



केन्द्रीय भूमिजल बोर्ड

जल शक्ति मंत्रालय, जल संसाधन, नदी विकास
और गंगा संरक्षण विभाग

भारत सरकार

Central Ground Water Board

Ministry of Jal Shakti,
Department of Water Resources, River Development
and Ganga Rejuvenation
Government of India

Report on

AQUIFER MAPPING AND MANAGEMENT PLAN

Bailahongal Taluk, Belagavi District, Karnataka

दक्षिण पश्चिमी क्षेत्र, बेंगलुरु

South Western Region, Bengaluru

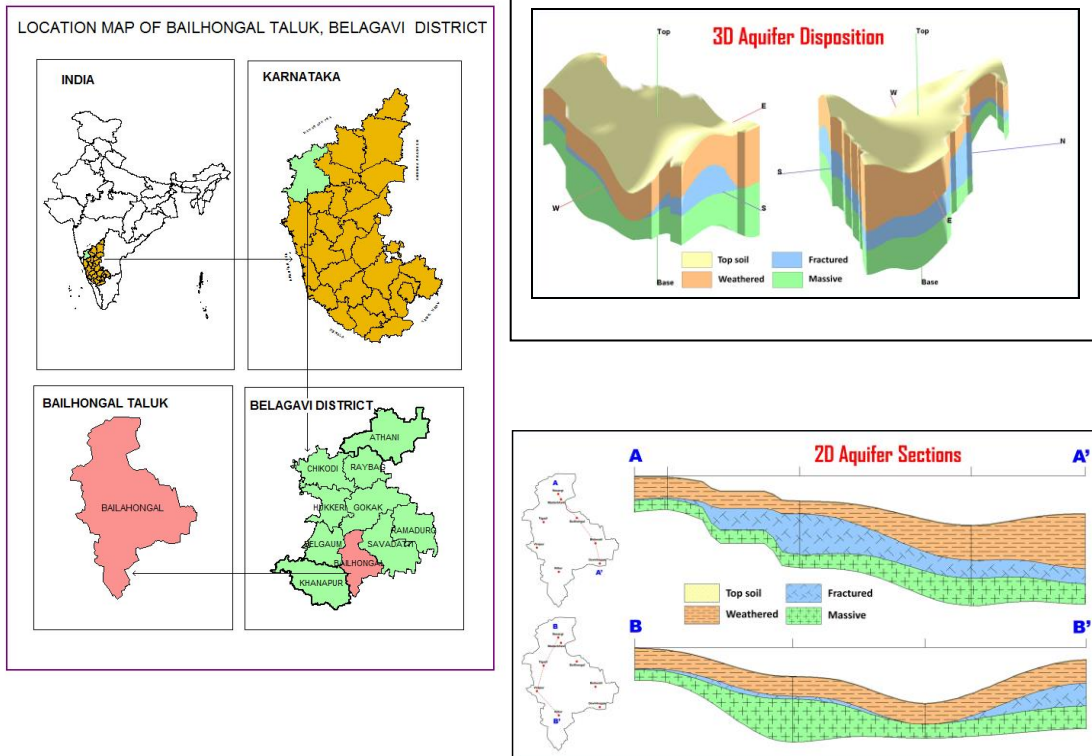
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AQUIFER MAPS AND MANAGEMENT PLAN, BAILAHONGAL TALUK, BELAGAVI DISTRICT, KARNATAKA STATE

(AAP – 2020-2021)



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AUGUST 2022

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AQUIFER MAPS AND MANAGEMENT PLAN OF BAILHONGAL TALUK, BELAGAVI DISTRICT, KARNATAKA STATE

1 SALIENT INFORMATION

Name of the taluk: **BAILHONGAL**
District: **BELAGAVI**; State: Karnataka
Area: 1120 sq.km.
Population: 3,81,189
Annual Normal Rainfall: 641 mm

1.1 Aquifer Management Study Area

Aquifer Mapping Studies have been carried out in Bailhongal taluk, Belagavi district of Karnataka, covering an area of 1120 sq.kms under National Aquifer Mapping Project. The Bailhongal taluk is located between North Latitudes 15°27'34.4" and 15°59'23.17" and East Longitudes between 74° 37' 57.9" to 75°00'57.7" and is falling in Survey of India Toposheets No forms parts of 48I/9,I/10, I/13 and I/14. The study area is bounded on the East by Savadatti taluk, on the North by Gokak, on the South by Dharwad district, on the West by Belagavi and Khanapur taluks of Belagavi district. Location map of Bailhongal taluk of Belagavi district is presented in **Figure-1**. Bailhongal is taluk head quarter . There are 132 villages and 50 gram panchayats in this taluk.

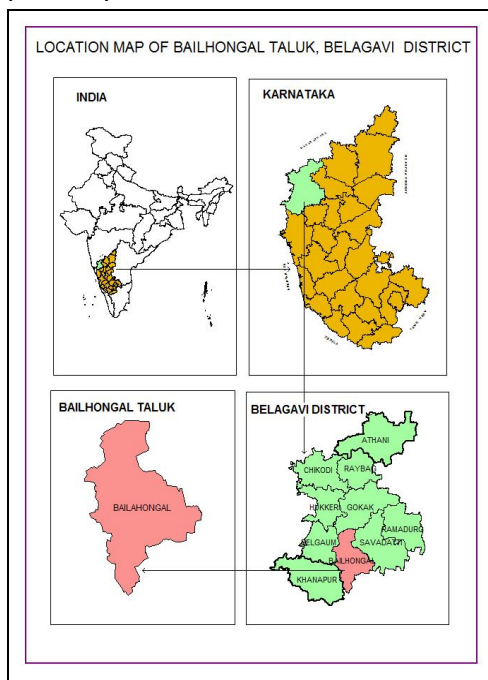


Fig-1: Location map of Bailhongal taluk of Belagavi district

1.2 Population

According to 2011 census, the population in Bailhongal taluk is 3,81,189. Out of which 1,92,462 are males while 1,88,727 are females. The average sex ratio of Bailhongal taluk is 991. The Bailhongal taluk has an overall population density of 340 persons per sq.km. The decadal variation in population from 2001-2011 is 15.10% in Bailhongal taluk. Details of Population of Bailhongal taluk is given in **Table-1**.

Table-1. Details of Population of Bailhongal taluk, Belagavi district

Male	Female	SC	ST	TOTAL	No. of Village's	No. of GPs	Literacy %	Density
192462	188727	26111	33911	381189	132	50	72	340

Source: Belgavi District at A Glance, 2017-18

1.3 Rainfall

Bailhongal taluk enjoys semi-arid climate. This taluka falls under Northern Transitional agro-climatic zone of Karnataka state. The normal annual rainfall in Bailhongal taluk for the period 1981 to 2010 is 641 mm. Seasonal rainfall pattern indicates that, major amount of 430 mm rainfall was recorded during South-West Monsoon seasons, which contributes about 67% of the annual normal rainfall, followed by North-East Monsoon season (130 mm) constituting 20% and remaining (81 mm) 13% in Pre-Monsoon season (**Table-1**).

On Computations were carried out for the 30 year blocks of 1981-2010, the mean monthly rainfall at Bailhongal taluk is ranging between 1 mm during January & February to 122 mm during July. The coefficient of variation percent for pre-monsoon, monsoon and post-monsoon season is 61, 39 & 52 percent respectively. Annual Co-efficient Variation at this station works out to be 28 percent (**Table-2**).

Table-2: Statistical Analysis of Rainfall Data of Bailhongal taluk, Belagavi district (1981 to 2010)

STATI ON		JA N	FE B	MA R	AP R	MA Y	PR E	JU N	JU L	AU G	SE P	S W	OC T	NO V	DE C	NE	Annua l
BAILHONGAL	NR M	1	1	9	18	52	81	12	12	86	10	43	98	27	5	13	641
	STD EV	4	4	27	15	42	50	71	80	43	65	16	67	28	15	67	178
	CV%	31	47	293	81	82	61	59	66	50	64	39	68	105	28	52	28

The annual rainfall data from 2009 to 2018 of the Bailhongal taluk is collected from the district statistical office, Belagavi and is given in Table.3. The rainfall trend for the period from 2009 to 2018 and probability occurrence of rainfall of the taluk are shown in **Fig.2 & Fig-3** respectively.

Table-3 Actual Annual Rainfall of Bailhongal taluk from 2009 to 2018

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Rainfall (mm)	856	889	728	448	615	871	593	515	615	552

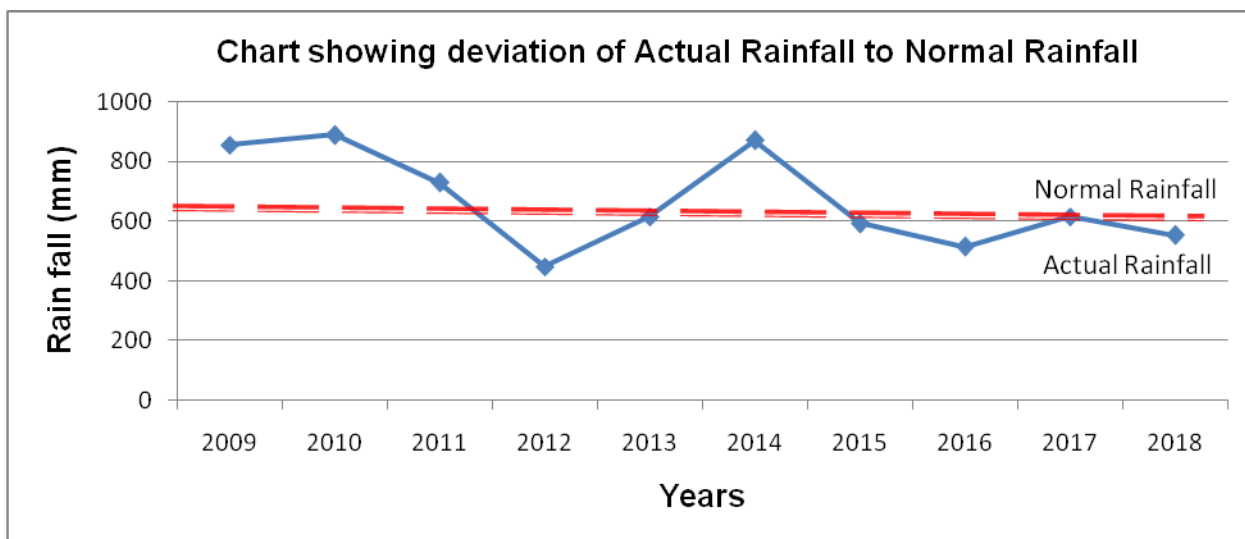


Fig-2. Rainfall trend in Bailhongal taluk of Belagavi district

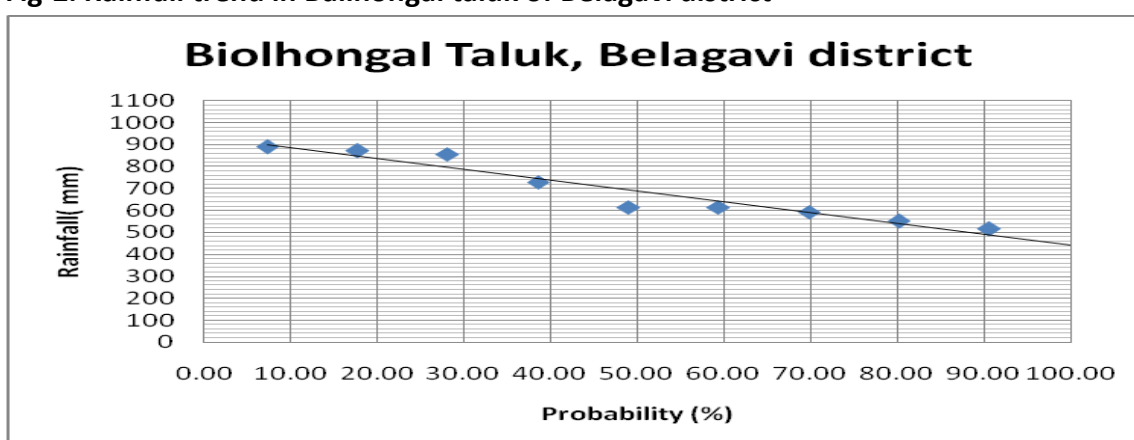


Fig-3. Probability occurrences of Rainfall in Bailhongal taluk of Belagavi district

The rainfall pattern in the Bailhongal taluk reveals the irregularity of rainfall behaviour (**Fig-2**) and the rainfall varies from 448 mm to 889 mm (**Table-3**). The normal annual rainfall of Bailhongal taluk is 641mm. Bailhongal taluk received rainfall above normal during the years 2009, 2010, 2011 and 2014.

Probability analysis of rainfall for the years from 2009 to 2019 (**Fig-3**), indicating that 600 mm rainfall is sure to occur in 70% in the taluk. The dependable rainfall for the taluk can be calculated with the help of probability occurrences of rainfall for construction of any ground water recharge structures.

1.4 Agriculture & Irrigation

Agriculture is the main occupation in Bailhongal taluk. Major Kharif crops are Maize, Bajra, Jowar, Tur and Vegetables. Main crops of Rabi season are Maize, Bajra and Jowar (**Table-4**). Water intensive crops like sugarcane is are grown in 8% of total crop area. Jowar is grown in 21% and oil seeds in 30% of total crop area of taluk. Bajra & Maize account 8.5% of total crop area.

Table-4: Cropping pattern in Bailhongal taluk 2017-2018 (Ha)

Year	Paddy	Jowar	Baj ra	Maize	Wheat	Pulses	Fruits	Oil seeds	Sugarc ane	Cott on
	Area under cultivation (in ha)									
2017-2018	3033	22240	66	9039	2462	15268	688	31495	8310	9442

It is observed that net sown area accounts **75%** and area sown more than once is **20%** of total geographical area in Bailhongal taluk (**Table-5**). Area not available for cultivation and Fallow land cover **11%** & **5%** of total geographical area respectively. **9%** of net area irrigated is only from bore wells and **2%** from lift irrigation (**Table-6**).

Table-5: Details of land use in Bailhongal taluk 2017-2018 (Ha)

Taluk	Total Geographical Area	Area under Forest	Area not available for cultivation	Fallow land	Net sown area	Area sown more than once
Bailhongal	112233	7913	12041	5353	84143	22367

[Source: District at a glance 2017-18, Govt. of Karnataka]

Table-6: Irrigation details in Bailhongal taluk (in ha)

Source of Irrigation	Nos.	Gross area irrigated (Ha)	Net area irrigated (Ha.)
Canals	0	0	0
Tanks	218	0	0
Wells	1822	1468	1174
Bore wells	6993	13105	10484
Lift Irrigation	219	0	0
Other Sources		1361	1089
Total		15934	12747

[Source: District at a glance 2017-18, Govt. of Karnataka]

1.5 Geomorphology, Physiography & Drainage

The geomorphology of the Bailhongal is formed by hilly area in northern part and plain region in central and southern parts of the taluk. The elevation in the taluk varies from **804 m** in the North and Southern part to **640m** amsl in the Eastern part of the taluk. This has its bearing on the regional slope which is towards East. The differential altitude is significant because, it is likely to cause irregular ground water flow patterns on the micro scale (**Fig.-4**). Topography is dominantly controlled by geological structures. The entire Bailhongal taluk falls in Malaprabha river basin which is tributary of Krishna river basin. The drainage pattern is dendritic to sub-dendritic (**Fig.-5**).

1.6 Soil

The soils of Bailhongal taluk can broadly be classified into red soils, black cotton soils, lateritic soils and clayey soils. These soils vary in depth and texture, depending on the parent rock type, physiographic settings and climatic conditions. By and large, black cotton soils predominates the Deccan Trap terrain and the red soils are found in the schistose and gneissic terrain (**Fig-6**).

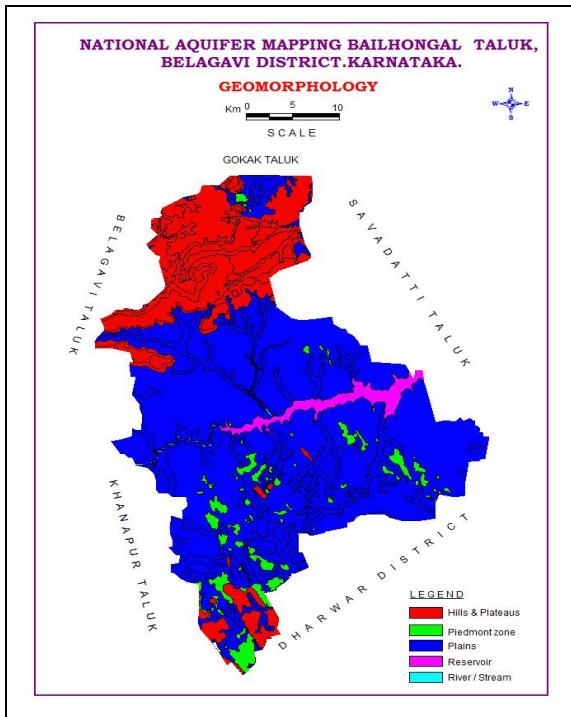


Fig-4: Geomorphology Map

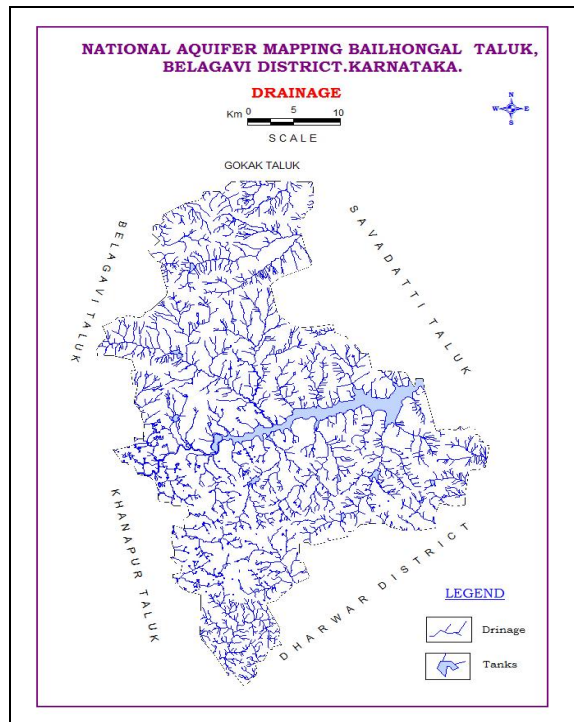


Fig-5: Drainage Map

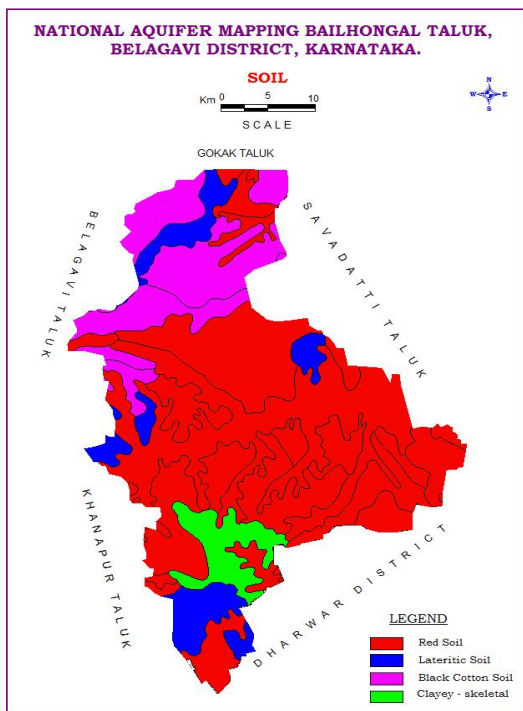


Fig-6: Soil Map

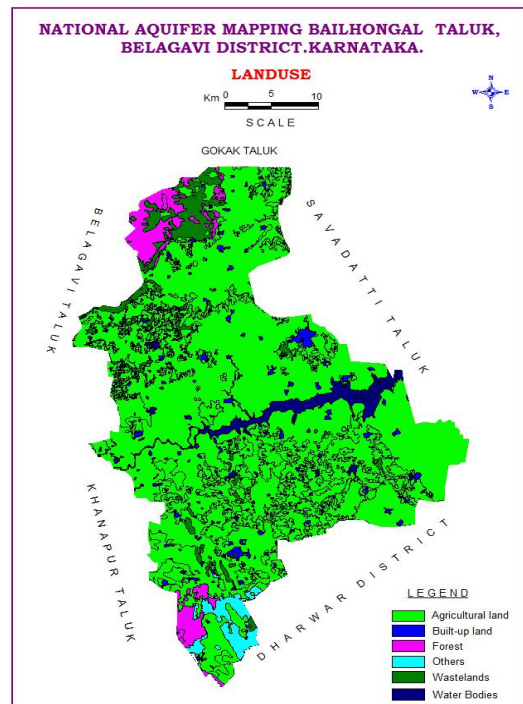


Fig-7: Land use Map

1.7 Ground Water Resource Availability and Extraction

Aquifer wise total ground water resources up to 200 m depth is given in **Table-7** below. It indicates that the annual replenishable ground water resources are 7433 ham, whereas in-storage ground water resources in phreatic aquifer are 11323 ham, whereas in fractured aquifer it is 2635 ham. Thus the fractured deeper aquifer is having the least ground water resources.

Table-7: Total Ground Water Resources (2017) (Ham)

Taluk	Annual replenishable GW resources	Fresh In-storage GW resources		Total availability of fresh GW resources
		Phreatic	Fractured (Down to 200m)	
BAILHONGAL	7433			Dynamic + phreatic in-storage + fractured
		11323	2635	21391

1.8 Existing and future water demands (as per GEC-2017)

- Net ground water availability for future irrigation development : **25.90 MCM**
- Domestic (Industrial sector) demand for next 25 years : **5.23 MCM**

1.9 Water level behaviour**(a) Depth to water level****Aquifer-I**

- Pre-monsoon: 2.56 – 15.87 mbgl (Fig.-8)
- Post-monsoon: 0.58 – 4.86 mbgl (Fig.-9)

Aquifer-II

- Pre-monsoon: 7.70 – 52.00 mbgl
- Post-monsoon: 1.70 – 12.95 mbgl

(b) Water level fluctuation**Aquifer-I**

- Seasonal Fluctuation: Rise ranges 1.8 – 14.82 m (Fig.-10).

Aquifer-II

- Seasonal Fluctuation: Rise ranges 4.70 – 22.65 m.

Table-8: Depth to water level for Pre-monsoon and Post-monsoon

Sr. No	Village	Source	Pre-monsoon Depth to water May-2019 (mbgl)	Post-monsoon Depth to water Nov-2019 (mbgl)	Water level Fluctuation
Aquifer-I					
1	Bailhongal	Dug Well	4.41	0.58	3.83
2	Hire Begewadi	Dug Well	15.52	0.70	14.82
3	Kittur	Dug Well	2.56	0.76	1.8
4	Nesargi	Dug Well	12.79	3.36	9.43
5	Murgod	Dug Well	11.64	2.05	9.59
6	Sutgatti	Dug Well	15.87	4.86	11.01
Aquifer-II					
1	Baillhongal	Bore well	14.05	1.95	12.10
2	Ambadgatti	Bore well	25.60	3.60	22.00
3	Belavadi	Bore well	7.70	3.00	4.70
4	C. Begewadi	Bore well	22.20	1.70	20.50
5	M.K.Hubli	Bore well	35.60	12.95	22.65
6	Kittur	Bore well	52.00	11.65	40.35

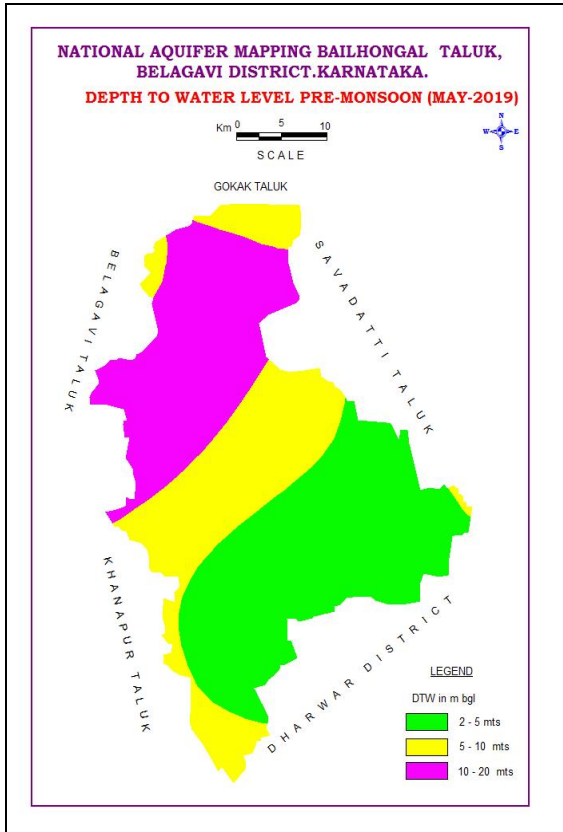


Fig-8: Pre-monsoon Depth

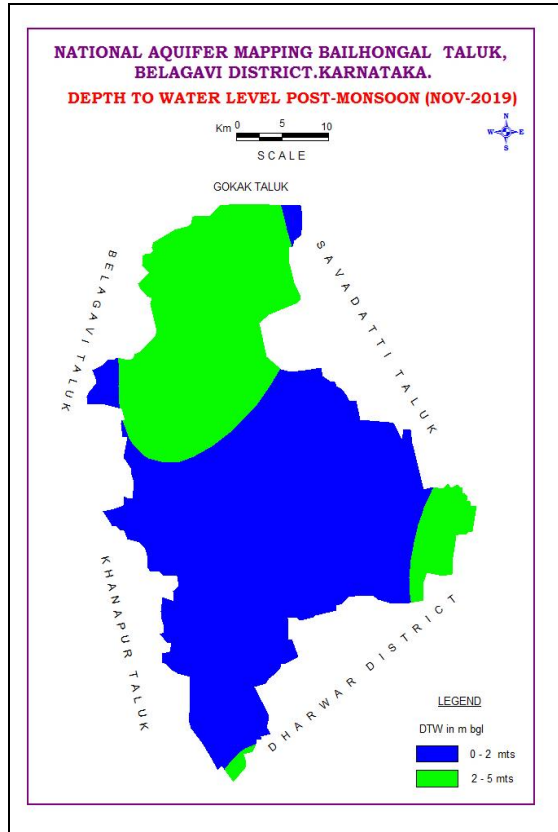


Fig-9: Post-monsoon Depth

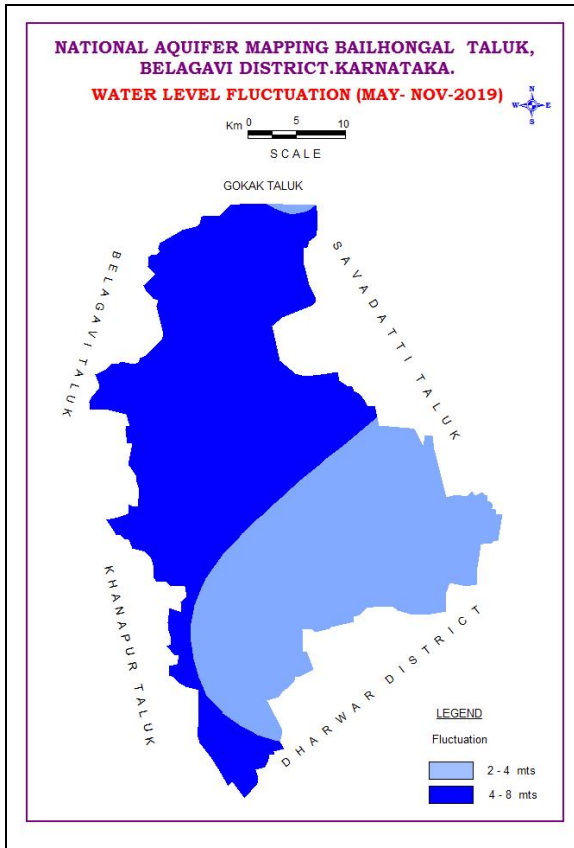


Fig-10: Water Level Fluctuation

2 AQUIFER DISPOSITION

2.1 Number of aquifers

In Bailhongal taluk, there are mainly two types of aquifer systems

- **Aquifer-I (Phreatic aquifer):** Weathered Basalt, metagreywacke and granitic gneiss
- **Aquifer-II (Fractured aquifer):** Fractured Basalt, metagreywacke and granitic gneiss

In Bailhongal taluk, basalt, meta greywacke and granitic gneiss are the main water bearing formations (**Fig-11**). Ground water occurs within the weathered and fractured basalt, meta greywacke and granitic gneiss under water table condition and semi-confined condition. In Bailhongal taluk bore wells were drilled from a minimum depth of **66** mbgl to a maximum of **202.60** mbgl. Depth of weathered zone ranges from **6** mbgl to **38** mbgl. Ground water exploration reveals that aquifer-II fractured formation was encountered between the depth of **19** to **130** mbgl. Yield ranges from **negligible** to **5.41** lps. The details of ground water exploration are given in **Table-9** and basic characteristics of each aquifer are summarized in **Table-10**.

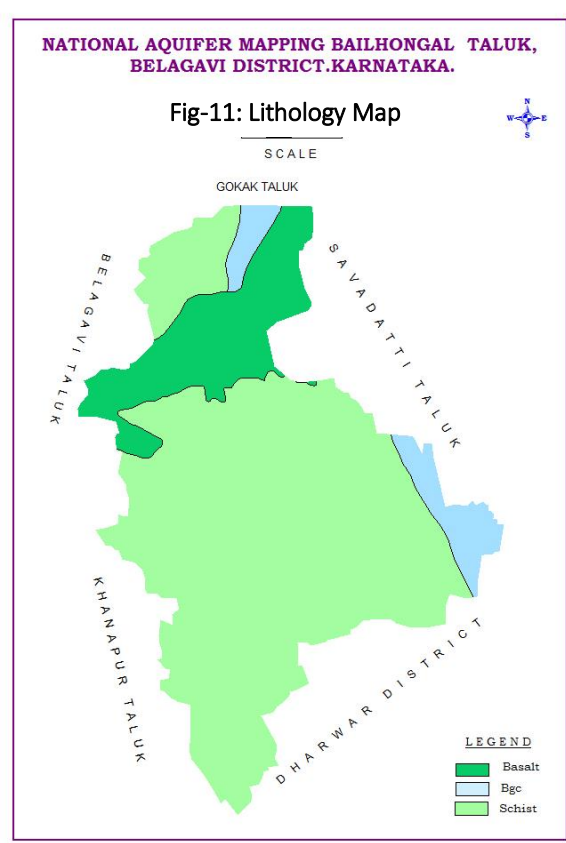
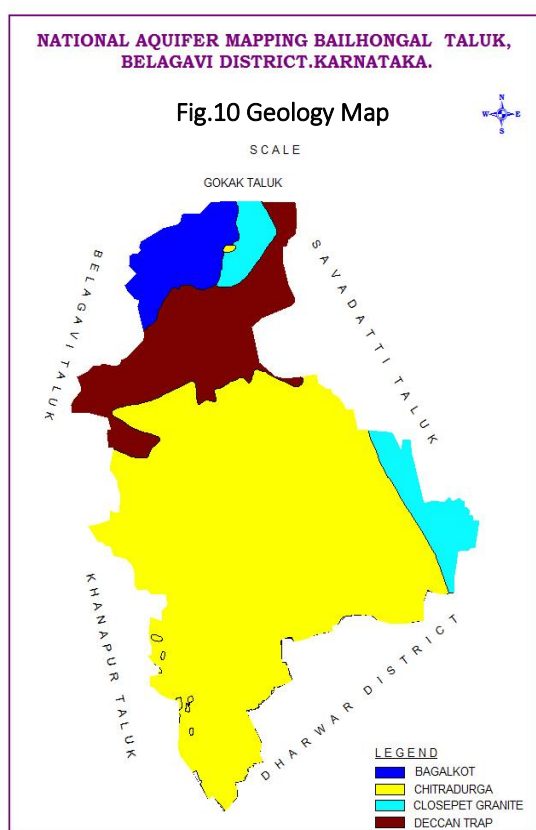


Table-9: Details of Ground Water Exploration

S. No	Location	Lat & Long	Depth m bgl	Casing(m)	Lithology	SWL (mbgl)	Q (lps)	DD (m)	T (m ² /day)
1	Govinkoppa-EW	15°37'56.6" 74° 56'26.0"	178.20	63.0	Metagreywack	56.64	5.00	18.40	6.59
	Govinkoppa-OW	15°37'57.3" 74° 56'25.8"	202.60	63.0	Metagreywack	55.76	5.41	23.24	6.79

2	Boilhongal-EW	15°48'49.7'' 74° 50'58.5''	197.0	10.0	Metagreywack	4.17	3.26	16.25	5.61
	Boilhongal-OW	15°48'50.1'' 74° 50'59.3''	202.60	8.50	Metagreywack	3.00	1.30	29.56	1.49
3	Kittur-EW	15°35'59.1'' 74° 46'42.5''	130.40	38.5	Phyllite Metagreywack	2.35	4.84	20.13	10.08
	Kittur-OW	15°35'00.1'' 74° 46'39.5''	202.60	51.0	Metagreywack	7.43	1.50	33.32	1.32
4	Tigadi	15°48'07.7'' 74° 43'16.2''	200.60	18.0	Metagreywack	19.01	2.62	9.15	14.80
5	Belavadi	15°42'47.7'' 74° 55'24.2''	202.20	36.0	Kaladgi/ Schist/ Granitic Gneiss	42.26	0.078	-	5.26
6	Nesargi	15°54'32.0'' 74° 46'35.4''	77.50	8.0	Basalt	9.00	Neg	-	-
7	Madanbhavi	15°53'15.0'' 74° 47'13.0''	66.0	6	Basalt/ Schist	14.7	Neg	-	-
8	Virapur	15°41'45.0'' 74° 41'30.0''	80.0	21.5	Schist	13.7	1.95	2.55	171

Table-10: Basic characteristics of each aquifer

Aquifers	Weathered Zone (Aq.-I)	Fractured Zone (Aq.-II)
Prominent Lithology	Weathered Basalt, Meta greywacks and Granitic gneiss	Fractured / Jointed Basalt, Meta greywacks and Granitic gneiss
Thickness range (mbgl)	20	Fractures upto 200 mbgl
Depth range of occurrence of fractures (mbgl)	5-15	20-126
Range of yield potential (lps)	<1-2	<1 – 5
Specific Yield	2%	0.2%
T (m ² /day)	-	1 – 171
Quality Suitability for Domestic & Irrigation	Suitable	Suitable

2.2 3 D Aquifer Disposition and Cross-Sections

The 3-D aquifer disposition of the taluk is given in **Fig.-13, 15**, whereas the 2-D section is presented in **Fig. 14**. The perusal of Fig.13 and 15 indicates that the thickness of the 1st aquifer is more in eastern part and the thickness of 2nd aquifer is more in northern part. The perusal of Fig.14 indicates that as we move from north to south along section A-A', the thickness of the 1st aquifer increases, whereas that of 2nd aquifer decreases.

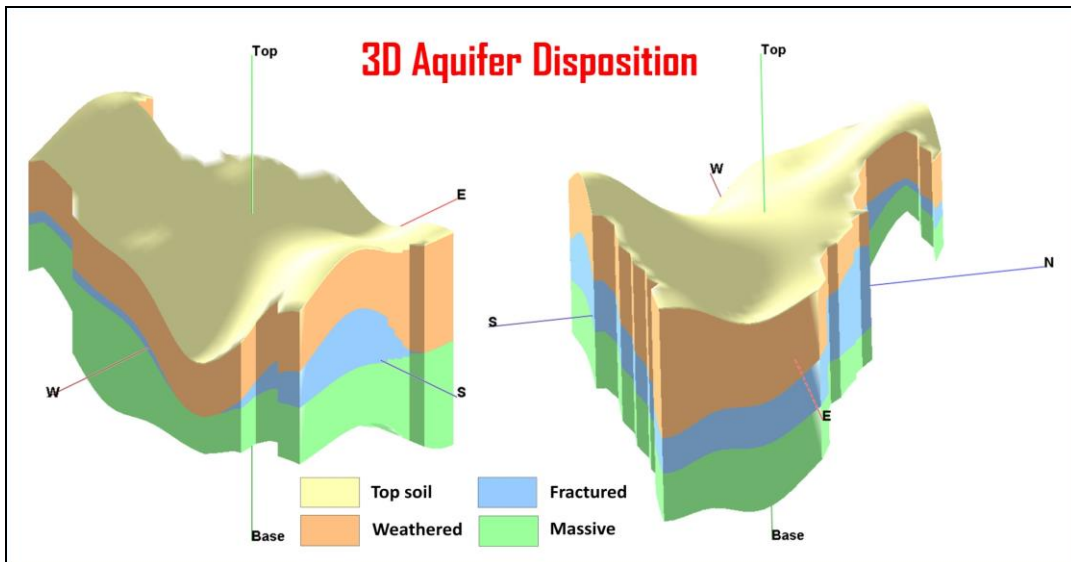


Fig-13: 3D aquifer Disposition

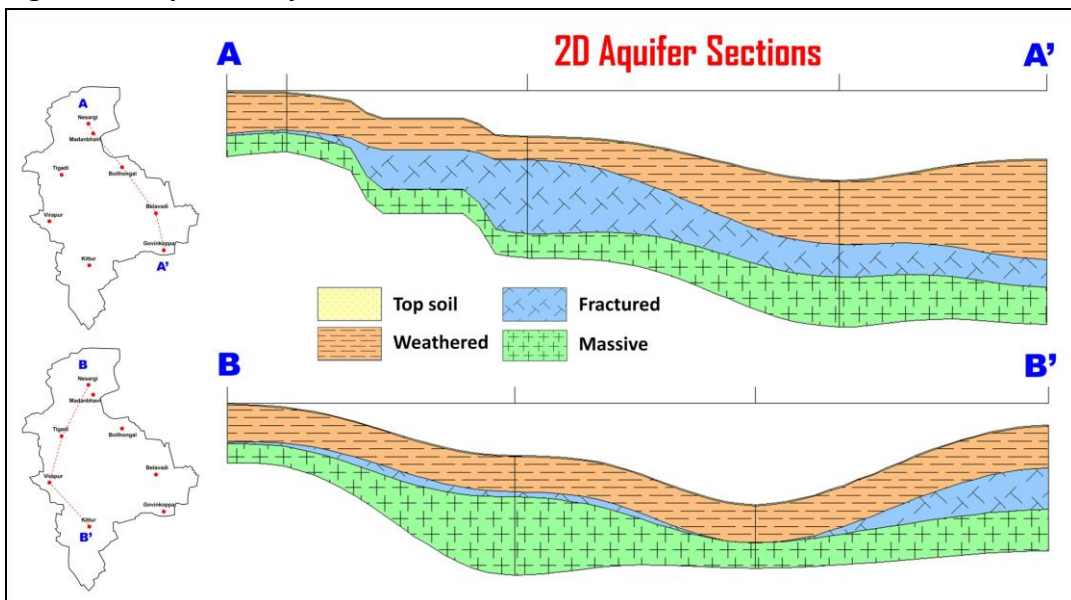


Fig-14: Cross sections in different directions

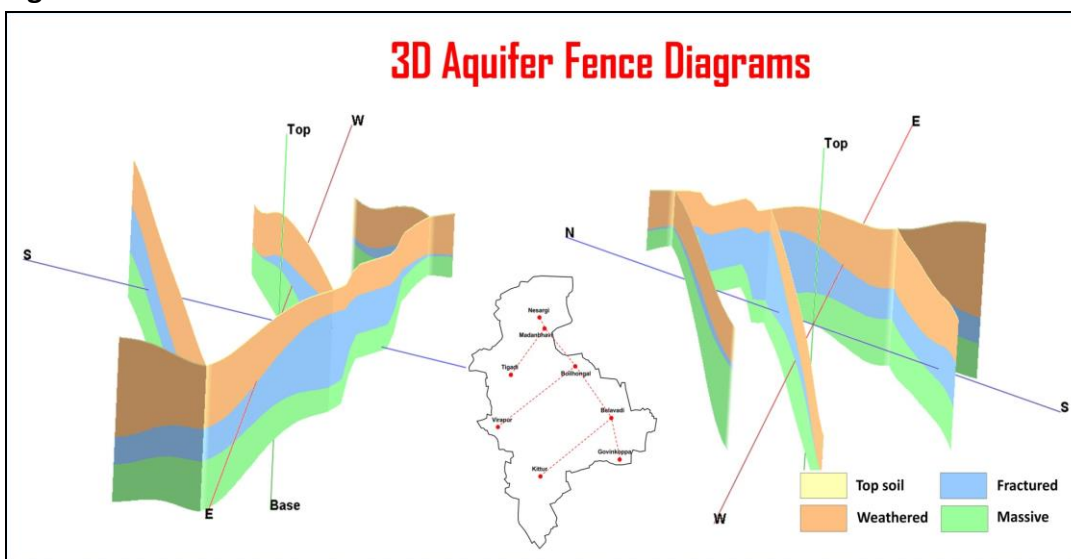


Fig-15: 3D Aquifer Fence Diagram

3 GROUND WATER RESOURCE, EXTRACTION, CONTAMINATION AND OTHER ISSUES

The major issues which are affecting the ground water resource extraction are semi-arid climate and drought prone, northern transition agro climatic zone, declining water levels in both aquifers and ranges between 0.18 and 0.32 m/year, Increase in number and depth of bore wells, Increasing ground water draft for irrigation. Due to this the, stage of ground water extraction has reached over exploited stage (119%). The phreatic aquifer is recharged during monsoon and the dug wells sustain only for 1 to 2 hours of pumping with a drawdown of 2 to 3 m. In addition to these, groundwater quality problems of high concentration of NO₃ and EC in some parts of taluk is also observed.

3.1 Aquifer wise resource availability and extraction

The details of dynamic (Phreatic) ground water resources for Bailhongal taluk as on March 2020 is shown in Table.11. It is observed that the draft is more than recharge and the stage of ground water extraction is 119% and it falls in over exploited category.

Table-11: Present Dynamic Ground Water Resource (2020)

Net Annual Ground Water Availability	Existing Gross Ground Water Draft For Irrigation	Existing Gross Ground Water Draft For Domestic and Industrial Water Supply	Existing Gross Ground Water Draft For All Uses	Annual GW Allocation for Domestic Use as on 2025 (Ham)	Net Ground Water Availability for future use (Ham)	Existing Stage of Ground Water Development	Category
4801.58	5374.55	353.34	5727.90	381.89	508.61	119.29	Over-exploited

3.2 Comparison of Ground Water Resource and Extraction

The Dynamic Ground Water Resource as on 2020 has already been summarised above and shown in Table 11. The comparison of the resource as on 2011, 2013, 2017 and 2020 are summarized below. It is observed that the ground water availability has remained more or less same during the years 2011, 2013 and 2017. However, the same has reduced during 2020 as the taluk had been bifurcated into 2 taluks viz. Kitthuru and Bailahongal.

Table-12: Comparison of ground water availability and draft scenario in Bailhongal taluk

GW availability (in ham)	GW draft (in ham)	Stage of GW development (%)	GW availability (in ham)	GW draft (in ham)	Stage of GW development (%)	GW availability (in ham)	GW draft (in ham)	Stage of GW development (%)	GW availability (in ham)	GW draft (in ham)	Stage of GW development (%)
2011			2013			2017			2020		
7087	5144	83	7041	5320	76	7433	6132	82	4801.58	5727.90	119

3.3 Chemical quality of ground water and contamination

Interpretation from Chemical Analysis results in Bailhongal taluk is mentioned as under:

A. ELECTRICAL CONDUCTIVITY: In general, EC values range from 240 to 1240 μ /mhos/cm in the aquifer-I at 25°C (Fig-16) and range from 750 to 2480 μ /mhos/cm in the aquifer-II.

B. CHLORIDE: Chloride concentration in ground water ranges between 25 and 202 mg/l in the aquifer-I (Fig-17) and ranges between 57 and 394 mg/l in the aquifer-II.

C. NITRATE: Nitrate concentration in ground water ranges from 4.0 and 40.0 mg/l in the aquifer –I (Fig-18) and ranges from 0.5 and 49.0 mg/l in the Aquifer –II .

D. FLUORIDE: Fluoride concentration in ground water ranges between 0.11 and 4.40 mg/l in the aquifer-I (Fig-19) and ranges between 0.22 and 0.84 mg/l in the aquifer-II

Table-13: Quality of ground water in Bailhongal taluk of Belagavi district

S. No	LOCATION	PH	EC	Cl	NO3	F
Aquifer-I						
1	Kittur	7.89	620	117	4.0	0.52
2	Bailhongal	8.58	510	39	9.0	0.15
3	Murgod	8.7	240	50	7.0	0.11
4	Nesargi	8.52	700	53	40.0	0.61
5	Sutgatti	8.49	330	25	25.0	0.17
Aquifer-II						
6	Govinkoppa	7.77	2480	394	4.0	0.22
7	Boilhongal	7.70	860	99	33	0.45
8	Kittur	7.98	750	57	0.5	0.65
9	Tigadi	7.71	1960	249	18	0.77
10	Belavadi	7.92	936	117	49	0.84

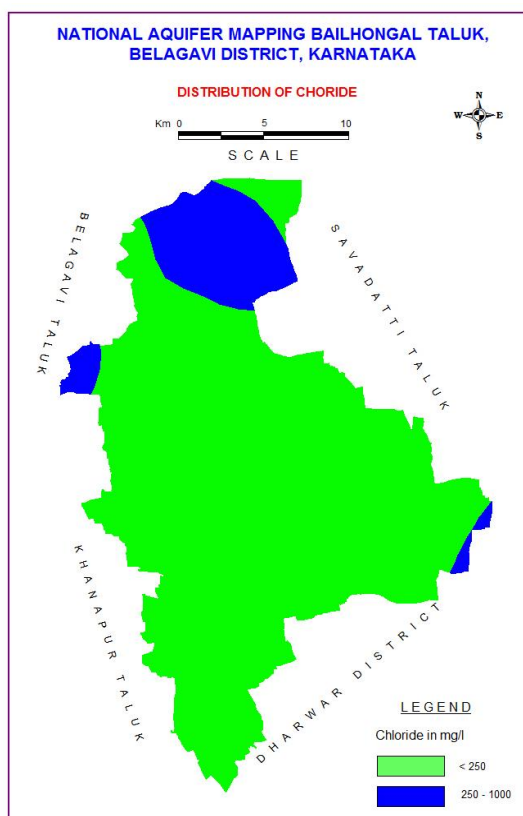
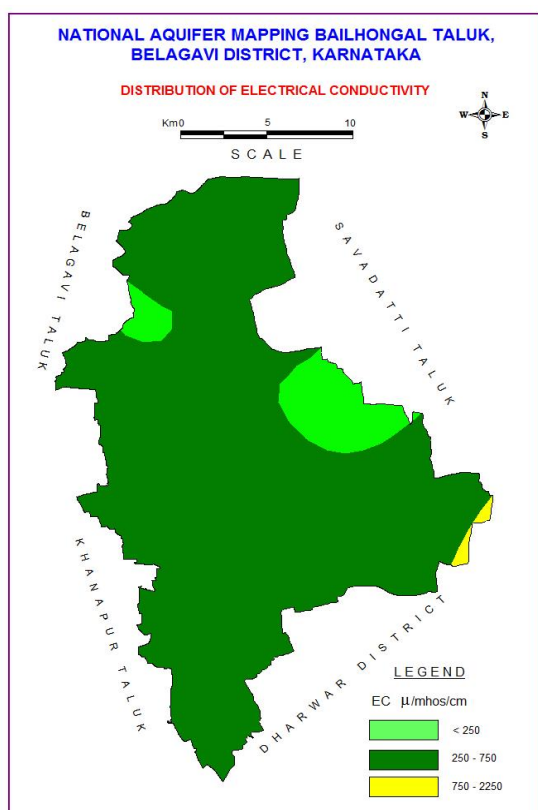


Fig-16 Distribution of Electrical Conductivity. Fig-17 Distribution of Chloride Conductivity

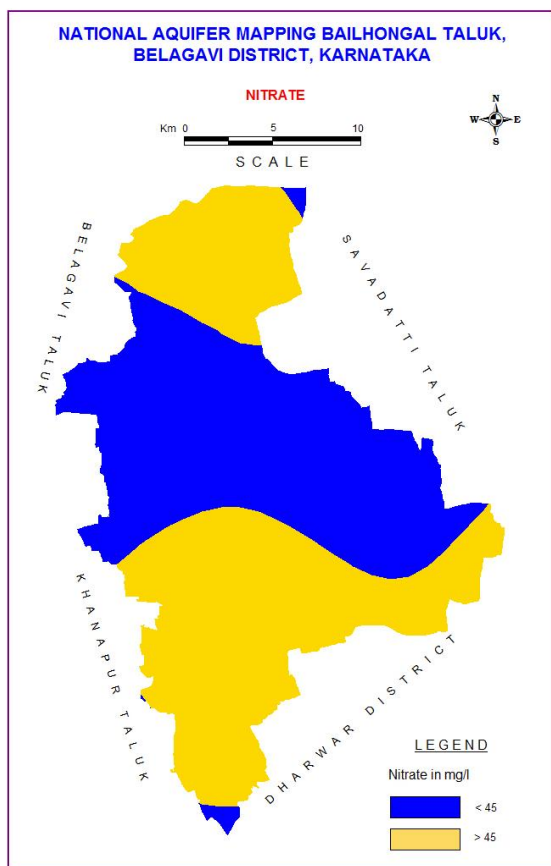


Fig-18 Distribution of Nitrate

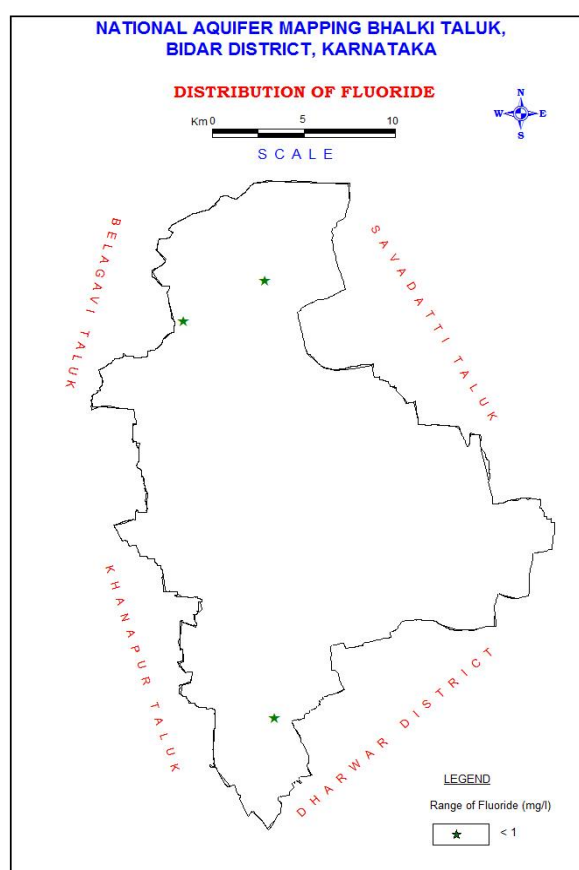


Fig-19 Distribution of Fluoride

4 GROUND WATER RESOURCE ENHANCEMENT

4.1 Resource Enhancement by Supply Side Interventions

The overall stage of ground water development is 119.29% as per GEC 2020. Considering the long-term water level trend and seasonal water level, seasonal fluctuation and declining trend of annual rainfall, it is proposed to construct artificial recharge (AR) structures to enhance the ground water resources and to arrest the decline in long term ground water level. The area feasible for recharge in Bailhongal taluk is worked out as 633 sq.km. and the surface surplus non-committed runoff availability is 53.85 MCM, which is considered for planning of AR structures. For this, a total of 1 sub-surface dykes, 48 percolation tanks and 261 check dams are proposed. The volume of water expected to be conserved/recharged @75% efficiency is 40.39 MCM through these AR structures. The approximate cost estimate for construction of these AR structures is Rs. 36.10 Cr. The additional area which can be brought under assured ground water irrigation will be about 4900 hectares. However, the figures given are tentative and pre-field studies / DPR are recommended prior to implementation of these recharge structures.

The details pertaining to proposed recharge structures, cost estimates and likely Recharge benefits for Bailhongal taluk, Belgavi district have been carried out and given in below Tables 14. After implementation of Artificial Recharge structures for GW recharge, the annual ground water availability will increase from 4801.58 to 6622.58 ham and the expected reduction in stage of development is 32.79% from 119.29% to 86.50% (**Table-15**). The

tentative locations of proposed AR structures and area feasible for recharge is shown in **Fig.- 20**, whereas the location details of check dams and percolation tanks are presented in **Annexure-I and II** respectively.

Table-14: Details of Proposed Recharge Structures (As per Master Plan on Artificial Recharge in Karnataka, 2020)

Artificial Recharge Structures Proposed	Bailhongal taluk
Non committed monsoon runoff available (MCM)	53.85
Total no. of existing Artificial Recharge Structures	85
Number of Check Dams Proposed	261
Number of Percolation Tanks Proposed	48
Number of Sub surface dyke Proposed	1
Tentative total cost of the project (Rs. in Cr)	36.10
Expected recharge (MCM)	18.21
Additional irrigation potential (hectares)	4900

Table-15 Improvement in GW availability due to Recharge, Bailhongal Taluk

Taluk	Net annual ground water availability	Existing gross ground water draft for all uses	Existing stage of ground water development	Expected recharge from proposed artificial recharge structures	Expected reduction in stage of ground water development after the implementation of the project	Expected improvement in overall stage of ground water development
	HAM	HAM	%	HAM	%	%
BAILHONGAL	4801.58	5727.90	119.29	1821	32.79	86.50

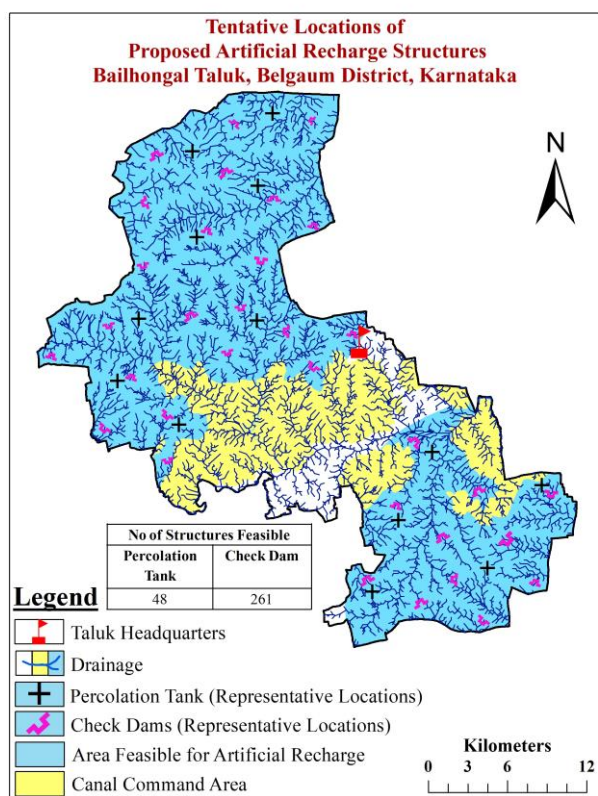


Fig. 20: Tentative locations of representative artificial recharge structures

4.2 Resource Savings by Demand Side Interventions

4.2.1 Water Use Efficiency by Micro Irrigation Practices

It is observed that 1822 wells and 6993 bore wells are the source for 12747 ha of net irrigation in the taluk constituting about 91% of the irrigated area. Adoption of water use efficiency (WUE) techniques will contribute in ground water resource enhancement in the long run by way of saving of water.

Efficient irrigation practices like Drip irrigation & sprinkler needs to be adopted by the farmers in the water intensive sugar cane crop to start with. It is proposed to adopt micro irrigation (drip) techniques in water intensive sugarcane grown area 8310 ha. It is assumed that 40% of this area i.e., 3324 ha is irrigated by ground water. Implementation of efficient irrigation techniques will contribute in saving ground water by 1662 ham and thus will improve stage of ground water development. **(Table-16).**

Table-16: Improvement in GW availability due to saving by adopting water use efficiency

Sl. No.	Resource Details	As per 2020 Estimation
1.	Net Ground Water Availability in Ham	4801.58
2.	Existing ground water draft for all uses in Ham	5727.90
3.	Existing Stage of Ground Water Development in percentage %	119.29
4.	Total Sugarcane Irrigated Area (Ha)	8310
5.	Considering GW irrigation in 40% of Sugarcane grown area (Ha)	3324
6.	Expected Savings (m) (Surface irrigation – 2 m, Drip irrigation – 1.5)	0.50
7.	Saving due to adopting water Use Efficiency measures in Ham	1662
8.	Saving due to adopting grey water in Ham	Nil
9.	Cumulative Ground water availability after adopting WUE and AR in Ham	1662+1821 = 3483
10.	Change in Cropping Pattern	Not Recommended
11.	Expected improved stage of ground water development after implementation of AR (%)	From 119.29 % to 86.50 %
12.	Expected improved stage of ground water development after implementation of WUE (%)	From 86.50 % to 69.13 %
13.	Expected Change in Category	Over Exploited to Safe

4.2.2 Change in cropping pattern

Water intensive crops like paddy, sugarcane and cotton are grown in 3033 ha, 9442 ha and 8310 ha of net sown area of 84143 ha. However, paddy is grown during kharif period and sugarcane grown only in 9.8% of the cropped area. At present (2020), the stage of ground water extraction is 119.29% and taluk has been categorised as Over-exploited. However, the supply side and demand side interventions will definitely help in improving the situation, thus change in cropping pattern has not been suggested.

4.2.3 Regulation and Control

Bailhongal taluk has been categorized as **Over-exploited**, since the stage of ground water development is **119.29% (GWRA March 2020)**. Hence, stringent action has to be taken

up through Karnataka Ground Water Authority to control further ground water exploitation in the taluk.

4.2.4 Other interventions proposed

- Periodical maintenance of artificial recharge structures should also be incorporated in the Recharge Plan.
- Excess nitrate & fluoride concentration is found in ground water samples require remedial measures viz.
- Dilution of nitrate rich ground water through artificial recharge & water conservation.
- Build up awareness among local village community about proper disposal of sewage/runoff from chemical fertilizers contributing to nitrate
- Roof top rain water harvesting.

5 SUMMARY AND RECOMMENDATIONS

The major issues which are affecting the ground water resource extraction are semi-arid climate and drought prone, northern transition agro climatic zone, declining water levels in both aquifers and ranges between 0.18 and 0.32 m/year, Increase in number and depth of bore wells, Increasing ground water draft for irrigation. Due to this the, stage of ground water extraction has reached over exploited stage (119%). The phreatic aquifer is recharged during monsoon and the dug wells sustain only for 1 to 2 hours of pumping with a drawdown of 2 to 3 m. In addition to these, groundwater quality problems of high concentration of NO₃ and EC in some parts of taluk is also observed. The summary of management plan of Bailhongal taluk to deal with these issues is given in **Table-17**.

Table-17: Summary of Management plan of Bailhongal taluk

Sl. No.	Resource Details	As per 2020 Estimation
1.	Net Ground Water Availability in Ham	4801.58
2.	Existing ground water draft for all uses in Ham	5727.90
3.	Existing Stage of Ground Water Development in percentage %	119.29
4.	Non committed monsoon runoff available (MCM)	53.85
5.	Total no. of existing Artificial Recharge Structures	85
6.	Number of Check Dams Proposed	261
7.	Number of Percolation Tanks Proposed	48
8.	Number of Sub surface dyke Proposed	1
9.	Tentative total cost of the project (Rs. in Cr)	36.10
10.	Expected recharge (MCM)	18.21
11.	Additional irrigation potential (hectares) OR	4900
12.	Expected improved stage of ground water development after implementation of AR (%)	From 119.29 % to 86.50 %
13.	Total Sugarcane Irrigated Area (Ha)	8310
14.	Considering GW irrigation in 40% of Sugarcane grown area (Ha)	3324
15.	Expected Savings (m) (Surface irrigation – 2 m, Drip irrigation – 1.5)	0.50
16.	Saving due to adopting water Use Efficiency measures in Ham	1662
17.	Saving due to adopting grey water in Ham	Nil
18.	Cumulative Ground water availability after adopting WUE and AR in Ham	1662+1821 = 3483
19.	Change in Cropping Pattern	Not Recommended

20.	Expected improved stage of ground water development after implementation of WUE (%)	From 86.50 % to 69.13 %
21.	Expected Change in Category	Over Exploited to Safe
22.	Excess nitrate & fluoride concentration	Dilution of nitrate rich ground water through artificial recharge & water conservation. Roof top rain water harvesting.
23.	Water Use efficiency measures	Government to take initiative to encourage at least 70% farmers to adopt water use efficiency irrigations practices like dip & sprinkler irrigation

As per the resource estimation – 2020, Bailhongal taluk falls under over-exploited category with the stage of ground water extraction is 119.29 %. Thus, there is need to formulate management strategy to tackle the water scarcity related issues in the taluk in the coming days to avoid water crisis in the future. It is suggested to adopt a scientific and multi-pronged ground water management strategy covering supply side interventions, demand side interventions, ground water development interventions and ground water quality protection aspects as mentioned in the management plan suggested above

Ground water resource enhancement by supply side interventions: Quantity of surface water available through non-committed surface run-off is estimated to be 5385 ham. This can be used to recharge the aquifer mainly through percolation tanks (48), check dams (261), and sub-surface dyke structures (01). The volume of water expected to be conserved/recharged @ is 1821 ham through these AR structures. The approximate cost estimate for construction of these AR structures is Rs. 36.10 Cr. The additional area which can be brought under assured ground water irrigation will be about 4900 hectares. However, the figures given are tentative and pre-field studies / DPR are recommended prior to implementation of these recharge structures.

Ground water resource enhancement by demand side interventions: At present about 91 % of irrigation is by wells and bore wells (ground water). The micro irrigation practices like drip and sprinkler irrigation are comparatively less practiced in comparison with traditional surface flooding mode of irrigation. The micro irrigation water efficient methodology needs to be adopted for growing water intensive sugarcane crop which is grown in 8310 ha area and efficient irrigation techniques will contribute in saving ground water by 1662 ham and thus will improve stage of development further from 86.50% to 69.13%.

Change in cropping pattern: Water intensive crops like paddy, cotton & sugarcane are grown in 3033 ha, 9442 ha and 8310 ha of net cropped area of 84143 ha. However, paddy is grown during kharif period and sugarcane grown only in 9.8% of the cropped area. At present (2020), the stage of ground water extraction is also on higher side @ 119.29% and taluk has been categorised as over-exploited. However, the supply side and demand side interventions suggested above will definitely help in improving the situation, thus change in cropping pattern has not been suggested.

Ground Water Regulation: Bailhongal taluk has been categorized as Over-exploited, since the stage of ground water development is 119.29% (GWRA March 2020). Hence, stringent action has to be taken up through Karnataka Ground Water Authority to control further ground water exploitation in the taluk.

Annexure-I : Tentative Locations of Proposed Check Dams, Bailhongala Taluk, Belagavi District.

S. No	Longitude	Latitude	Village	Gram Panchayath	Taluk
1	74.8626	15.6243	Thurkara Shigihalli	Turakarshigihalli	Bailhongal
2	74.9463	15.6284	Chikkabellikatti	Govanakoppa	Bailhongal
3	74.9223	15.6289	Budrakatti	Budrakatti	Bailhongal
4	74.8841	15.6299	Kadasaghatti	Turakarshigihalli	Bailhongal
5	74.9119	15.6342	Budrakatti	Budrakatti	Bailhongal
6	74.8540	15.6358	Thurkara Shigihalli	Turakarshigihalli	Bailhongal
7	74.9265	15.6404	Govanakoppa	Govanakoppa	Bailhongal
8	74.8690	15.6412	Kadasaghatti	Turakarshigihalli	Bailhongal
9	74.9594	15.6416	Gudikatte	Govanakoppa	Bailhongal
10	74.9021	15.6425	Budrakatti	Budrakatti	Bailhongal
11	74.9478	15.6440	Govanakoppa	Govanakoppa	Bailhongal
12	74.8552	15.6483	Hirebellikatte	Turakarshigihalli	Bailhongal
13	74.8781	15.6519	Kadasaghatti	Turakarshigihalli	Bailhongal
14	74.9100	15.6545	Budrakatti	Budrakatti	Bailhongal
15	74.9544	15.6545	Gudikatte	Govanakoppa	Bailhongal
16	74.8954	15.6550	Beedaragaddi	Budrakatti	Bailhongal
17	74.9845	15.6572	Nanagundhikoppa	Dodavad	Bailhongal
18	74.9263	15.6574	Budrakatti	Budrakatti	Bailhongal
19	74.8642	15.6588	Hirebellikatte	Turakarshigihalli	Bailhongal
20	74.9416	15.6593	Gudikatte	Govanakoppa	Bailhongal
21	74.9618	15.6619	Doddawada	Dodavad	Bailhongal
22	74.8853	15.6626	Beedaragaddi	Budrakatti	Bailhongal
23	74.9850	15.6658	Nanagundhikoppa	Dodavad	Bailhongal
24	74.9710	15.6674	Doddawada	Dodavad	Bailhongal
25	74.9354	15.6689	Siddasamudra	Belavadi	Bailhongal
26	74.9571	15.6710	Doddawada	Dodavad	Bailhongal
27	74.9164	15.6715	Siddasamudra	Belavadi	Bailhongal
28	74.8832	15.6732	Siddasamudra	Belavadi	Bailhongal
29	74.9450	15.6739	Doddawada	Dodavad	Bailhongal
30	74.9827	15.6746	Doddawada	Dodavad	Bailhongal
31	74.9539	15.6804	Doddawada	Dodavad	Bailhongal
32	74.9925	15.6805	Doddawada	Dodavad	Bailhongal
33	74.9661	15.6845	Doddawada	Dodavad	Bailhongal
34	74.8991	15.6849	Siddasamudra	Belavadi	Bailhongal
35	74.9777	15.6855	Doddawada	Dodavad	Bailhongal
36	74.8803	15.6875	Pattihala K.B	Pattihal K.B	Bailhongal
37	74.9164	15.6880	Siddasamudra	Belavadi	Bailhongal
38	74.9485	15.6901	Doddawada	Dodavad	Bailhongal
39	74.9312	15.6906	Koravinakoppa	Udikeri	Bailhongal
40	74.9951	15.6926	Doddawada	Dodavad	Bailhongal
41	74.9630	15.6950	Doddawada	Dodavad	Bailhongal
42	74.9772	15.6959	Doddawada	Dodavad	Bailhongal
43	74.9001	15.6961	Siddasamudra	Belavadi	Bailhongal

44	75.0085	15.6970	Doddawada	Dodavad	Bailhongal
45	74.8714	15.6993	Pattihala K.B	Pattihal K.B	Bailhongal
46	74.9956	15.7016	Doddawada	Dodavad	Bailhongal
47	74.9868	15.7040	Doddawada	Dodavad	Bailhongal
48	74.9009	15.7042	Hire Belawadi	Belavadi	Bailhongal
49	74.9766	15.7068	Doddawada	Dodavad	Bailhongal
50	75.0059	15.7089	Doddawada	Dodavad	Bailhongal
51	74.8855	15.7094	Hire Belawadi	Belavadi	Bailhongal
52	74.9843	15.7101	Doddawada	Dodavad	Bailhongal
53	74.8734	15.7102	Pattihala K.B	Pattihal K.B	Bailhongal
54	74.9209	15.7113	Hire Belawadi	Belavadi	Bailhongal
55	74.9054	15.7133	Hire Belawadi	Belavadi	Bailhongal
56	74.9750	15.7140	Doddawada	Dodavad	Bailhongal
57	74.9951	15.7165	Doddawada	Dodavad	Bailhongal
58	74.9419	15.7181	Udakeri	Udikeri	Bailhongal
59	74.8800	15.7185	Hire Belawadi	Belavadi	Bailhongal
60	74.9858	15.7189	Doddawada	Dodavad	Bailhongal
61	74.9162	15.7231	Hire Belawadi	Belavadi	Bailhongal
62	74.9261	15.7243	Hire Belawadi	Belavadi	Bailhongal
63	74.8991	15.7267	Hire Belawadi	Belavadi	Bailhongal
64	74.9452	15.7268	Udakeri	Udikeri	Bailhongal
65	74.7179	15.7282	Hooli Hosura	Holihosur	Bailhongal
66	74.9104	15.7319	Hire Belawadi	Belavadi	Bailhongal
67	74.7238	15.7379	Hooli Hosura	Holihosur	Bailhongal
68	74.9272	15.7409	Boodhiala	Udikeri	Bailhongal
69	74.9045	15.7451	Konanakudra	Kenganur	Bailhongal
70	74.8822	15.7524	Jyalakoppa	Kenganur	Bailhongal
71	74.9006	15.7534	Konanakudra	Kenganur	Bailhongal
72	74.9192	15.7550	Sangatikoppa	Vakkund	Bailhongal
73	74.7299	15.7552	Kallura	Maradinagalapur	Bailhongal
74	74.7063	15.7553	Geddhikeravinakoppa	Chikkabagevadi	Bailhongal
75	74.7385	15.7598	Pattihala K.S	Maradinagalapur	Bailhongal
76	74.6783	15.7604	Chikkabagewadi	Chikkabagevadi	Bailhongal
77	74.9125	15.7659	Sangatikoppa	Vakkund	Bailhongal
78	74.7025	15.7662	Geddhikeravinakoppa	Chikkabagevadi	Bailhongal
79	74.9271	15.7669	Koravikoppa	Vakkund	Bailhongal
80	74.6918	15.7682	Chikkabagewadi	Chikkabagevadi	Bailhongal
81	74.7225	15.7690	Mardi Nagalapura	Maradinagalapur	Bailhongal
82	74.7408	15.7695	Pattihala K.S	Maradinagalapur	Bailhongal
83	74.7111	15.7708	Mardi Nagalapura	Maradinagalapur	Bailhongal
84	74.9380	15.7737	Koravikoppa	Vakkund	Bailhongal
85	74.6900	15.7748	Chikkabagewadi	Chikkabagevadi	Bailhongal
86	74.7169	15.7779	Mardi Nagalapura	Maradinagalapur	Bailhongal
87	74.6710	15.7782	Benajinamardi	Chikkabagevadi	Bailhongal
88	74.6884	15.7832	Benajinamardi	Chikkabagevadi	Bailhongal
89	74.7103	15.7862	Thigadi	Tigadi	Bailhongal

90	74.6959	15.7892	Giriyala K.B	Chikkabagevadi	Bailhongal
91	74.6809	15.7912	Benajinamardi	Chikkabagevadi	Bailhongal
92	74.7157	15.7916	Thigadi	Tigadi	Bailhongal
93	74.7636	15.7948	Sampagaov	Sampagon	Bailhongal
94	74.6976	15.7968	Thigadi	Tigadi	Bailhongal
95	74.7106	15.7993	Thigadi	Tigadi	Bailhongal
96	74.7554	15.8000	Sampagaov	Sampagon	Bailhongal
97	74.7794	15.8010	Sanikoppa	Chivatgundi	Bailhongal
98	74.6841	15.8018	Giriyala K.B	Chikkabagevadi	Bailhongal
99	74.8253	15.8030	Devalapura	Devalapuar	Bailhongal
100	74.6759	15.8032	Giriyala K.B	Chikkabagevadi	Bailhongal
101	74.6924	15.8041	Navalaghatti	Marikatti	Bailhongal
102	74.8101	15.8051	Sanikoppa	Chivatgundi	Bailhongal
103	74.7918	15.8052	Sanikoppa	Chivatgundi	Bailhongal
104	74.6511	15.8080	Ganikoppa	Marikatti	Bailhongal
105	74.7310	15.8080	Thigadi	Tigadi	Bailhongal
106	74.7559	15.8091	Sampagaov	Sampagon	Bailhongal
107	74.7786	15.8102	Naganura	Naganur	Bailhongal
108	74.6413	15.8112	Ganikoppa	Marikatti	Bailhongal
109	74.6668	15.8113	Sheegihalli .K.S	Marikatti	Bailhongal
110	74.7659	15.8119	Sampagaov	Sampagon	Bailhongal
111	74.8316	15.8128	Bylawada	Bailwad	Bailhongal
112	74.7083	15.8130	Thigadi	Tigadi	Bailhongal
113	74.7889	15.8132	Bevata Gundi	Chivatgundi	Bailhongal
114	74.8036	15.8141	Bevata Gundi	Chivatgundi	Bailhongal
115	74.8514	15.8170	Bailahongala	Bailhongal	Bailhongal
116	74.6959	15.8187	Navalaghatti	Marikatti	Bailhongal
117	74.7567	15.8197	Bhavihala	Bhavihal	Bailhongal
118	74.6750	15.8199	Marikatti	Marikatti	Bailhongal
119	74.7182	15.8202	Thigadi	Tigadi	Bailhongal
120	74.8249	15.8208	Bylawada	Bailwad	Bailhongal
121	74.7292	15.8208	Thigadi	Tigadi	Bailhongal
122	74.7384	15.8215	Yarakoppa	Tigadi	Bailhongal
123	74.7691	15.8221	Naganura	Naganur	Bailhongal
124	74.8135	15.8221	Bylawada	Bailwad	Bailhongal
125	74.7966	15.8224	Bevata Gundi	Chivatgundi	Bailhongal
126	74.7500	15.8239	Bhavihala	Bhavihal	Bailhongal
127	74.6548	15.8244	Ganikoppa	Marikatti	Bailhongal
128	74.7819	15.8245	Naganura	Naganur	Bailhongal
129	74.8546	15.8260	Bailahongala	Bailhongal	Bailhongal
130	74.8427	15.8262	Bailahongala	Bailhongal	Bailhongal
131	74.8070	15.8276	Bevata Gundi	Chivatgundi	Bailhongal
132	74.6443	15.8287	Siddapura	Marikatti	Bailhongal
133	74.7286	15.8297	Jakanayakanakoppa	Bhavihal	Bailhongal
134	74.8617	15.8308	Bailahongala	Bailhongal	Bailhongal
135	74.6684	15.8309	Marikatti	Marikatti	Bailhongal

136	74.6825	15.8309	Pularakoppa	Hannikeri	Bailhongal
137	74.7115	15.8321	Chikkamela	Hannikeri	Bailhongal
138	74.8384	15.8323	Bailahongala	Bailhongal	Bailhongal
139	74.6999	15.8327	Hiremele	Hannikeri	Bailhongal
140	74.7503	15.8328	Bhavihala	Bhavihal	Bailhongal
141	74.8279	15.8334	Bylawada	Bailwad	Bailhongal
142	74.8530	15.8334	Bailahongala	Bailhongal	Bailhongal
143	74.7926	15.8373	Naganura	Naganur	Bailhongal
144	74.7393	15.8386	Jakanayakanakoppa	Bhavihal	Bailhongal
145	74.6633	15.8392	Marikatti	Marikatti	Bailhongal
146	74.6806	15.8393	Marikatti	Marikatti	Bailhongal
147	74.8169	15.8396	Naganura	Naganur	Bailhongal
148	74.6557	15.8416	Siddapura	Marikatti	Bailhongal
149	74.7226	15.8421	Byranahatti	Hannikeri	Bailhongal
150	74.7541	15.8422	Bhavihala	Bhavihal	Bailhongal
151	74.7759	15.8425	Naganura	Naganur	Bailhongal
152	74.6990	15.8442	Hannikeri	Hannikeri	Bailhongal
153	74.8100	15.8451	Naganura	Naganur	Bailhongal
154	74.7300	15.8480	Byranahatti	Hannikeri	Bailhongal
155	74.6892	15.8489	Hannikeri	Hannikeri	Bailhongal
156	74.7826	15.8490	Naganura	Naganur	Bailhongal
157	74.7594	15.8515	Lakkundi	Bhavihal	Bailhongal
158	74.7376	15.8526	Byranahatti	Hannikeri	Bailhongal
159	74.7472	15.8526	Yaraguddhi	Bhavihal	Bailhongal
160	74.7674	15.8547	Lakkundi	Bhavihal	Bailhongal
161	74.7206	15.8554	Byranahatti	Hannikeri	Bailhongal
162	74.8054	15.8556	Murakibhavi	Murakibavi	Bailhongal
163	74.7068	15.8565	Hannikeri	Hannikeri	Bailhongal
164	74.7926	15.8581	Murakibhavi	Murakibavi	Bailhongal
165	74.7749	15.8587	Murakibhavi	Murakibavi	Bailhongal
166	74.6972	15.8589	Hannikeri	Hannikeri	Bailhongal
167	74.7348	15.8609	Yaraguddhi	Bhavihal	Bailhongal
168	74.7982	15.8615	Murakibhavi	Murakibavi	Bailhongal
169	74.7458	15.8626	Yaraguddhi	Bhavihal	Bailhongal
170	74.7126	15.8642	Hannikeri	Hannikeri	Bailhongal
171	74.7567	15.8644	Lakkundi	Bhavihal	Bailhongal
172	74.7304	15.8700	Suthagatti	Sutagatti	Bailhongal
173	74.7785	15.8714	Murakibhavi	Murakibavi	Bailhongal
174	74.7068	15.8715	Hannikeri	Hannikeri	Bailhongal
175	74.7691	15.8732	Madhanabhavi	Murakibavi	Bailhongal
176	74.7461	15.8742	Matthikoppa	Sutagatti	Bailhongal
177	74.7896	15.8748	Murakibhavi	Murakibavi	Bailhongal
178	74.7141	15.8809	Suthagatti	Sutagatti	Bailhongal
179	74.7791	15.8816	Madhanabhavi	Murakibavi	Bailhongal
180	74.7932	15.8825	Madhanabhavi	Murakibavi	Bailhongal
181	74.7550	15.8842	Matthikoppa	Sutagatti	Bailhongal

182	74.8011	15.8859	Somanahatti	Mekalmaradi	Bailhongal
183	74.7737	15.8869	Madhanabhavi	Murakibavi	Bailhongal
184	74.7009	15.8914	Hogarthi	Sutagatti	Bailhongal
185	74.7259	15.8933	Hogarthi	Sutagatti	Bailhongal
186	74.7163	15.8934	Hogarthi	Sutagatti	Bailhongal
187	74.7812	15.8934	Chittalarakoppa	Nesaragi	Bailhongal
188	74.8144	15.8937	Kalakuppi	Mekalmaradi	Bailhongal
189	74.7524	15.8957	Mohare	Deshanur	Bailhongal
190	74.7408	15.8979	Deshanura	Deshanur	Bailhongal
191	74.8045	15.8981	Somanahatti	Mekalmaradi	Bailhongal
192	74.8269	15.8996	Kalakuppi	Mekalmaradi	Bailhongal
193	74.7205	15.9006	Hogarthi	Sutagatti	Bailhongal
194	74.7694	15.9020	Nesaragi	Nesaragi	Bailhongal
195	74.7039	15.9035	Deshanura	Deshanur	Bailhongal
196	74.8375	15.9059	Myakalamaradi	Mekalmaradi	Bailhongal
197	74.7984	15.9063	Somanahatti	Mekalmaradi	Bailhongal
198	74.6942	15.9084	Deshanura	Deshanur	Bailhongal
199	74.7876	15.9088	Nesaragi	Nesaragi	Bailhongal
200	74.8182	15.9103	Kalakuppi	Mekalmaradi	Bailhongal
201	74.7351	15.9116	Deshanura	Deshanur	Bailhongal
202	74.7541	15.9135	Mohare	Deshanur	Bailhongal
203	74.7078	15.9141	Deshanura	Deshanur	Bailhongal
204	74.8081	15.9141	Kalakuppi	Mekalmaradi	Bailhongal
205	74.8328	15.9155	Myakalamaradi	Mekalmaradi	Bailhongal
206	74.7417	15.9167	Mohare	Deshanur	Bailhongal
207	74.7980	15.9180	Nesaragi	Nesaragi	Bailhongal
208	74.7725	15.9193	Mallapura K A	Mallapur K.N.	Bailhongal
209	74.6969	15.9213	Deshanura	Deshanur	Bailhongal
210	74.7084	15.9214	Deshanura	Deshanur	Bailhongal
211	74.8172	15.9218	Kalakuppi	Mekalmaradi	Bailhongal
212	74.7188	15.9220	Deshanura	Deshanur	Bailhongal
213	74.7317	15.9235	Deshanura	Deshanur	Bailhongal
214	74.7519	15.9246	Mohare	Deshanur	Bailhongal
215	74.7691	15.9258	Mallapura K A	Mallapur K.N.	Bailhongal
216	74.7416	15.9258	Mohare	Deshanur	Bailhongal
217	74.8081	15.9262	Kalakuppi	Mekalmaradi	Bailhongal
218	74.7020	15.9266	Deshanura	Deshanur	Bailhongal
219	74.8191	15.9291	Myakalamaradi	Mekalmaradi	Bailhongal
220	74.7941	15.9300	Ujjenahatti	Mekalmaradi	Bailhongal
221	74.7776	15.9334	Hanabaratti	Hanabarahatti	Bailhongal
222	74.7117	15.9352	Deshanura	Deshanur	Bailhongal
223	74.7641	15.9365	Hanabaratti	Hanabarahatti	Bailhongal
224	74.7224	15.9377	Deshanura	Deshanur	Bailhongal
225	74.8184	15.9392	Myakalamaradi	Mekalmaradi	Bailhongal
226	74.7024	15.9401	Deshanura	Deshanur	Bailhongal
227	74.8085	15.9411	Hanabaratti	Hanabarahatti	Bailhongal

228	74.7527	15.9416	Hanabaratti	Hanabarahatti	Bailhongal
229	74.7759	15.9419	Hanabaratti	Hanabarahatti	Bailhongal
230	74.7404	15.9423	Mohare	Deshanur	Bailhongal
231	74.7242	15.9438	Deshanura	Deshanur	Bailhongal
232	74.8258	15.9440	Myakalamaradi	Mekalmaradi	Bailhongal
233	74.7321	15.9455	Mohare	Deshanur	Bailhongal
234	74.7962	15.9456	Hanabaratti	Hanabarahatti	Bailhongal
235	74.7145	15.9484	Deshanura	Deshanur	Bailhongal
236	74.7608	15.9487	Hanabaratti	Hanabarahatti	Bailhongal
237	74.7486	15.9501	Hanabaratti	Hanabarahatti	Bailhongal
238	74.6998	15.9516	Deshanura	Deshanur	Bailhongal
239	74.7796	15.9537	Gajiminahala	Hanabarahatti	Bailhongal
240	74.8155	15.9564	Vannura	Vannur	Bailhongal
241	74.8300	15.9567	Vannura	Vannur	Bailhongal
242	74.7905	15.9583	Gajiminahala	Hanabarahatti	Bailhongal
243	74.7336	15.9607	Mohare	Deshanur	Bailhongal
244	74.7568	15.9613	Hosakote	Hanabarahatti	Bailhongal
245	74.7796	15.9614	Gajiminahala	Hanabarahatti	Bailhongal
246	74.7176	15.9614	Deshanura	Deshanur	Bailhongal
247	74.7427	15.9619	Hosakote	Hanabarahatti	Bailhongal
248	74.8367	15.9646	Vannura	Vannur	Bailhongal
249	74.7524	15.9655	Hosakote	Hanabarahatti	Bailhongal
250	74.8130	15.9679	Vannura	Vannur	Bailhongal
251	74.7712	15.9698	Hosakote	Hanabarahatti	Bailhongal
252	74.7350	15.9699	Hosakote	Hanabarahatti	Bailhongal
253	74.8246	15.9717	Vannura	Vannur	Bailhongal
254	74.7645	15.9741	Hosakote	Hanabarahatti	Bailhongal
255	74.7835	15.9810	Vannura	Vannur	Bailhongal
256	74.8293	15.9837	Vannura	Vannur	Bailhongal
257	74.7650	15.9839	Vannura	Vannur	Bailhongal
258	74.8209	15.9851	Vannura	Vannur	Bailhongal
259	74.8050	15.9856	Vannura	Vannur	Bailhongal
260	74.8409	15.9868	Vannura	Vannur	Bailhongal
261	74.7855	15.9884	Vannura	Vannur	Bailhongal

Annexure-II: Tentative Locations of Proposed Percolation Tanks, Bailhongala Taluk, Belagavi District.

S. No	Longitude	Latitude	Village	Gram Panchayath	Taluk
1	74.8741	15.6197	Thurkara Shigihalli	Turakarshigihalli	Bailhongal
2	74.9371	15.6400	Govanakoppa	Govanakoppa	Bailhongal
3	74.9093	15.6469	Budrakatti	Budrakatti	Bailhongal
4	74.8685	15.6501	Kadasaghatti	Turakarshigihalli	Bailhongal
5	74.9500	15.6663	Doddawada	Dodavad	Bailhongal
6	74.9242	15.6731	Siddasamudra	Belavadi	Bailhongal
7	74.9563	15.6857	Doddawada	Dodavad	Bailhongal
8	74.9837	15.6902	Doddawada	Dodavad	Bailhongal
9	74.8870	15.6989	Hire Belawadi	Belavadi	Bailhongal
10	74.9716	15.7084	Doddawada	Dodavad	Bailhongal
11	74.9884	15.7229	Doddawada	Dodavad	Bailhongal
12	74.9109	15.7455	Lingadhalli	Kenganur	Bailhongal
13	74.7317	15.7641	Kallura	Maradinagalapur	Bailhongal
14	74.7017	15.7745	Thigadi	Tigadi	Bailhongal
15	74.6882	15.7940	Giriyala K.B	Chikkabagevadi	Bailhongal
16	74.7654	15.8028	Sampagaov	Sampagon	Bailhongal
17	74.8402	15.8197	Bailahongala	Bailhongal	Bailhongal
18	74.7628	15.8233	Bhavihala	Bhavihal	Bailhongal
19	74.7351	15.8273	Jakanayakanakoppa	Bhavihal	Bailhongal
20	74.8137	15.8291	Bylawada	Bailwad	Bailhongal
21	74.6425	15.8340	Siddapura	Marikatti	Bailhongal
22	74.7868	15.8354	Naganura	Naganur	Bailhongal
23	74.7030	15.8365	Hannikeri	Hannikeri	Bailhongal
24	74.6733	15.8432	Marikatti	Marikatti	Bailhongal
25	74.7547	15.8532	Lakkundi	Bhavihal	Bailhongal
26	74.6928	15.8571	Hannikeri	Hannikeri	Bailhongal
27	74.7268	15.8602	Byranahatti	Hannikeri	Bailhongal
28	74.7935	15.8663	Murakibhavi	Murakibavi	Bailhongal
29	74.7653	15.8699	Matthikoppa	Sutagatti	Bailhongal
30	74.7840	15.8769	Murakibhavi	Murakibavi	Bailhongal
31	74.7331	15.8782	Suthagatti	Sutagatti	Bailhongal
32	74.7068	15.8802	Suthagatti	Sutagatti	Bailhongal
33	74.8049	15.8905	Somanahatti	Mekalmaradi	Bailhongal
34	74.7441	15.8922	Matthikoppa	Sutagatti	Bailhongal
35	74.7703	15.8937	Koladhura	Mallapur K.N.	Bailhongal
36	74.8333	15.9057	Myakalamaradi	Mekalmaradi	Bailhongal
37	74.7154	15.9110	Deshanura	Deshanur	Bailhongal
38	74.7997	15.9141	Nesaragi	Nesaragi	Bailhongal
39	74.7874	15.9275	Mallapura K A	Mallapur K.N.	Bailhongal
40	74.7463	15.9299	Mohare	Deshanur	Bailhongal
41	74.7110	15.9421	Deshanura	Deshanur	Bailhongal
42	74.8032	15.9506	Vannura	Vannur	Bailhongal
43	74.7410	15.9510	Mohare	Deshanur	Bailhongal

44	74.7715	15.9539	Hanabaratti	Hanabarahatti	Bailhongal
45	74.8215	15.9546	Vannura	Vannur	Bailhongal
46	74.7977	15.9770	Vannura	Vannur	Bailhongal
47	74.8334	15.9774	Vannura	Vannur	Bailhongal
48	74.7720	15.9802	Vannura	Vannur	Bailhongal