



Quality of water of south Rajasthan (Review artical : A case study of Distt. Dungarpur (Rajasthan))

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Abstract

Dungarpur district of south Rajasthan is tribble area , covering geographical area of 3855.93 sq km, forms southern part of the state of Rajasthan. The district is bounded in the north by Udaipur district, in the east by Banswara district, in the southwest it has common border with the state of Gujarat . State extending between north latitudes 23°20' & 24°01' and east longitudes 73°22' & 74°23' is administered by 4 tehsils and 5 blocks. The district covers about 1.13% of total area of the State. According to 2011 census, total population of Dungarpur district was 1388552 with the composition of 1299809 rural and 88743 urban population.

I. INTRODUCTION

Dungarpur district is comprised by uneven hills of Aravallis comprising of mainly quartzite and intrusive rocks with low lying areas of phyllites, slates and schists. The district, though fairly open in the south is interspersed with stony hills covered with low jungle. In the north and east, the landscape is rugged and wild, but towards the southwestern border, the harsh features gradually become softer and finally merge in the hills of Gujarat region near shamlaji. The eastern part slopes towards the basin of Mahi river .

The district water pockets are two rivers Som and Mahi. Som seperates Dungarpur and Udaipur districts and also separates Dungarpur district from Banswara district. Mahi Kanta hills is origine point of river Mahi in the western part of Madhya Pradesh and from there it enters Banswara and Dungarpur districts before entering Gujarat near village Salakari. The principal source of ground water recharge is precipitation.

II. GROUND WATER QUALITY

For the evaluation of hydrochemical status and distribution of various chemical constituents in ground water in the district, ground water samples are collected from the national network of observation wells during the month of May. Analysis and obserations of various important chemical constituents on ground water are as :

1 Electrical Conductivity (EC)

The presence of dissociated ions in solution makes the solution conductive. EC of a solution gives an idea about the quantity of ions or dissolved solids present in it. Electrical conductivity in the district has been found to range from 466 to 2800 $\mu\text{S}/\text{cm}$ at 25°C. Electrical conductivity more than 2000 $\mu\text{S}/\text{cm}$ at 25°C has been observed mostly in the adjoining blocks of Sagwara, Aspur and Dungarpur which suggests more soluble particals in the water.

2 Fluoride (F)

Fluoride concentration in ground water in the district was found to vary from 0.12 to 5.35 mg/l. Occurrence of high fluoride in ground water in the district is a matter of great concern as 55.56% of the ground water samples collected for chemical analysis have shown fluoride value beyond maximum permissible limit of 1.5 mg/l (Table 2) . Around 33.33% and 11.11% of stations are within desirable and maximum permissible limit respectively. The area adjoining blocks of Aspur, Dungarpur and Sagwara are affected with fluoride contamination in ground water.

3.Iron (Fe)

Iron content in ground water has been found to vary from 0.005 to 1.065 mg/l. Iron contamination has been observed in the adjoining blocks of Bicchiwara, Dungarpur and Simalwara. About 11.11% of samples analysed have iron value beyond the permissible limit of 1.0 mg/l. About 44.44% samples have iron content are

within desirable limit of 0.3 mg/l and rest 44.44% have iron content between the desirable and maximum permissible limits (0.31 to 1.0 mg/l).

4. Nitrate (NO₃)

Dungarpur district does not have nitrate pollution problem. Nitrate concentration was found to range from 1 to 71 mg/l. Only one sample from Sagwara block was found to contain nitrate concentration more than the permissible limit 45 mg/l. Around 88.88% of stations have nitrate values within desirable limit & 11.11% of stations are within maximum permissible limit & no station have value beyond permissible limit in the district. Higher concentrations of nitrate are expected where fertilizers are used, in decayed animals and vegetable matter, in leaches from sludge and refuse disposal and in industrial discharges. Higher concentration of nitrate causes methaemoglobinaemia disease in bottle fed infants (3 months old). Gastrointestinal disorders are also found. It may also have adverse effect on central nervous and cardio vascular system.

Ground water related issues and problems

Over the past decade, ground water levels have registered declining trends in some parts of the district. Four blocks in the district fall under semicritical category, which require cautious approach in ground water development to protect ground water resources against depletion. Fluoride contamination in ground water is also a matter of concern.

Due to pressure of population and improvement in the standard of living, the demand of fresh water for both agriculture and domestic use has substantially increased. As surface flow is available only for a limited period, ground water withdrawal has sharply increased. Four out of five blocks fall under semicritical category. Special attention is to be paid for ground water management in such blocks to avoid further deterioration of ground water situation. Artificial recharge measures need to be implemented simultaneously in these blocks to sustainability of abstraction structures.

Table 1 Organoleptic and Physical Parameters

Sl No.	Characteristic (Acceptable Limit)	Requirement Limit in the Absence of Alternate	Permissible Ref to Part of IS 3025	Method of Test,	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i) Colour	Hazen units, Max	5	15	Part 4	Extended to 15 only, if toxic substances are not suspected in absence of alternate source
ii) Odour heated b) Test		Agreeable	Agreeable	Part 5	a) Test cold and when at several dilutions
iii) pH		value 6.5-8.5	No relaxation	Part 11	-
iv) Taste be conducted only after been established		Agreeable	Agreeable	Parts 7 and 8	Test to safety has
v) Turbidity, NTU Max		1	5	Part 10	-
vi) Total dissolved solids, mg/l, Max		500	2 000	Part 16	—

Table 2 General Parameters Concerning Substances Undesirable in Excessive Amounts

Sl No.	Characteristic	Requirement Acceptable limit	Permissible limit
(i)	Aluminium (as Al), mg/l	Max 0.03	0.2
ii)	Ammonia (as total ammonia-N),	0.5	No relaxation)
iii)	Anionic detergents (as MBAS)	0.2	1.0 mg/l
iv)	Barium (as Ba), mg/l,	Max 0.7	No relaxation
v)	Boron (as B), mg/l,	Max 0.5	—
vi)	Calcium (as Ca), mg/l,	Max 75	—
vii)	Chloramines (as Cl ₂), mg/l	, Max 4.0	No relaxation
viii)	Chloride (as Cl), mg/l,	Max 250	1 000—
ix)	Copper (as Cu), mg/l,	Max 0.05 1.5 —	
x)	Fluoride (as F) mg/l,	Max 1.0	1.5
xi)	Free residual chlorine, mg/l,	Min 0.2	1

REFERENCES :

- [1]. DISTRICT GROUND WATER BROCHURE, WESTERN REGION JAIPUR 2013
 [2]. BUREAU OF INDIAN STANDARDS (II edition) May 2012