CHANGES IN GROUND WATER LEVELS

Analysis of the long-term groundwater level trend for 10 years from 1997-2006 of the district reveals that rise and fall in groundwater level in different parts of the district. Long term rise in water level during the pre-monsoon period ranged from neglible to 1.6 m/yr while the fall ranged from neglible to 3.15 m/yr. The long term water level fluctuation for the Post monsoon period also reveals that rise in groundwater level is predominant in the district with changes in rise ranging from neglible to 1.33 m/yr while fall recorded in the district ranged from neglible to 0.66 m/yr.

GROUND WATER RESOURCES

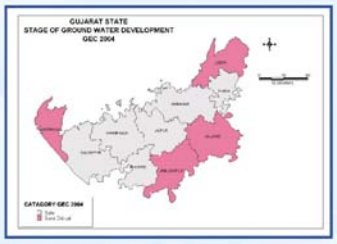
The ground water resources potential as on March 2004 of Jamnagar district and stage of development are presented in table. Jodiya, Jam Jodhpur, Kalavad and Okhamandal taluka have been classified as semi critical category and the rest of 6 talukas of the district are classified as safe or white category.

Table: Ground water resources potential in Jamnagar

(in ham)

Taluka	Net Annual GW Availability	Existing Gross GW Draft for irrigation	Total Draft	Allocation for domestic and industrial need25 yrs	Net GW Availability for future irrigation	Stage of GW Development (%)
Bhanvad	9007	4127	4426	444	4436	49
Dhrol	5248	2902	3005	152	2193	57
Jodiya	3420	2477	2610	198	745	76
Jamnagar	11507	6256	7556	1934	3317	66
Kalyanpur	7196	2683	3122	652	3861	43
Khambhalia	13392	7151	7721	847	5393	58
Kalavad	11726	7850	8221	552	3324	70
Jam Jodhpur	10179	6967	7287	476	2737	72
Lalpur	11840	5206	5483	412	6221	46
Okhamandal	1638	1069	1314	366	203	80
Total	**85153**	**46688**	**50745**	**6033**	**32431**	**60**

The overall stage of groundwater development in the district is about 60% and thus it is categorised as Semi-Critical.



GROUND WATER QUALITY

Chemical Constituents	Geological formations			
	Deccan Traps	Gaj Series	Dwarka series	Alluvium
EC (µS/cm)	620-2650	990-7870	855-16910	1405-10850
Na (ppm)	32-1839	101-1127	49-2875	43-1656
Cl (ppm)	28-9268	142-2329	64-5991	57-3000
Fluoride (ppm)	0.16-4.6	0.4-9.6	0.2-9.6	0.2-0.7

GROUND WATER ISSUES AND PROBLEMS

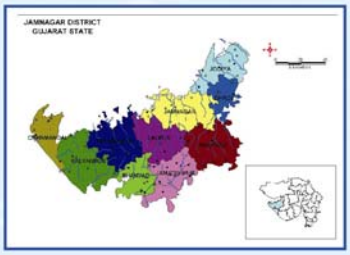
- Declining groundwater level needs immediate attention.
- Four taluka categorised as semi-critical needs proper groundwater management.
- As per the GWSSB about 232 villages are affected by groundwater salinity, 58 villages by high Fluoride concentration.
- Regularisation of abstraction and control of salinity ingress is required.
- Awareness among the people regarding rainwater harvesting and artificial recharge is required.

ARTIFICIAL RECHARGE

This district falls in the Rivers draining into Gulf of Kachchh. It is estimated that the total volume of de-saturated zone feasible for recharge in the basin is 32013 MCM. Around 3271 MCM of water is needed to recharge to bring the water level upto 8m

Government of India
Ministry Of Water Resources
Central Ground Water Board

GROUND WATER SCENARIO OF JAMNAGAR DISTRICT GUJARAT



CENTRAL GROUND WATER BOARD
West Central Region
Ahmedabad
March-2009

GROUND WATER SCENARIO OF JAMNAGAR DISTRICT, GUJARAT

Introduction

Jamnagar district occupies 14,125 sq. km and lies in the Saurashtra Peninsular region of Gujarat state. The district has 10 talukas, having 756 villages. Total population of the district as per 2001 census is 19,04,000 souls.

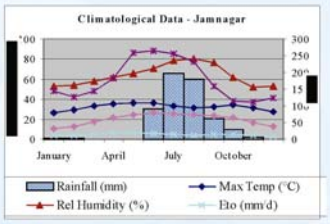
Rainfall & Climate

The district has semi-arid climate. Extreme temperatures, erratic rainfall and high evaporation are the characteristic features of this type of climate. The average annual normal rainfall (1951-1980) recorded at the Jamnagar IMD is about 573.4 mm. The minimum and maximum temperature ranges from 10.7°C in January to 36.5°C during the months of May.

Geomorphology & Soil

Physiographically the district can be divided into the Hilly areas, Coastal area & alluvial Plains. Plain areas exist in Jamnagar, Jodiya, Khambhaliya and Kalyanpur talukas. Hilly areas occur in Jam Jodphur, Lalpur and Bhanwad talukas. Cliffs are present in the Dwarka taluka with height up to 30m. Okha Rann is a low-lying marshy area. Low coastal dunes and sand banks run along the north and west coasts. Jamnagar, Jodiya and Kalyanpur are plain areas.

Soils of the district may be broadly classified as Coastal alluvial, medium black, shallow black and hilly. The medium black and shallow black soils are the main soil type of the district, while the coastal and hilly soils are the sub-soils.



GROUNDWATER OCCURRENCE HYDROGEOLOGY

Hydrogeologically rock formation in the district can be broadly grouped into fissured formation comprising "Deccan traps" and porous formation comprising "Tertiary and Alluvium". Nearly 80% of the area is underlain by Deccan Traps, 19% by the Tertiaries and the rest by Alluvium.

Deccan Traps: Groundwater occurs under unconfined to confined conditions. The depth to water level ranges from 3.30 m bgl to 25.40 bgl during the pre-monsoon period while during the post monsoon the water level ranges from mere ground level to 17 m bgl. The yields of the wells tapping weathered basalts range between 20 and 100 m3/day, while wells tapping the interflow zones have high yields (100-400 m3/day). The bore wells in this district have yields ranging from 100 to 500 m3/day.

Gaj Beds: Groundwater in Gaj beds occurs in water table conditions confined. The upper granular bed of the series consisting of limestone and grits forms a good aquifer for shallow groundwater. Dug wells and dug-cum bore wells within the depth range of 20-25 mbgl are constructed. The depth to water level ranges from 5 to 15 m bgl during pre-monsoon while during post monsoon the water level ranges from mere ground level to 17.0 m bgl. The yield of the wells varies from 4 to 312 m^3/day with an average yield of 66 m^3/day.

Dwarka Beds : The groundwater within this formation occurs under water table conditions. The clayey nature of Dwarka beds and the narrow stretch of sandy limestone exposed form poor aquifers. The depth to the water level in the Dwarka beds ranges from 2 to 10 m bgl during pre-monsoon period while during the post monsoon the water level ranges from mere ground level to 8 m bgl. The depth of the dugwells and dug-cum bore well range

between 20 and 35 mbgl. The yield of the wells varies from 8 to 270 m3/day with an average yield of 80 m^3/day.

Miliolite Series: Groundwater occurs under phreatic conditions. The milliolite limestone acts as a good reservoir for shallow groundwater. The depth to water level in milliolite limestones is generally about 5m bgl and yields 100-200m^3/day.

Alluvium: Groundwater occurs under unconfined conditions. The thickness of the alluvium is not more than 20m. Because of its clayey nature, percolation of rainwater is very poor resulting in poor yields. The depth to water level ranges from 2 to 10m bgl in Premonsoon while during the post monsoon the water level ranges from mere ground level to 7.89 m bgl. The yield of these wells is generally less than 100m^3/day.