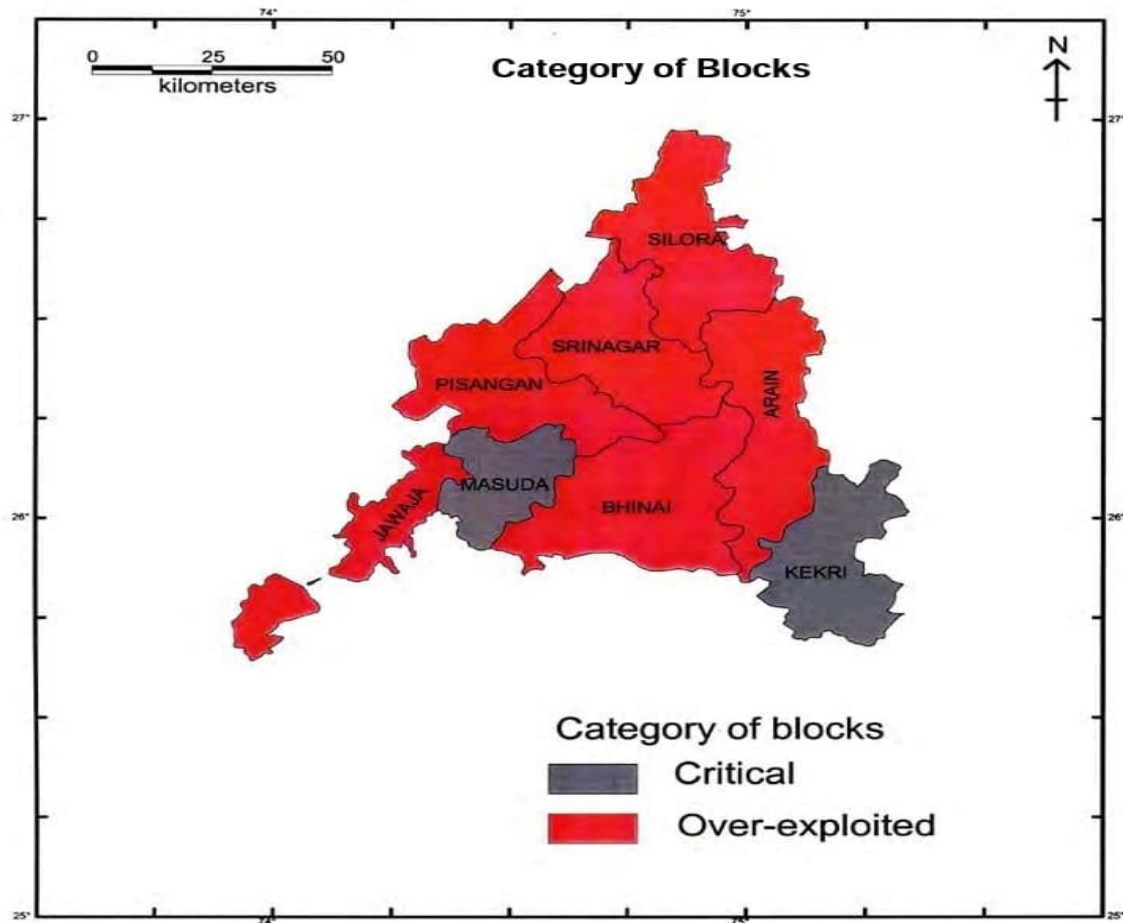
Source- Report on Dynamic Ground water resources of Rajasthan 2020 Fig .4

Table: Rainfall during southwest monsoon over Rajasthan in last few years

YEAR	ACTUAL RAINFALL (MM)	NORMAL RAINFALL (MM)	DEPARTURE FROM NORMAL (%)
2011	590.4	419	+41
2012	464.0	419	+11
2013	527.2	419	+26
2014	420.4	419	0
2015	457.0	419	+9
2016	536.4	419	+28
2017	454.9	419	+9
2018	393.3	419	-6
2019	583.6	415	+41
2020	449.8	415	+8
2021	485.3	414.5	+17

Fig .5

Dug wells, bore wells are the major tools for the ground water in development in the district. Which varies with 1 to 4 meter with depth ranging from 5 m to 50 m. 7 block out of 9 falls under the Over Exploited category and the rest 2 falls under the Critical category as per the report) Ground water scenario Ajmer District 2008). Gneiss, Schist and alluvium forms the aquifer of the district.



Source-Ajmer District Ground water report Jaipur 2008

The reassessed Ground water report 2004 by the Ground water estimation committee (1997) showed the below data that 7 out of 9 blocks of the Ajmer district are lies under over exploited category. The remaining 2 block lies under the Critical condition. The Masuda block of the district is the most vulnerable in the sense of water scarcity. The block is fully dependent on ground water and the pipeline supply. Which is maintained by the Public Health Engineering Department of the state.

The major source of water supply in the block is Bisalpur Dam. In 2001 its existing water Production was –

Bisalpur Dam -: 649.81 lac liters.

Foysagar -: 2.68 lac liters

Ganhera -: 9.94 lac liters

Local wells -: Nil

Block	Area (Sq.Km)	Type of Area	Potential Zone Area (Sq.Km.)	Net Annual GW availability (mcm)	Agriculture Draft (mcm)	Dom. & Ind Draft (mcm)	Annual Gross Draft for All Uses (mcm)	Stage of GW Dev (%)	Category
Arain	1194.4	NC	1064.01	37.8179	34.5084	3.7982	38.3066	101.29	O E
Bhinai	1216.19	NC	1150.82	37.0594	38.5668	4.4150	42.9818	115.98	O E
Jawaja	674.51	NC	484.33	22.3821	26.7428	5.7790	32.5218	145.3	O E
Kekri	985.92	NC	889.67	63.7925	55.6809	5.2867	60.9676	95.57	Critical
Masuda	891.99	NC	817.00	30.7444	25.1460	4.6027	29.7487	96.76	Critical
Pisangan	1239.91	NC	1108.05	54.2009	88.1961	8.4450	96.6411	178.3	O E
Silora	1245.09	NC	1012.88	42.8952	44.6370	4.2836	48.9206	114.05	O E
Srinagar	1032.99	NC	940.00	30.6722	32.8512	9.4477	42.2989	137.91	O E
DISTRICT			7466.76	319.5646	346.3292	46.0579	392.3871	122.79	
<i>O E – Over-exploited NC – Non Command</i>									

Conclusion –

The above study focuses on the water availability and quality in the block Masuda of Ajmer district. The study found that the scenario of the region is very disturbing in sense of purity and quality. The aim and objective of the study was to understand and explore the quality and availability of ground water in the region. For this study various sources of information are used for example Various journals, books, government reports, newspapers and different research papers. The author also visited in the region to explore the ground reality of the block and interacted with locals and had interviewed the farmers and local people about the study. The block is mainly known for its cultural and physical characteristics the region is lies in the mid aravali ranges of Ajmer district. The geology of the region as given above is kind of metamorphic and igneous majorly in nature.

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