Draft Report

केंद्रीय भूमि जल बोर्ड

जल संसाधन, नदी विकास और गंगा संरक्षण मंत्रालय

भारत सरकार

Central Ground Water Board

Ministry of Water Resources, River Development and Ganga Rejuvenation

Government of India

Report on

AQUIFER MAPPING AND MANAGEMENT PLAN

Channagiri Taluk, Davanagere District, Karnataka

दक्षिण पश्चिमी क्षेत्र, बैंगलोर

South Western Region,Bengaluru

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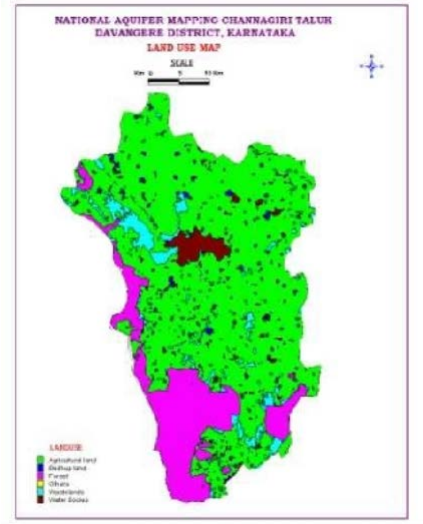
Government of India
Ministry of Water Resources, River Development
& Ganga Rejuvenation
Central Ground Water Board

CHANNAGIRI TALUK AQUIFER MAPS AND MANAGEMENT PLANS,

DAVANAGERE DISTRICT, KARNATAKA STATE



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March 2017

CHANNAGIRI TALUK AQUIFER MAPS AND MANAGEMENT PLANS, DAVANAGERE DISTRICT, KARNATAKA STATE

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CHANNAGIRI TALUK AQUIFER MAPS AND MANAGEMENT PLANS, DAVANAGERE DISTRICT, KARNATAKA STATE

1. SALIENT INFORMATION

Name of the taluk : **CHANNAGIRI**
District : Davanagere
State : Karnataka
Area : 1,219 sq.km.
Population : 3,02,317 (2011): Urban 21313: Rural 281004.
Growth rate : 3.35%
Annual Normal Rainfall : 818 mm: Normal monsoon 507 mm

1a. Agriculture & irrigation

The taluk's main economical activities of the populace is agriculture. The principal crops commonly grown are Paddy, Maize, Jowar,,Ragi, Pulse varieties, Sugarcane, Fruit, Vegetables in the area. The cotton and sugarcane crops accounted little over an area of 20 sq.km. The net area of 744.18 Sq.km sown in the taluk.The forest covers an area of about 294 sq.km which is found uncultivable as shown in figure 1.

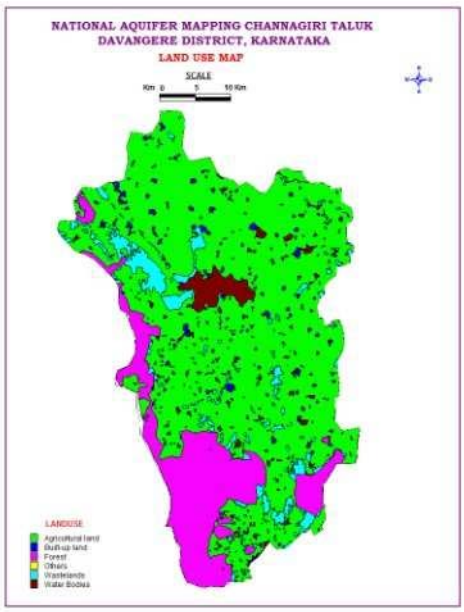

Fig 1: Local district

The surface water (Tanks) and ground water (BW) are predominantly used for irrigating various crops in the taluk and accounted for an area of 136.17 &192.51 Sq.km respectively as indicated in table 1. The gross area under irrigation accounts for about 511.26 sq.km (source: District at a glance 2013-14).

Table 1. Source of Irrigation, Channagiri taluk

Source of Irrigation	Unit in Nos.	Net Area (Ha)	Gross Area (Ha)
Canals*	42	11705	23166
Tanks	176	1912	1912
Wells	1084	0	0
Bore wells	14882	19251	26048
Lift Irrigation	298	0	0
Others	0	0	0
Total		**32868**	**51126**

1.**2 Groundwater Availability and Extraction**

1.2a Groundwater availability

The main source of ground water in Channagiri taluk is precipitation occurring in the area. Groundwater occurs under phreatic and semi-confined conditions. The yield of wells varies from <1 to >5 lps. The ground water extraction is carried out through bore wells as dug well zones observed depleting trend owing to the high demand and poorly regulated private and government system result in unabated with drawl for the precious water from the deeper zones. It is estimated a net annual ground water resources of 11382 ham available annually in the taluk. The gross groundwater draft of 13079 Ham is accounted for the water utilised in various sectors in the taluk, which resulted in an overall draft of 115 % of the resources viz,. Irrigation draft 12157 ham and domestic & industrial water supply as 922 Ham.

1.2b Water level behaviour

Depth to Water level (DTW) during the pre-monsoon period-May observed in the range of 1.0-4.00 m.bgl and 0.5-2.00 mbgl recorded during the Post- monsoon period November, as depicted in figure 2 & 3 respectively.

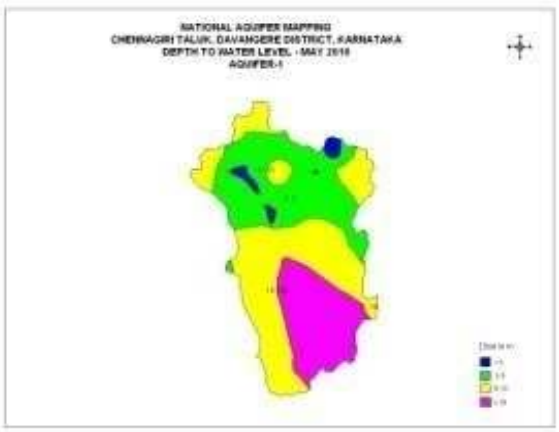

Fig 2. Pre-monsoon DTW map (Aq-I)

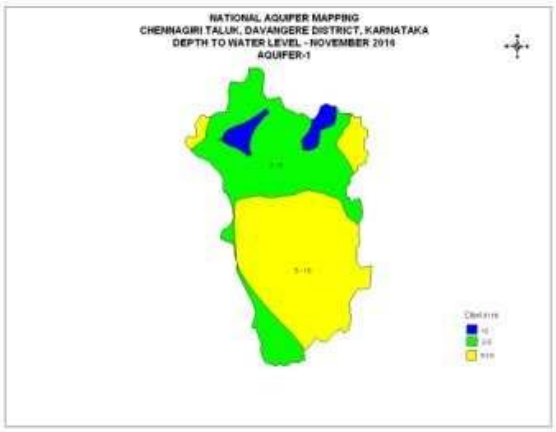

Fig 3. Post-monsoon DTW map (Aq-I)

The annual seasonal fluctuation of water level registered between 2.0- 4.0 m. Also, isolated pockets identified having a –ve fluctuation/fall in water level up to 4.0 m as shown in figure 4. A representative hydrograph station located at Santebennur shows a rising trend of DTW

during January months ,as depicted in figure 5. The bore well records show the water level ranged from 5.00 to > 20.00 mbgl during pre-monsoon as shown in figure 6.

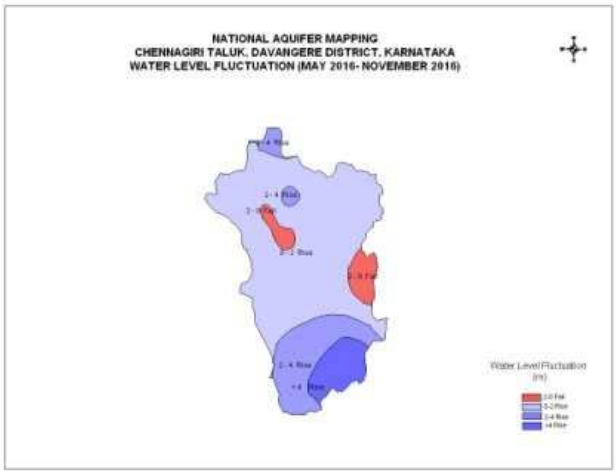

Fig 4. Water table fluctuation map(Aq-I)

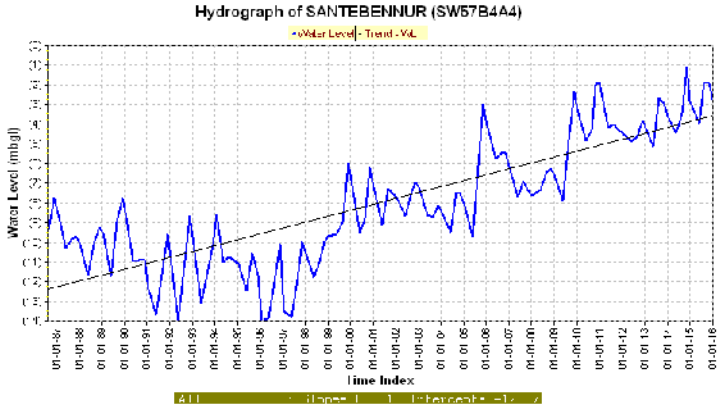

Fig 5. Hydrograph of Santebennur observation well

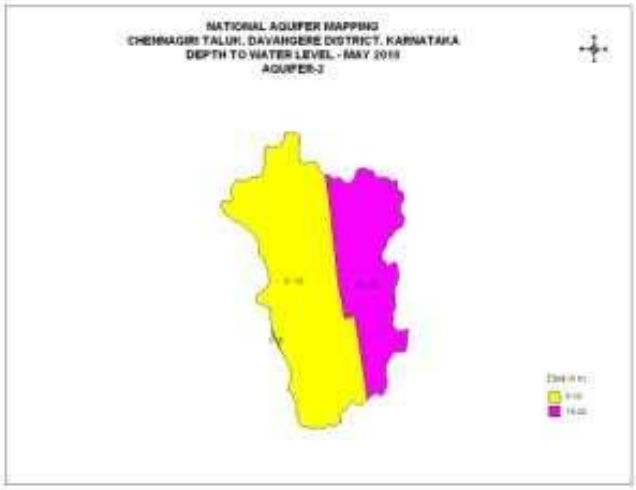

Fig 6. Water table fluctuation map (Aq-II)

2. AQUIFER DISPOSITION

Granites, Granitic-gneisses and Schist formations occupy the entire taluk and they form the main water bearing formations in the area (figure 7). Weathered zone occurs > 5.00 mbgl to 21 mbgl thick as shown in figure 4. The bore wells drilled down to 200 mbgl depth reveals the presence of potential fracture between 50 - 100 mbgl. Also, the frequency of fracture occurrence in the bore wells reduces with depth.

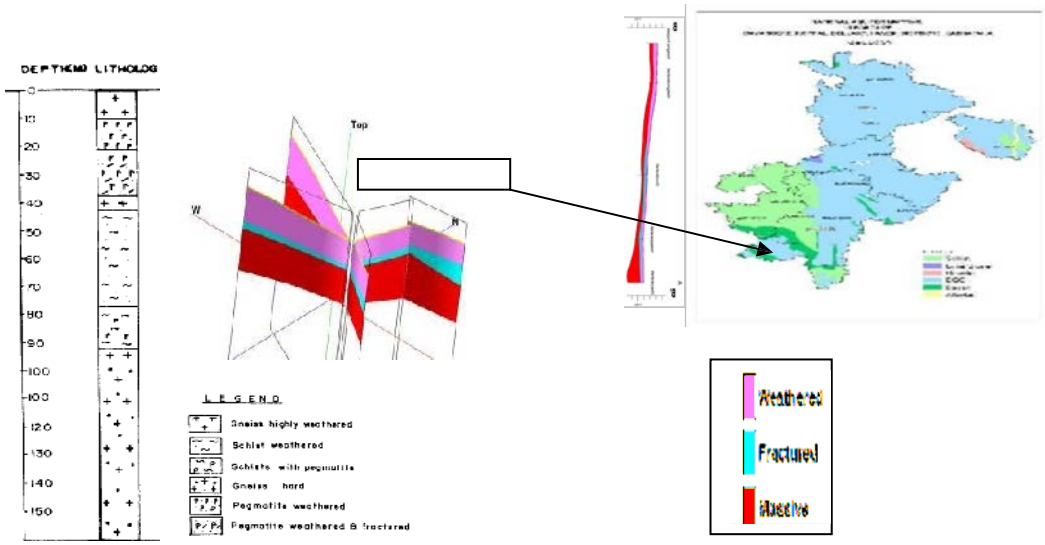

Fig 7. Aquifer disposition (Rockworks output)

Groundwater occurs under phreatic and semi-confined conditions. The yield of wells varies from <1 to >5 lps and Transmissivity 5 to 16 m2/day, at places it is observed up to 171 m2/day, as tested at Nallur-Ground water exploratory well.

3. GROUNDWATER RESOURCE, EXTRACTION, CONTAMINATION AND OTHER ISSUES

3 a. **Groundwater Resource**

It is estimated a net annual ground water resources of 11382 ham available annually in the taluk. The gross groundwater draft of 13079 Ham is accounted for the water utilised in various sectors in the taluk, which resulted in an overall draft of 115 % of the resources viz,. Irrigation draft 12157 ham and domestic & industrial water supply as 922 Ham. On the basis of ground water development, the taluk is categorised as over exploited (OE), as on 31 March 2013.

3 b. Aquifer wise Groundwater availability

In addition to the aquifer zone available in the dynamic zone there is an area of 1133 Sq.km as identified suitable area where the aquifer material is available down to 200 m depth. It is estimated availability of 45.32 and 405.614 MCM of storage potential , which include a part

of weathered zone below the zone of fluctuation and the fractured zone underneath the weathered zone . The dynamic zone having developed annually, have capacity to store a net annual ground water resources of 11382 ham.3-c.

3 c. Chemical quality &Contamination

There are areas with higher fluoride concentration in the groundwater showing above 1.5 mg/l as in and around the localities Kanavabelichi and Venkateshwara camp, as shown in the figure.8 and the Nitrate pollution >45 mg/l occurs in localised areas as indicated in fig.9 .The above quality deterioration attributed to the decomposition of fluorite bearing minerals in the host aquifer material and in efficient waste and drainage disposal system prevail in the taluk.

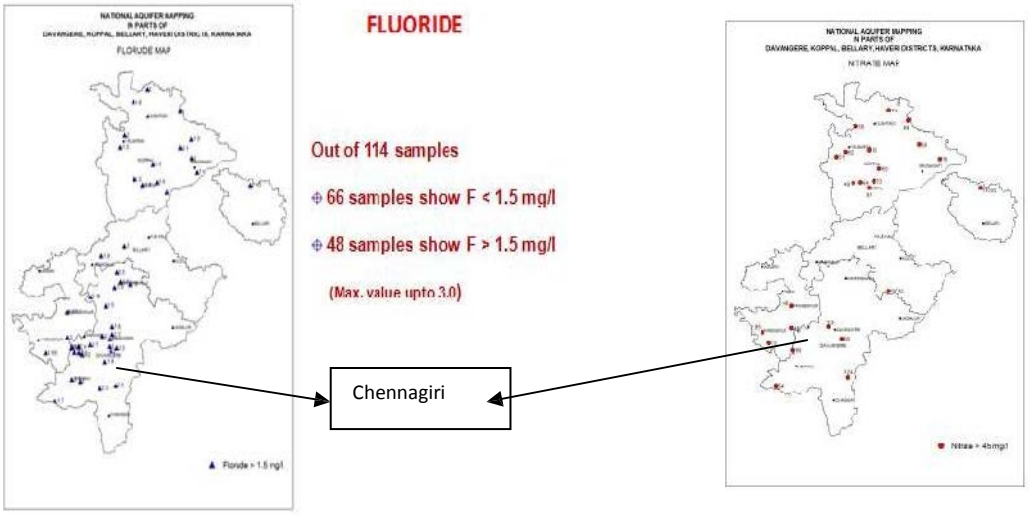

Fig 8. Fluoride distribution map

Fig 9. Nitrate distribution map

4. GROUNDWATER RESOURCE ENHANCEMENT

4 a. Non-committed monsoon run-off

In order to improve groundwater resources especially in the supply areas, it is proposed 29.20 MCM of non-committed monsoon run-off to develop them through an area of 1133 Sq.km as identified suitable area having 45.32 and 405.614 MCM of storage potential of aquifer material available both in weathered and fractured aquifer zones available down to 200 m.

Considering the estimated storage potential, it has been proposed to develop the said area through 180 Check Dams, 12 No of Percolation tanks and 19 No of Point Recharge Structure. As a result a total of around 16.547 MCM ground water recharge is anticipated from the above structures, viz.CD-10.808, PT-5.477, /PRS-0.263 MCM respectively ,as indicated in table 2.

To facilitate the above development, it is proposed to develop the micro watersheds by drainage line treatment, reclamation of small gullies.

Table 2. Non-committed monsoon run-off and its development

Taluk Area (sq Km)	Area suitable for artificial recharge (sq km)	Non Committed Monsoon Run off (MCM)	No of Check Dams Feasible	No of Percolation Tanks Feasible	No of Point Recharge Structure Feasible	Total Cost including impact assessment (lakhs)	Total Recharge (MCM)	Expected Rise of water Level (m)
1219	1133	29.2	180	12	19	704.14	16.55	0.73

5. DEMAND SIDE INTERVENTION

5 a. Water use efficient practices

In terms of demand side management of water resources, it is proposed to enhance area within the irrigated lands to practice water efficient irrigation and water conservation practices like micro irrigation - Drip & Sprinkler devices. It is also proposed to switch over to use of water use efficient gadgets in the domestic and industrial sectors. Also, changing in cropping pattern by growing less water intensive crops in a limited area with micro irrigation practices proposed to save the groundwater to the tune of 3116 Ham.

5 b. Alternate water resources

A proposal in pipeline with the Government of Karnataka to transfer surplus surface water from the west flowing river basin under ambitious Yettinahole project has been projected to recharge/enhance the availability of groundwater resources by 5886 Ham in the taluk.

5 c. Regulation & Control/Other intervention proposed

The implementation of ground water regulation and control measures would improve the issues prevailing in the taluk viz. (1) ill organised/uncontrolled withdrawal - Poor information dissemination or knowledge sharing among the population/stake holders of groundwater on the nature and occurrence of potential aquifer system in the taluk (2) Depleting phreatic aquifer, decline in water level, decline in water level, quality deterioration - High degree of dependence on the groundwater resources results in overdraft of resources, declining water level, resource scarcity,

Implementation of Rain water harvesting in massive scale would improve the availability of water resources in the micro watersheds and cost effectiveness in fresh water

accessibility and its sustainability. Supply of alternate sources in the fluoride affected areas and arrangements for proper waste disposal and drainage system in both domestic and irrigation sector would improve the water resources and its security.

5 d. Outcome of AMP

The proposed supply and demand side management measures proposed in the AMP expected to have the cumulative annual resources availability to the tune of 22038 Ham. With the prevailing resource draft scenario, it is anticipated to bring up the area under comfortable water resource position with 59% development. It is also inferred a phenomenal shift from the existing Over-exploited category to a safe category and with an ample scope for the furthering groundwater developmental activities.

Table 3. Status Ground water Resources & Development

Cumulative annual ground water availability after implementing AR structures & GW recharge schemes	Existing gross ground water draft for all uses	Stage of ground water development after implementing AR structures & Yettinahole project	Saving due to adopting WUE measures	Cumulative annual ground water availability	Expected improvement in stage of ground water development after the implementation of WUE	Expected improvement in overall stage of ground water development
18922	13079	69	3116	22038	59	10