



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**

Khanapur Taluk, Belagavi District, Karnataka

दक्षिण पश्चिमी क्षेत्र, बेंगलुरु
South Western Region, Bengaluru

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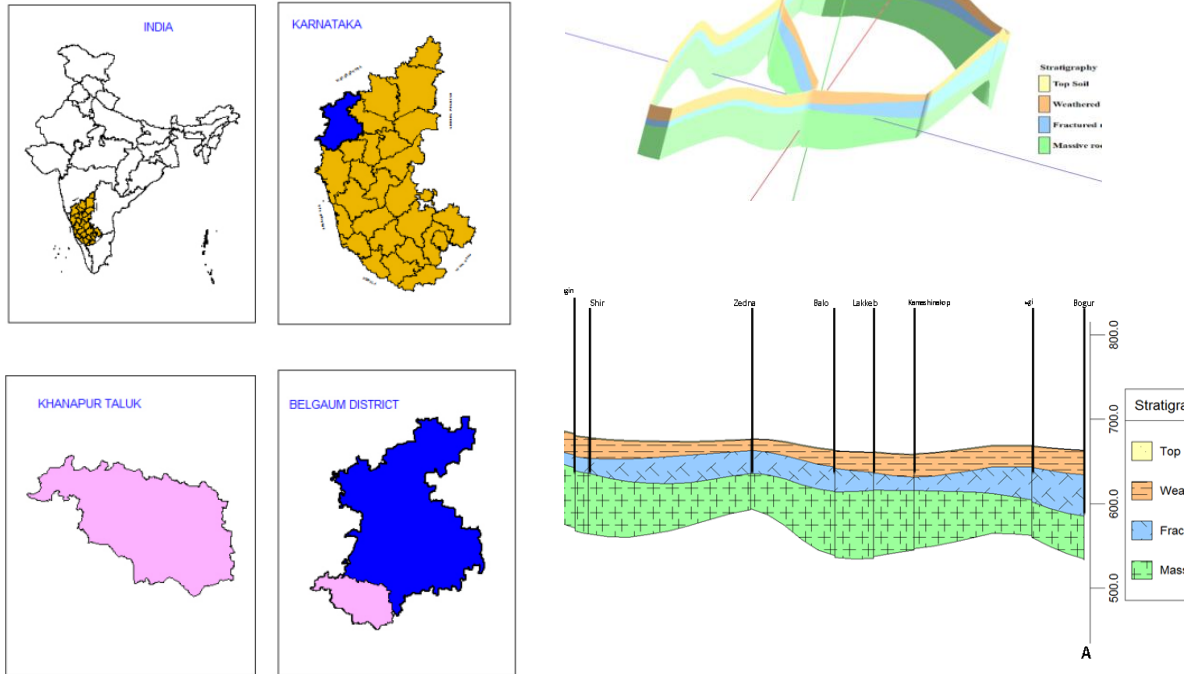
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AQUIFER MAPS AND MANAGEMENT PLAN, KHANAPUR TALUK, BELAGAVI DISTRICT, KARNATAKA STATE

(AAP – 2019-2020)



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

1 SALIENT FEATURES

Name of the taluk	: KHANAPUR
District	: Belagavi
State	: Karnataka
Area	: 1742 sq.km.
Population	: 258089
Annual Normal Rainfall	: 1969mm(90 rainy days)

1.1 Study area

Aquifer mapping studies have been carried out in Khanapur taluk, Belagavi district of Karnataka covering an area of 1742sq.kms under National Aquifer Mapping Project. Khanapur taluk of Belagavi district is located in between North Latitudes 15°21'30.96" and 15°47'12.84" and between East Longitudes 74° 05' 15" and 74°44'35.52" and is falling in parts of Survey of India Toposheet48I/2, 48I/5, 48I/6, 48I/7, 48I/10, 48I/11. The study area is bounded on the North by Belagavi taluk and Maharastra state, on the East by Bailahongala taluk, on the South by the Joida taluk of Uttara kannada district and Goa state and on the West by Maharashtra state. Location map of Khanapur taluk of Belagavi district is presented in **Fig-1**.

LOCATION MAP OF KHANAPUR TALUK, BELGAUM DISTRICT, KARNATAKA

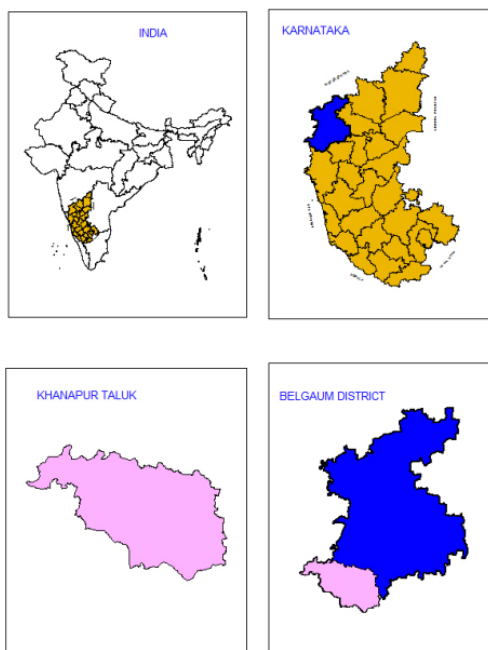


Fig 1: Location map of Khanapur taluk of Belagavi district

Administratively, Khanapur town is the talukheadquarters and there are 3 other urban settlements in the taluk. There are 51 grama panchayats, 218 inhabited and 1 uninhabited villages in the taluk.

1.2 Population

According to 2011 census, the human population in Khanapur taluk is 258089 out of which 13% constitutes the urban population and 87% constitute the rural population. The taluk has an overall population density of 149 persons per sq.km. In Khanapur taluk the decadal variation in population from 2001-2011 is 6.13%. The population details are given in **Table-1**.

Table-1: Population details of Khanapur taluk

Total	Male	Female	Share of the district population	Rural population	Urban population	Decadal change in population	Decadal change in rural population	Decadal change in urban population
258089	130598	127491	5.40	223987	34102	6.13	1.65	49

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

1.3 Rainfall and Climate

The climate of the district as a whole can be termed as semi-arid. The variation in the maximum temperature during the year ranges from 27°C to 35.70° C and minimum from 13.90°C to 20.60° C. The district experiences pleasant winters and hot dry summers. The hot season extends from March to May, during which the daily maximum temperature often shoots up to 35.70C.

Agro-climatologically, the district can be divided into three zones taking into consideration the rainfall pattern-quantum and distribution, soil types, texture, depth and physio-chemical properties, elevation, topography major crops and type of vegetation i.e. high rainfall “Hilly zone”, “Northern transitional zone” and “Northern dry zone” from southwest to northeast respectively. Khanapur taluk falls under “**hilly zone**” of agro-climatic zones of Karnataka state. The normal annual rainfall in Khanapur taluk for the period 1941 to 2000 is 1969 mm. Seasonal rainfall pattern indicates that, major amount of rainfall was recorded during South-West Monsoon seasons, which contributes about 92% of the annual normal rainfall, followed by North-East Monsoon season constituting 5% and remaining 3% in Pre-Monsoon season.

Computations were carried out for the 30-year blocks of 1981-2010, the mean monthly rainfall at Belagavi is ranging between 0 mm during February to 116 mm during June. The coefficient of variation percent for pre-monsoon, monsoon and post-monsoon season is 64, 39 & 65 percent respectively. Annual CV at this station works out to be 26 percent.

Statistical Analysis of Rainfall Data of Belagavi district (1981 to 2010), Annual rainfall (mm) in Khanapur rain gauge station from 2007 to 2020 and Monthly rainfall for the year 2020 recorded in various rain gauge stations in Khanapur taluk is given **Table- 2, 2a and 2b** respectively. The perusal of Table – 2a indicates that the rainfall ranges from 1974 mm (2015) to 4088 (2007), whereas the average rainfall is 3091 mm. The rainfall trend analysis for the period 2007-2020 of Khanapur taluk is presented in **Fig.3** and it indicates that the rainfall is decreasing @ 46.56 mm / year which is quite significant.

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

	JAN	FEB	MAR	APR	MAY	PRE	JUN	JUL	AUG	SEP	SW	OCT	NOV	DEC	NE	Annual
NRM	1	0	4	18	56	81	116	96	84	110	406	109	22	4	136	622
ST.DEV	5	1	8	22	50	52	70	56	40	86	160	76	32	11	88	164
CV%	324	381	203	119	89	64	60	58	47	78	39	69	146	269	65	26

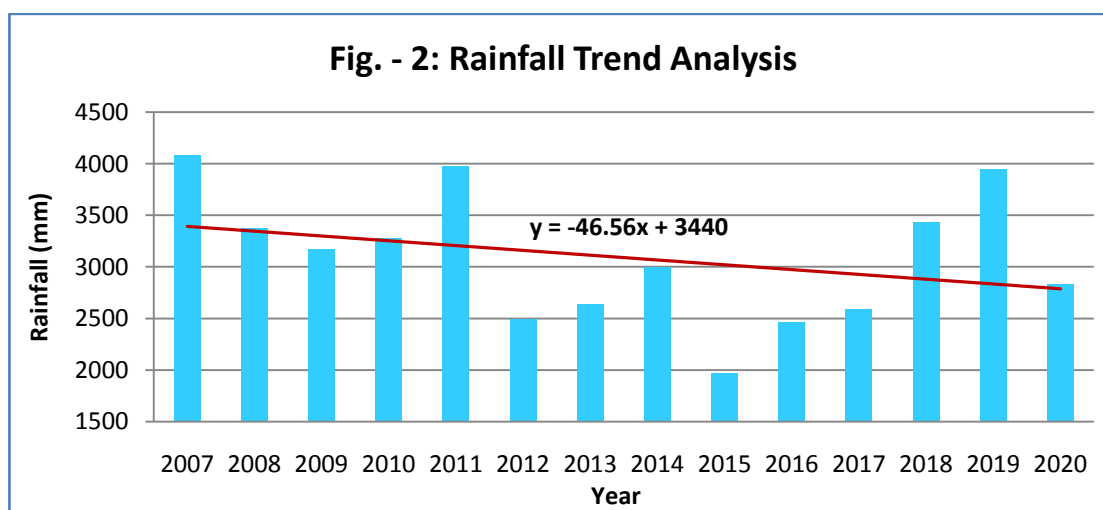
Table- 2a: Annual rainfall(mm)in Khanapur rain gauge station from 2007 to 2020

2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
4088	3380	3175	3279	3975	2488	2635	2998	1974	2468	2589	3437	3953	2834	3091

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

Table- 2b: Monthly rainfall (2020) at various rain gauge stations in Khanapur taluk.

Year	Rain Gauge Station	Jan	Feb	Mar	Apr	May	PRE	Jun	Jul	Aug	Sep	SW	Oct	Nov	Dec	NE	Total
2020	Khanapur	0.00	0.00	8.20	25.10	34.20	67.50	314.90	333.20	1080.70	247.80	1976.60	102.10	1.00	0.00	103.10	2147.20
	Asoga	0.00	0.00	6.00	26.40	62.40	94.80	-	420.00	1039.20	321.40	1780.60	96.00	0.00	0.00	96.00	1971.40
	Bidi	0.00	0.00	12.40	59.00	32.80	104.20	182.40	225.63	669.00	308.80	1385.83	101.60	4.80	0.00	106.40	1596.43
	Gunji	0.00	0.00	15.80	52.40	18.40	86.60	350.20	429.40	1231.60	298.60	2309.80	155.20	0.40	0.00	155.60	2552.00
	Jamboti	0.00	0.00	1.20	16.00	8.60	25.80	561.40	561.20	1500.30	345.80	2968.70	139.40	0.00	0.00	139.40	3133.90
	Kakkeri	0.00	0.00	34.80	32.00	57.40	124.20	219.00	313.00	746.20	457.40	1735.60	133.60	0.00	0.00	133.60	1993.40
	Kanakumbi	0.00	0.00	5.60	22.00	22.60	50.20	1268.80	1071.40	2826.40	753.00	5919.60	302.40	0.60	0.00	303.00	6272.80
	Londa PWD	0.00	0.00	3.00	38.20	82.80	124.00	477.10	574.90	1502.80	417.20	2972.00	147.00	0.00	0.00	147.00	3243.00
	Londa RLY	0.00	0.00	6.00	29.00	89.60	124.60	470.90	576.00	1480.50	394.60	2922.00	149.40	0.00	0.00	149.40	3196.00
	Nagargali	0.00	0.00	12.40	48.90	18.00	79.30	322.20	418.30	1014.80	295.40	2050.70	106.00	0.00	0.00	106.00	2236.00
	Average	0.00	0.00	10.54	34.90	42.68	88.12	416.69	492.30	1309.15	384.00	2602.14	143.27	0.68	0.00	143.95	2834.21



1.4 Agriculture & Irrigation

Agriculture is the main occupation in Khanapur taluk. Major Kharif crops are paddy, maize and vegetables. Main crops of Rabi season are maize, vegetables and oilseeds (**Table-3**). Water intensive crops like sugarcane and paddy are grown in 67.46 and 20.50% respectively of the total crop area. However, paddy is grown during Kharif period. Maize is grown in 2.02% and oil seeds in 2.69% of total crop area of the taluk. The annual crop sugarcane is grown in 9874 Ha (20.50%) and short duration crop vegetable is grown in 816 Ha (1.69%) of the crop area which requires ground water during post monsoon season.

Table-3: Cropping pattern in Khanapur taluk 2017-2018 (Ha)

Crop	Paddy	Maize	Ragi	Wheat	Pulses	Fruits	Vegetables	Oil seeds	Sugarcane	Cotton	Total crop
Area	32484	972	192	4	125	2289	816	1293	9874	107	
%	67.46	2.02	0.40	0.01	0.26	4.75	1.69	2.69	20.50	0.22	100

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

About 53% of the geographical area is covered by forest. It is observed that net sown area accounts for 27.36% and area sown more than once is only 2.38% of total geographical area in Khanapur taluk. Out of total geographical area, area not available for cultivation, the other uncultivable land and fallow land cover 4.76%, 4.16% and 10.93% respectively. About **35.25%** of net area irrigated is from dug wells and 61.92% is from bore wells, constituting 97% of irrigation is from ground water (**Fig.-3**). Only 2.83% of the irrigation is from the tanks. Thus ground water is the major source of irrigation in the taluk. The details of land use and the details of Irrigation are given in **Table 4 and 5** respectively. The land use pattern in the taluk is shown in **Fig-4**.

Table-4: Details of land use in Khanapur taluk 2017-2018 (Ha)

Total Geographical Area	Area under Forest	Area not available for cultivation	Other uncultivable land	Fallow land	Net sown area	Area sown more than once	Gross sown area
172956	91309	8234	7188	18897	47328	4116	51444
% of the area	52.79	4.76	4.16	10.93	27.36	2.38	29.74

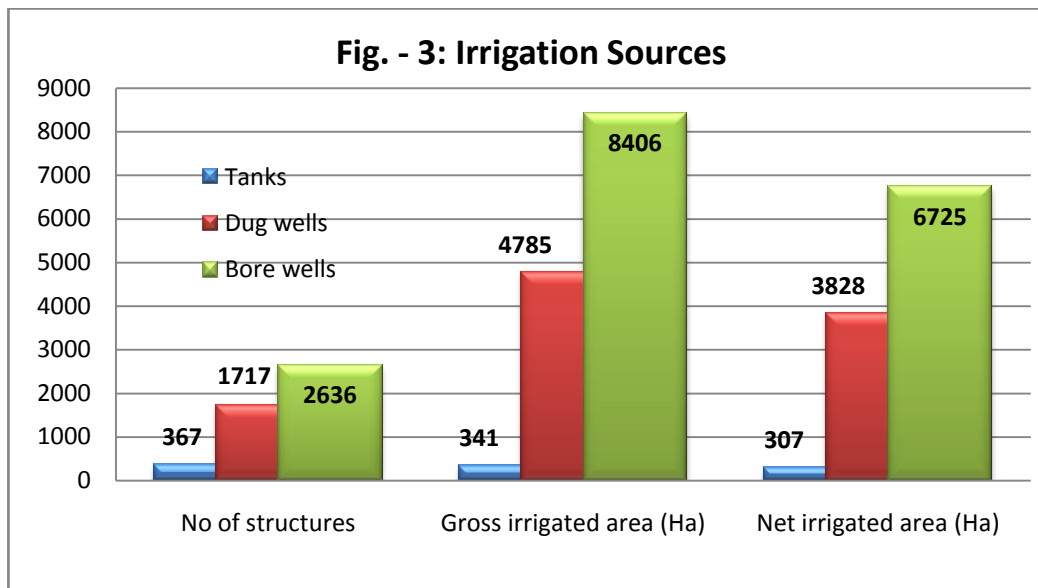
Source: District at a glance 2017-18, Govt. of Karnataka

Table-5: Details Irrigation in Khanapur taluk

Source of Irrigation	No of structures	Gross area irrigated (Ha)	Net area irrigated (Ha.)	% of area
Canals	0	0	0	0.00
Tanks	367	341	307	2.83
Dug wells	1717	4785	3828	35.25
Bore wells	2636	8406	6725	61.92
Lift Irrigation	7	0	0	0.00
Other Sources		0	0	0.00

Total		13532	10860	100.00
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Source: District at a Glance 2017-18, Govt. of Karnataka



There is one minor irrigation project namely **Kiniye project** which is under implementation. The salient features of the Kiniye project is given in **Table -6**.

Table- 6: Details of Kiniye Project

S. No	Beneficiary villages	Information of the canal command			Total area in Ha	
		Total area	Developed Area	Undeveloped Area	Developed Command	Undeveloped Command
1	Kiniye	129.70	0	129.70	-	129.70
2	Ranakunde	178.68	0	178.68	-	178.68
3	SantiBastavada	280.78	0	280.78	-	280.78
4	Vaghavade	468.89	0	468.89	-	468.89
5	Bhadurvadi	142.08	0	142.08	-	142.08
Total		1,200	-	1,200	-	1,200

1.5 Geomorphology, Physiography & Drainage

The Taluk is located on the eastern side of the Western Ghats and its topography is predominantly undulating. A “rugged terrain” marks the western part of the taluk with deep cutting ravines on the foothills of the Western Ghats. The elevation of these hills varies from 796m amsl around Hulundto 1025m amsl around Kalmani. The central and eastern parts exhibit moderate to gently “undulating terrain” having sparsely distributed knolls and tors. The elevation in the plains varies from 620 m in the eastern part to 655m amsl in the western part of the taluk. This has its bearing on the regional slope which is towards northeast. The differential altitude is significant because, it is likely to cause irregular ground water flow patterns on the micro scale (**Fig.-5**).

The major part of Khanapur taluk falls in Krishna river basin. The Malaprabha river along with its tributaries drain the major part of the taluk and are perennial and effluent in nature and flow in North-Easterly direction. The southern part of the taluk is drained by the tributaries of west flowing River Kali and the south western part of the taluk is drained by the tributaries of west flowing River Mahadayi (Mandovi). The drainage density varies from 0.80 to 3.4 km/sq.km. Number of minor streams which rises locally and ultimately drains into Malaprabha river. The drainage in the taluk is dendritic to sub-dendritic in nature (Fig-6).

1.6 Soil

The soils of Khanapur taluk can broadly be classified into red soils, black soils and laterite soils. These soils vary in depth and texture, depending on the parent rock type, physiographic settings and climatic conditions. By and large, black soils are predominating in the meta basalt terrain and the red soils are found in the eastern and southeastern part of the taluk in schist and gneiss formation area. These soils in turn can be grouped into seven categories viz. Shallow black soil, medium black soil, Deep to very black soil, mixed red & black soil, red loamy soil, which cover large tracks of land and the other two lateritic and alluvium soils are local in nature. The soil profile of Khanapur taluk is given in Table-7. The soil map is shown in Fig- 7 and slope map is shown in Fig- 8.

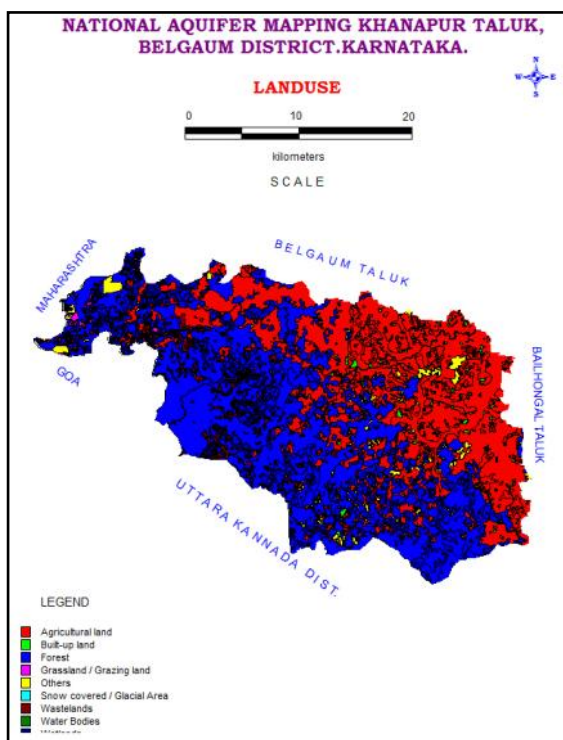


Fig 4: Land use Map

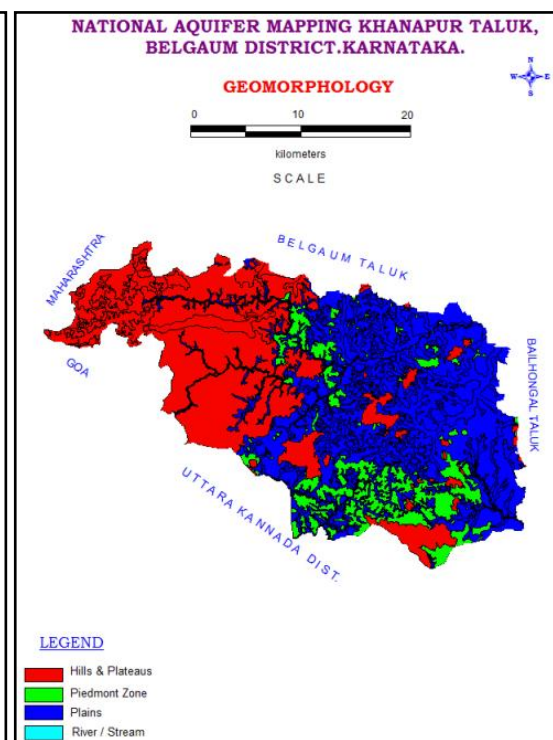


Fig 5: Geomorphology Map

Table-7: Soil profile of Khanapur taluk

S. No	Soil type		Land slope			
	Major soil classes	Area (ha)	0-3% (ha)	3-8% (ha)	8-25% (ha)	>25% (ha)
1	Shallow, red gravelly mixed with deep black soils	4668				
2	Medium deep, red clayey soils	22761				
3	Medium deep, red gravelly clay soils	22732				
4	Deep, red gravelly clay soils	2791				
5	Deep, lateritic gravelly clay soils	646				
6	Deep, laterite clayey soils	7634				
7	Deep, laterite gravelly clayey soils	17669				
8	Very shallow, mixed black clayey and brown loamy soils	179				
9	Deep, alluvial black clayey soils	8817				
10	Deep, forest brown clayey soils (gravelly in patches)	85578				
Total		173475	28063	72326	57443	15643

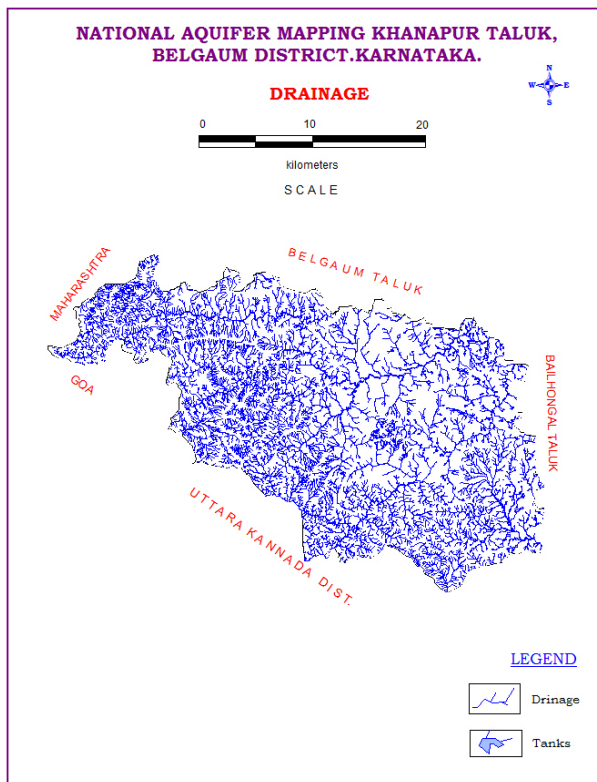


Fig 6: Drainage Map

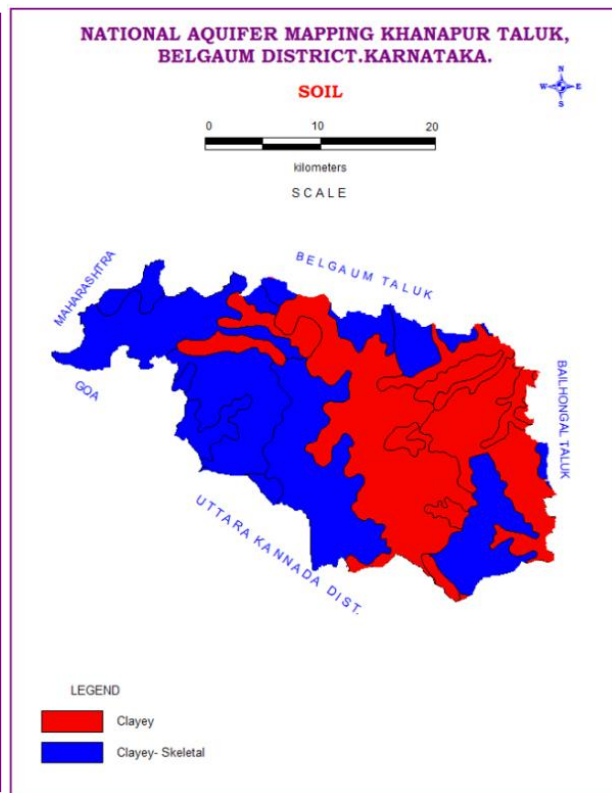


Fig 7: Soil Map

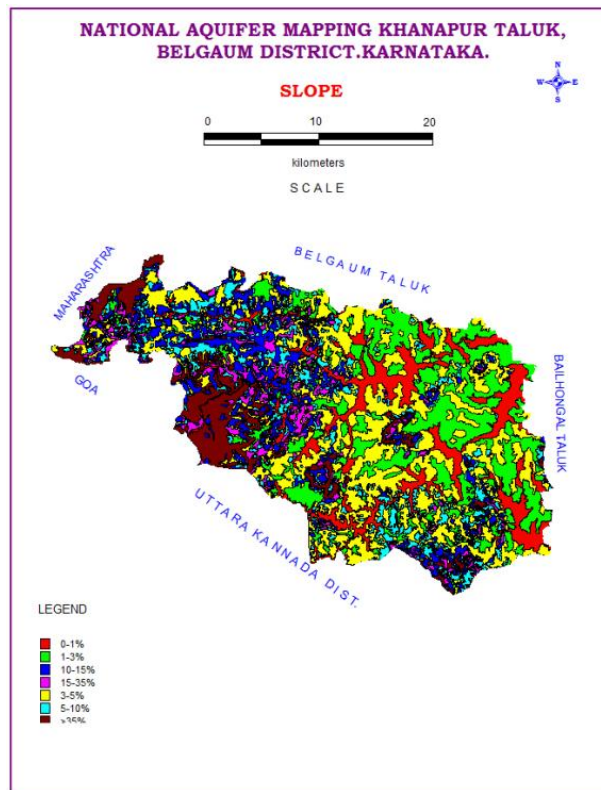


Fig 8: Slope Map

1.7 Ground water resource availability and extraction

Aquifer wise total ground water resources up to 200 m depth are given in **Table-8** below.

Table 8: 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)	Dynamic + phreatic in-storage + fractured
Khanapur	8959	20067	4361	33388

1.8 Existing and future water demands (as per GWRA-2017 and 2020)

As per the GWRA 2017, the net ground water availability is 8959 ham and the total ground water draft for all uses is 739 ham only with stage of development at 8% and the taluk falls in Safe category. Thus there is plenty of scope for future irrigation development @ 8184Ham. The domestic (Industrial sector) demand for next 25 years is estimated at 426Ham.

Table.8.b Detail of Dynamic Ground Water resource, Khanapur taluk (as on March 2017 Figures in Ham)

Net Annual Ground Water Availability	Existing Gross Ground Water Draft for Irrigation	Existing Gross GW Draft For Domestic And Industrial	Existing Gross Ground Water Draft For All Uses	Allocation For Domestic And Industrial Use For	Net Ground Water Availability For Future Irrigation Develop-	Existing Stage of Ground Water Development	Category

		Water Supply		Next 25 Years	ment		
8959	350	390	739	426	8184	8	Safe

The details of dynamic (Phreatic) ground water resources for Khanapur taluk as on March 2020 is shown in Table.8.c. It is observed that the stage of ground water extraction is slightly gone up in the taluk from 8 % to 11.67% from 2017 to 2020 with an increase in the net ground water availability during 2020 with a figure of 10933.98 Ham.

Table.8.cDetail of Dynamic Ground Water resource, Khanapur taluk, (as on March 2020)

Annual Extractable GW Resource (Ham)	GW Extraction for Irrigation Use (Ham)	GW Extraction for Industrial Use (Ham)	GW Extraction for Domestic Use (Ham)	Total Extraction (Ham)	Annual GW Allocation for Domestic Use as on 2025 (Ham)	Net GW Availability for future use (Ham)	Stage of GW Extraction (%)	Categorization (Over-Exploited/Critical/Semi-critical/Safe/Saline)
12414.08	1022.69	0	425.83	1448.52	457.41	10933.98	11.67	Safe

1.9 Water level behaviour

The depth to water level and water level fluctuation for the year 2019 is given in **Table-9a and 9b** respectively for Aquifer I and Aquifer II.

Table 9a: Depth to water level and Water level fluctuation, Aquifer – I

Location	May 2019	Nov 2019	Seasonal water level fluctuation
Bidi	Dry	1.25	
Gunji	2.87	1.32	1.55
Khanapur	11.83	7.3	4.53
Londa	10.5	7.46	3.04
Nandgad	Dry	2.16	
Watre	12.9	5.98	6.92
Kumbarwad	3.00	1.75	1.25

Table 9b: Depth to water level and Water level fluctuation, Aquifer – II

PZ location	Water level May 2019	Water level Nov 2019	Seasonal water level fluctuation
Khanapur	Dry	7.75	
Nagarahalli	11.32	3.51	7.81
Khanapur	12.20	7.50	4.70
Londa	18.45	12.45	6.00
Nagargalli	10.25	3.80	6.45
Parishwad	23.05	15.10	7.95
Beedi	26.20	6.20	20.00
Linganmath	25.15	4.25	20.90

During pre-monsoon, water level map shows that in 15% of the area water level ranges in between 2 and 5 mbgl, in 60 % of the area water level ranges in between 5 and 10 mbgl and that

in 25% of the area water level ranges in between 10 and 20 mbgl. During post monsoon, water level map shows that in 60 % of the area water level ranges in between 0 and 2mbgl, in 30 % of the area water level ranges in between 2 and 5mbgl and 10 % of the area water level ranges in between 5 and 10mbgl. The seasonal water level fluctuation map shows that in 30% of the area water level fluctuation is in the range of 2 to 4 m and in the remaining area water level fluctuation is in the range of 4 to 8m. The premonsoon, post monsoon and seasonal fluctuation maps are shown in figure 9, 10 and 11 respectively.

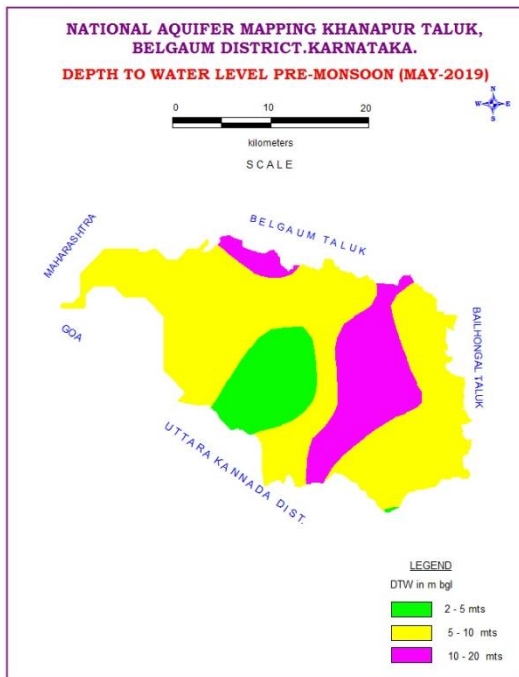


Fig-9: Pre monsoon water level

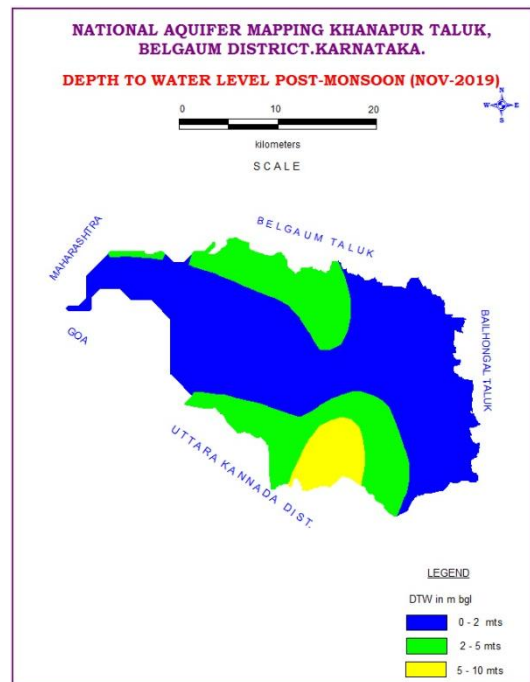


Fig-10: Post monsoon water level

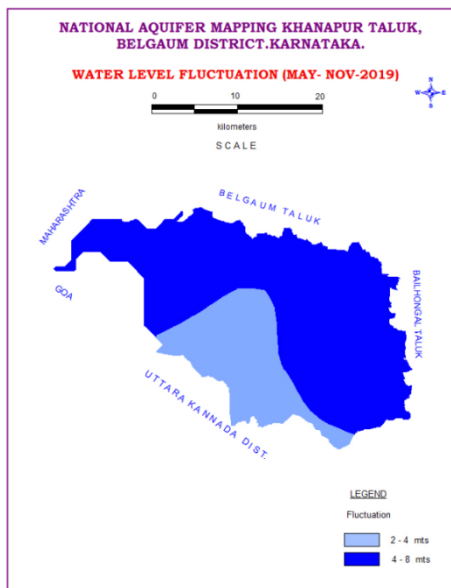


Fig-11: Water level fluctuation

2 AQUIFER DISPOSITION

The occurrence and movement of water in the subsurface is broadly governed by geological frameworks i.e., nature of rock formations including their porosity (primary and secondary) and permeability. The principal aquifers in the area is Basalt/meta-basalt, schist and gneiss and the occurrence and movement of ground water in these rocks is controlled by various factors and it primarily depends on the degree of interconnection of secondary pores/voids developed by fracturing and weathering in the hard rock.

2.1 Aquifer Types

In Khanapur taluk, there are mainly two types of aquifer systems;

- **Aquifer-I (Phreatic aquifer)** comprising Weathered Basalt/meta basalt, schist and gneiss.
- **Aquifer-II (Fractured aquifer)** comprising Fractured Basalt/ Metabasalt, schist and gneiss.

In **Khanapur taluk**, Basalt/meta-basalt, schist and gneiss are the main water bearing formations (**Fig-12**). Ground water occurs within the weathered and fractured Basalt,meta-basalt,schist and gneiss under water table condition and semi-confined condition. In Khanapur taluk bore wells were drilled from a minimum depth of 40.0mbgl to a maximum of 180mbgl. The depth of weathered zone (Aquifer-I) ranged from 6.0mbgl to 36.0 mbgl. Ground water exploration reveals that aquifer-II (fractured formation) has been encountered between the depth of 20 and 150mbgl. Yield ranges from 0.20 to 4.0lps.

The details of bore well drilled and the basic characteristics of each aquifer are summarized in **Table-10a and 10b** respectively. The 2D, 3D aquifer disposition and fence diagram are presented in **Fig-13 a and 13 b** respectively.

Table 10a: Details of Ground Water Exploration

Location	Depth (m bgl)	Casing depth (m bgl)	Lithology	Most promising water bearing Zones						S.W.L (m.bgl)	Discharge (lps)
				1		2		3			
				From	to	From	to	From	to		
Zednavgi	64	28.3	Granite							8.5	Neg
Bogur	165.7	31.5	Schist	34	35	46	47	152.45	153.5	12.6	4
Bogur	179	36.1	Schist	44.72	45.7					12.58	0.4
Godgeri	150.45	13.5	Schists	15.5	16.5					3.02	V.Poor
Virapur	80	20	Schist	39	40	49	50			13.78	1.95
Gandiwad	95.55	33	Schist	39	40	61	62	67	68	10.88	4.5
Shiroli	129.1	24	Granite	40.65	41.65	44.7	45.7			9.5	0.2
Asoga	175.85	8	Granite	106.6	107.7					1.245	Neg
Bidi	35		Phyllite							4.61	-
Khanapur	40.65	12	Granite	20	22.35					8.84	0.3
Itagi	82	20	Schist	39	40	57	58			24.61	Negl
Jamboti	80	6.5	Deccan trap, basalt	13	14	28	29			9.09	0.5
Khanapur	88	14	Arcn, grgn	22	24	28	29	34	69	20.47	1

Londa	80	11	Arcn, grgn	22	23	43	44			10.5	0.3
Nagargali	88	24	Arcn, gnss	41	47	63	65	81	82	9.19	1
Nandagad	59	18	Arcn, grgn	34	35	37	41			4.4	1.4

Table 10b: Basic characteristics of the Aquifers

Aquifers	Weathered Zone (Aq.-I)	Fractured Zone (Aq.-II)
Prominent Lithology	Weathered Basalt, Meta basalt, greywacke and granite	Fractured / Jointed Basalt, Meta basalt, greywacke and granite
Depth range (m bgl)	10 to 25	30 to 180
Depth range of occurrence of fractures (mbgl)	5 to 20 including weathered part	40 - 150 80% between 40 - 80
Thickness range (mbgl)	Upto 8 to 10	0.50 to 3.00
Range of yield potential (lps)	Poor yield	0.2 – 4.5
Specific Yield	2%	0.2%

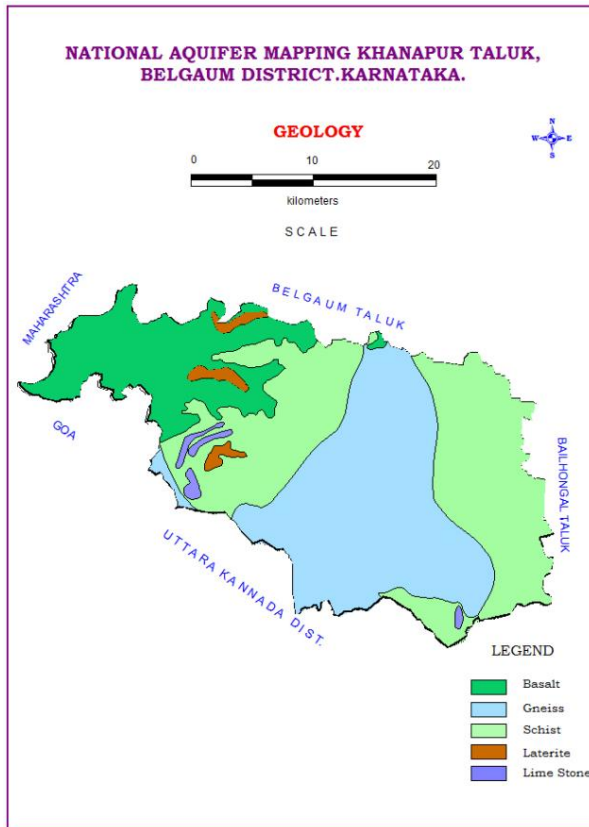


Fig-12: Geology

2D AQUIFER DISPOSITION

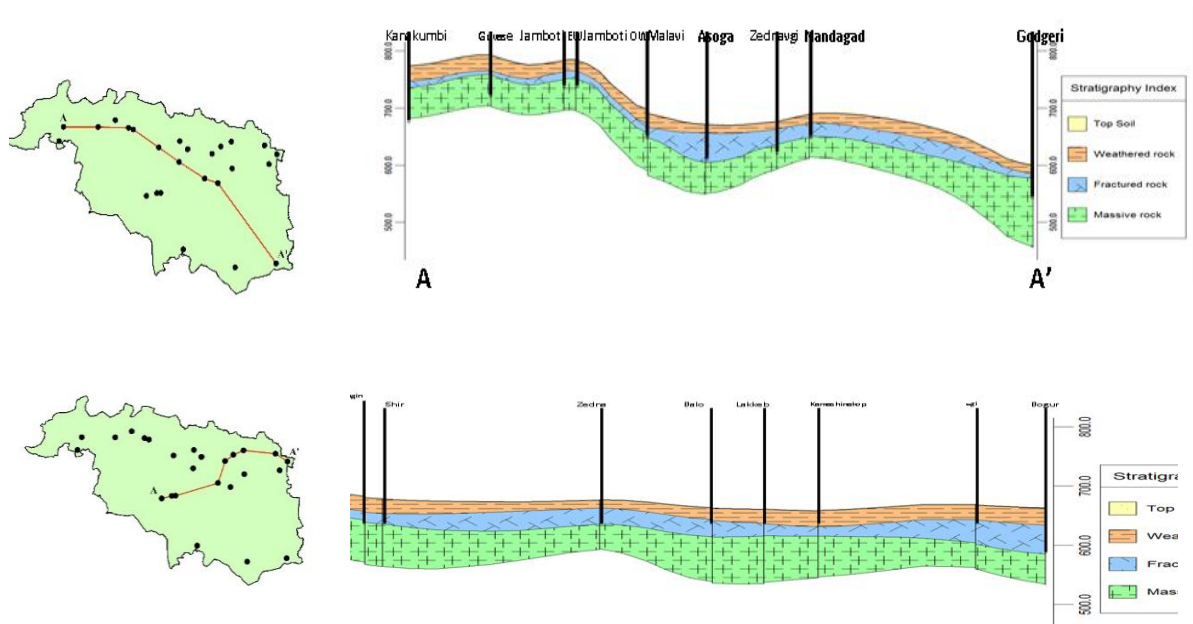
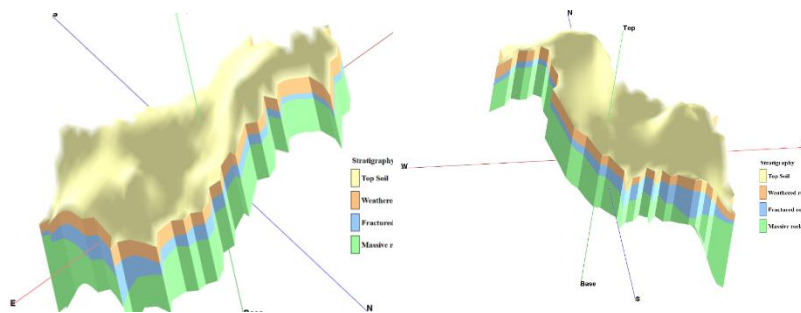


Fig.13a:2-D Aquifer disposition

3D AQUIFER DISPOSITION



3D FENCE DIAGRAM

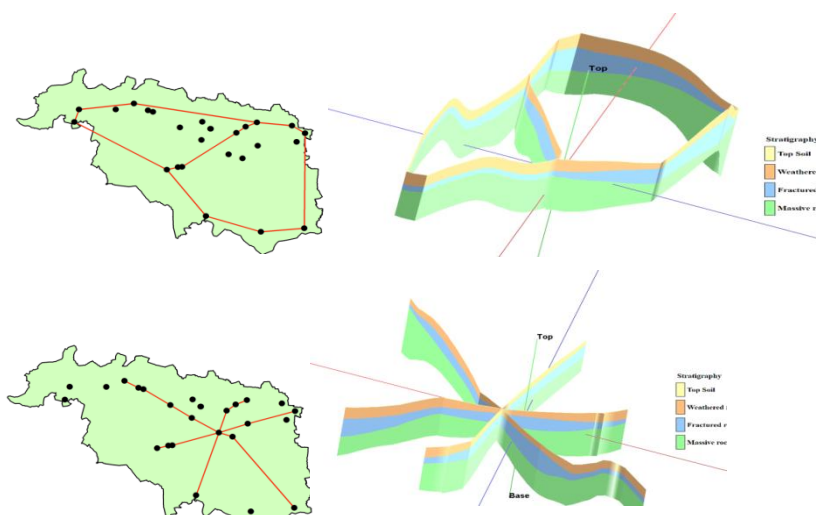


Fig.13 b: 3D Aquifer disposition

3 GROUND WATER RESOURCE, EXTRACTION, CONTAMINATION AND OTHER ISSUES

The main ground water issues are Low Ground Water Development, Limited Ground Water Potential / Limited Aquifer Thickness / Sustainability, Deeper Water Levels particularly in Aquifer-II in some parts, hilly and plateau areas (almost 30%), forest area (53%), falling rainfall trend which are all inter-related or inter dependent and Inferior Ground Water Quality due to nitrate contamination major part of the area.

3.1 Comparison of Ground Water Resource and Extraction

The Dynamic Ground Water Resource 2017 and as on 2020 have already been summarised above and are shown in Table 8. The comparison of the resource as on 2009, 2011, 2013 and 2017 are summarised below. It is observed that the ground water availability is remained more or less same during the years 2009, 2011 and 2013. However, the same is reduced during 2017. However, the stage of ground water development is improved during the same. In tune with this, the ground water draft is found to be reduced during the same period. It is attributable to the improvement in the irrigation practice and also due to the water conservation activities carried out in the taluk by various agencies.

Table – 8: Comparison of ground water availability and draft scenario

GW availability (ham)	GW draft (ham)	Stage of GW Development (%)	GW availability (ham)	GW draft (ham)	Stage of GW Development (%)	GW availability (ham)	GW draft (ham)	Stage of GW Development (%)	GW availability (ham)	GW draft (ham)	Stage of GW Development (%)
2009			2011			2013			2017		
10701	4033	38	11990	3474	29	11466	3390	30	8959	739	8

3.2 Chemical Quality of Ground Water and Contamination

The interpretation from Chemical Analysis results in Khanapur taluk is mentioned as under, whereas the chemical data of aquifer I is given in **Table-11**:

Electrical Conductivity: In general, EC values range from 200 to 690 μ /mhos/cm at 25°C which are within the permissible limit (**Fig-14**).

Chloride: Chloride concentration in ground water ranges between 43 and 106 mg/l which are within the permissible limit. (**Fig-15**).

Nitrate: Nitrate value ranges from 4.6 to 43.6 mg/l in Aquifer –I (**Fig-16**)

Fluoride: Fluoride concentration in ground water ranges between 0.22 – 0.73 mg/l which are within the permissible limit of 1.5 mg/l (**Fig-17**).

Table-11: Chemical data of Aquifer I

Location	pH	Specific Conduct. in μ S/cm at 25°C	Cl ⁻	NO ₃	F ⁻
Khanapur	7.51	380	56	38.7	0.29
Gunji	7.39	200	43	4.6	0.52
Watre	8.03	380	28	34.2	0.41

Nargalli	7.97	690	106	43.6	0.73
Nandgad	7.69	250	60	42.2	0.22
Bidi	7.66	260	43	18.1	0.40

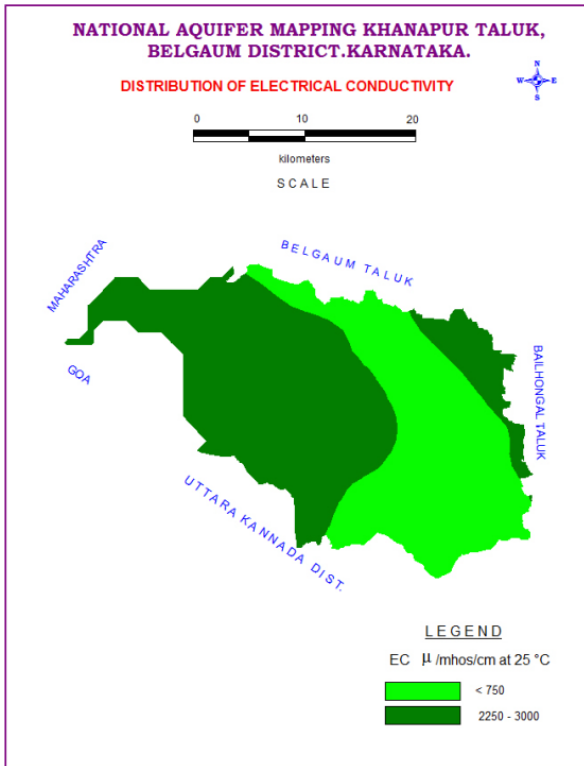


Fig-14: Electrical conductivity distribution

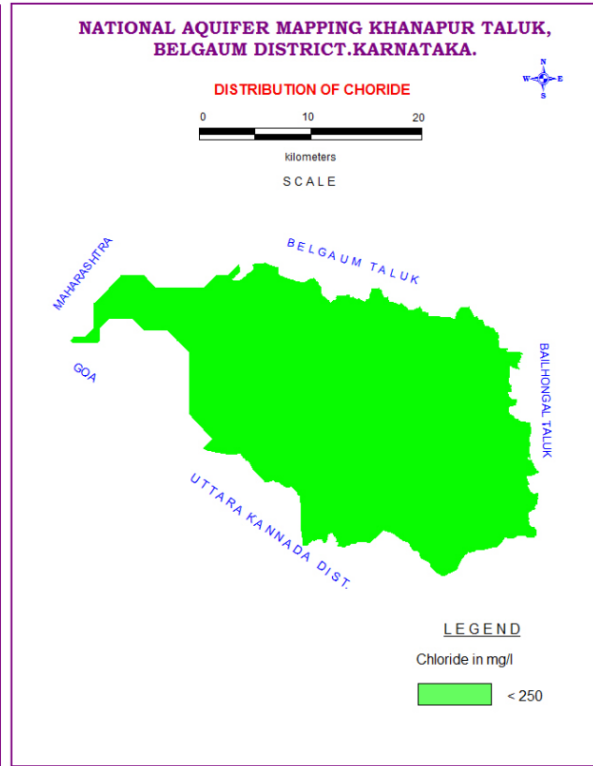


Fig-15: Chloride distribution

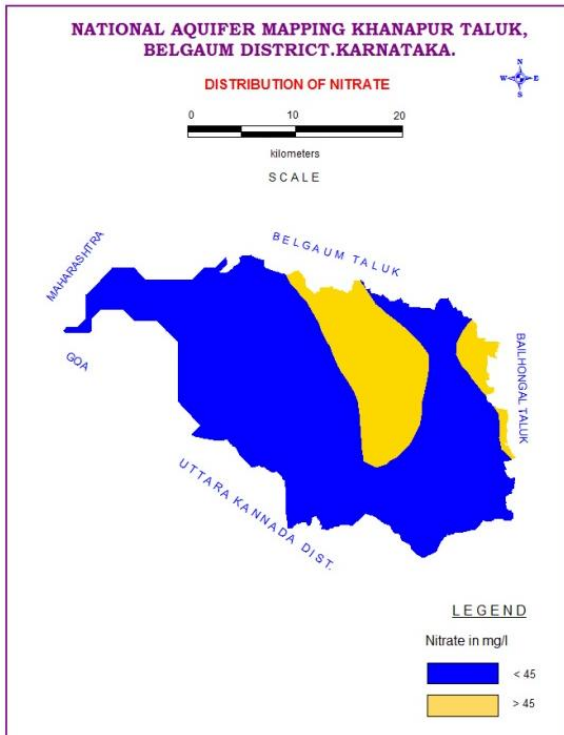


Fig-16: Nitrate distribution

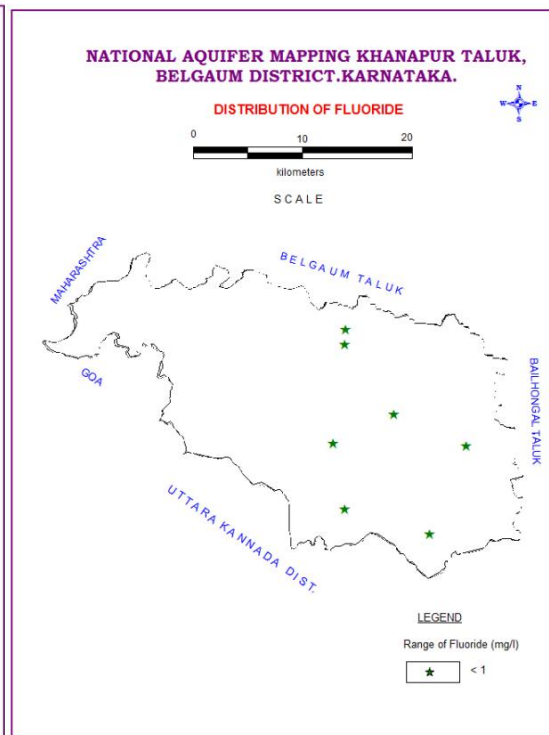


Fig-17: Fluoride distribution

In general, ground water quality in Khanapur taluk is good for drinking purpose except in some areas as depicted in above illustrated maps, where nitrate is found to be greater than the

permissible limit as per “Indian Standard Drinking Water Specification 2009”. Ground water samples have also been tested and found suitable for agriculture & irrigation purposes.

4 GROUND WATER RESOURCE ENHANCEMENT AND PROPOSED MANGEMENT STRATEGY

4.1 Resource Enhancement by Supply Side Interventions

The overall stage of ground water development is only 8% as per GEC 2017 and 11.67 % as on 2020. However, the pre-monsoon long term ground water trend shows the declining trend in the range of 0.02 m/year to 0.73m/year in 85% of the area where as 15% of the area show rising trend in the range of negligible to 0.0006m/ year. During post-monsoon period, even though 85% of the area show rise in water level in the range of 0.0109m/year to 0.1855m/year 15% of the area show fall in water level in the range of 0.00 to 0.0384m/year. During the pre-monsoon (2019) water level in 25% of the area the ranged from 10 to 20mbgl and 60% of the area water level ranged in between 5 and 10 mbgl. The seasonal fluctuation during 2019 in 70% Of the area ranged between 4 to 8m.

Considering the long-term water level trend and seasonal water level, seasonal fluctuation and declining trend of annual rainfall (**Fig-2**), 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 (**Table-12**). The area feasible for recharge in Khanapur taluk is worked out as 1379 sq.km. and the surface surplus non-committed runoff availability is 93.202 MCM, which is considered for planning of AR structures. For this, a total of 2 sub-surface dykes, 82 percolation tank and 393 Check dams are proposed. The volume of water expected to be conserved/recharged @75% efficiency is 69.902 MCM through these AR structures. The approximate cost estimate for construction of these AR structures is Rs. 5618.138 Lakhs. The additional area which can be brought under assured ground water irrigation will be about 0.084 lakh hectares. However, the figures given are tentative and pre-field studies / DPR are recommended prior to implementation of these recharge structures. The area feasible for AR and tentative locations of sites proposed for artificial recharge is shown in **Fig.18**. The tentative list of the proposed Percolation tanks and Check dams are listed in **Annexure-I and II** respectively.

Table-12: Details of Proposed AR structures

Geog. Area	Area feasible for AR	No of proposed AR structures			Availability of surface non committed monsoon runoff. (MCM)	Total cost in lakhs	Expected benefits of artificial recharge and RWH	
		Sub surface dyke	Percolation tank	Check dam			Vol. of water likely to be recharged (MCM)	Additional irrigation potential (lakh Hectares)
1748	1379	2	82	393	93.202	5618.138	69.902	0.084

Note: The numbers proposed are tentative and detailed feasibility studies are required in field to finalize the actual locations for the construction of AR structures.

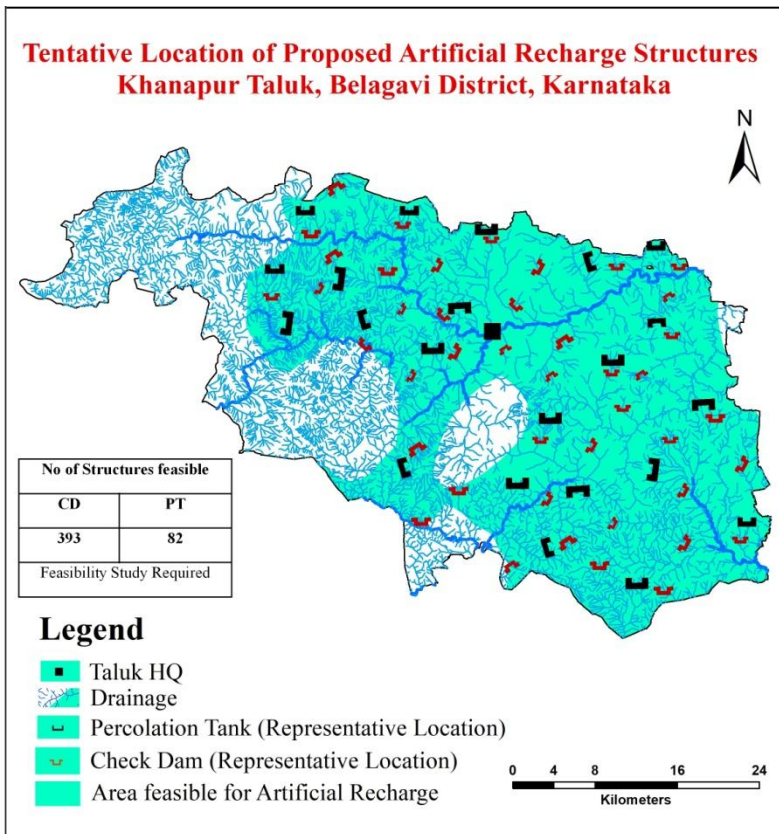


Fig.19 Tentative Locations of AR Structures

4.2 Resource Savings by Demand Side Interventions

4.2.1 Water Use Efficiency by MicroIrrigation Practices

It is observed that wells and bore wells are the source for 10860 ha of net irrigation in the taluk constituting about 97% 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 existing 10860 ha of net irrigated area by wells & bore wells (14747 IP sets). At present, the irrigation draft is 1022.69ham.

The water efficient methodology may be applied for growing sugarcane which is grown in 20% of the cropped area and is largely ground water dependent as compared to the other crops which are mainly grown during kharif. Efficient irrigation techniques will contribute in saving ground water by 100 ham and thus will improve stage of development marginally. However, in long run the practice of Efficient irrigation techniques will add to the ground water resource in large extent. **(Table-13).**

Table 13: Improvement in GW availability (2020) due to saving by adopting water use efficiency

Net annual ground water availability	Existing gross ground water draft for all uses	Existing stage of ground water development	Saving due to adopting WUE measures	Cumulative annual ground water availability	Expected improvement in stage of ground water development after the implementation of the project	Expected improvement in overall stage of ground water development
HAM	HAM	%	HAM	HAM	%	%
12414.08	739	11.67	100	12514.08	0.10	11.57

4.2.2 Change in cropping pattern

Water intensive crops like paddy & sugarcane are grown in 67% and 20% respectively of total cropped area. However, paddy is grown during kharif period and sugarcane grown only in 20% of the cropped area. At present, the stage of ground water extraction is also on lower side @ 11.67% (2020), thus change in cropping pattern has not been suggested.

4.3 Ground Water Development Plan

In Khanapur taluka, the present stage of ground water extraction (2020) is merely 11.67 % with net ground water availability of 12414 ham and total extraction of 1448.52 ham. The ground water draft for irrigation purpose is very low @ 1022.69 ham, thus indicating that ground water irrigation needs to be encouraged in the area. Also the less ground water development is most probably linked to the low ground water potential areas, hilly and plateau areas and limited aquifer thickness in Aquifer-II. To overcome these, it is imperative to have a robust ground water resource development plan for the area, which can be implemented in phased manner. The implementation of the plan needs to be based on site specific detailed hydrogeological, geophysical and scientific surveys for pinpointing the sites for construction of dugwells and Borewells.

In view of above, the focus of proposed ground water development plan is to up the ante of ground water development from the present 11.67% to 60% in the span of next 3 years in a systematic way by adopting scientific approach. About 3000 dugwells (15-30 m depth; 3 to 5 m diameter @ Rs. 3.00 lakh/dugwell) are recommended to be constructed in feasible areas. Further 2400 borewells (40-100 m depth; 150 mm dia @ Rs. 2.00 lakh/borewell) are also recommended to be drilled in feasible areas. Considering the project span of 3 years, every year a total of 1000 DW's and 800 BW's are proposed to be constructed in the feasible areas. Additional irrigation potential which can be created considering crop water requirement of 0.65 m (Ha) will be 9230 ha. The total expenditure proposed to be incurred will be Rs. 155.00 Cr. The detailed ground water development strategy to uplift the ground water use in the feasible areas is presented in Table – 1.

Table– 14 a: Feasibility of Additional GW abstraction structures based on GWRA 2020 availability

Annual Extractable GW Resource (Ham)	Net GW Availability for future use (Ham)	Stage of GW Extraction (%)	GWR required to take SOE to 60%	Total Extraction / Draft	Balance GWR available to enhance SOE 60%	No. of DW feasible considering 50% of balance GWR with unit draft of 1 ham	No. of BWs feasible considering 50% of balance GWR with unit draft of 1.25 ham

12414.08	10933.98	11.67	7448.448	1448.52	5999.92	3000	2400
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Table – 14 b: Ground Water Resource Development Plan as per GWRA 2020 availability

Items	Proposed Structures		Total
Present GW Availability is 124.14 MCM Present Gross Annual Draft is 14.48 MCM Present Stage of GW Development is 11.67%	Dug wells - 3000 Depth: 15 to 30 m Dia: 3 to 5 m Cost -Rs. 3.00 lakh, Av. Annual Gross draft - 1.00 ham	Bore well - 2400 Depth: 40 to 100 m Dia –150 mm Cost -Rs.2.00lakh, Av. Annual Gross draft - 1.50 ham	5400
No. of wells proposed per year over a period of 3 years	1000	800	1800
Yearly Expenditure (Rs. in Cr.)	30.00	16.00	46.00
Total Estimated Expenditure (Rs. in Cr.)	90.00	48.00	138.00
Additional irrigation potential created considering crop water requirement of 0.65 m (Ha)	4615	4615	9230

Note- Hydrogeological and scientific intervention is needed for pinpointing the sites for construction of dugwells and Borewells

4.4 Other interventions proposed

Excess nitrate concentration is found in ground water samples of the area, thereby requiring remedial measures viz.

- Dilution of nitrate rich ground water through artificial recharge & waterconservation.
- Roof top rain water harvesting.
- Limited usage of Nitrogenous fertilizers.

5 SUMMARY AND RECOMMENDATIONS

The main ground water issues are Low Ground Water Development, Limited Ground Water Potential / Limited Aquifer Thickness / Sustainability, Deeper Water Levels particularly in Aquifer-II in some parts, hilly and plateau areas (almost 30%)which are all inter-related or inter dependent and Inferior Ground Water Quality due to nitrate contamination major part of the area. The summary of ground water management plan of Khanapur taluk is given in **Table-15**.

Table 15: Summary of Management plan of Khanapur taluk

Stage of GW Extraction and Category (2020)	11.67 %, Safe
Annual Extractable GW Resource (Ham)	12414.08
Total Extraction(Ham)	1448.52
Total GW Resources (Dynamic & Static up to the depth of 200 mbgl) (Ham)	36842
Ground Water Draft for Irrigation (Ham)	1022.69
Ground Water Resource Enhancement by Supply side Interventions	
No of Proposed AR structures	
SSD	2
PT	82

CD	393
Expected Additional Recharge to GW due to AR (Ham)	6990
Additional Irrigation Potential that can be created (Ha)	8400
Total Estimated Expenditure (Rs. in Cr.)	56.18
Change in Stage of GW Extraction(%)	11.67 to 7.50
Ground Water Resource Savings by Demand side Interventions	
Expected Saving due to adopting WUE measures in sugarcane area (Ham)	100
Change in Stage of GW development (%)	7.50 to 7.40
Ground Water Resource Development Plan	
Balance GWR available to enhance SOE 60% (Ham)	6000
No. of wells proposed per year over a period of 3 years	
DW –Depth: 15 to 30 m, Dia: 3 to 5 m, Unit Cost –Rs. 3.00 lakh, Av. Annual Gross draft – 1.00 ham	3000
BW –Depth: 40 to 100 m, Dia: 150 mm, Unit Cost –Rs. 2.00 lakh, Av. Annual Gross draft – 1.50 ham	2400
Additional irrigation potential created considering crop water requirement of 0.65 m (Ha)	9230
Total Estimated Expenditure (Rs. in Cr.)	155.00
Increase in Stage of GW Extraction (%)	11.67 to 60
Ground Water Quality – Nitrate contamination	Improving quality by proper drainage of sewage and Limited usage of Nitrogenous fertilizers

As per the resource estimation – 2020, Khanapur taluk falls under Safe category with the stage of ground water extraction is 11.67 %. However, 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 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 9320 ham. This can be used to recharge the aquifer mainly through percolation tanks (82), check dams (393) and sub surface dyke structures (2). The volume of water expected to be conserved/recharged @75% efficiency is 6990ham through these AR structures. The approximate cost estimate for construction of these AR structures is Rs. 56.18 Cr. The additional area which can be brought under assured ground water irrigation will be about 8400 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 97 % 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 20% of the cropped area and is largely ground water dependent. Efficient irrigation techniques will contribute in saving ground water by 100 ham and thus will improve stage of development marginally. However, in long run the practice of efficient irrigation techniques will add to the ground water resource in large extent.

Change in cropping pattern: Farmers are facing inadequacy of groundwater for agriculture during summer. Vegetables are grown both in Kharif and Rabi seasons but only in 816ha (1.69 % of the cropped area) and mostly grown from ground water. As the stage of ground water extraction is low, it is proposed that more area under Rabi Paddy and other crops, vegetables, sugarcane needs to be cultivated by ground water irrigation.

Ground Water Resource Development Plan: The present stage of ground water extraction is merely 11.67 % with net ground water availability of 12414 ham and total extraction of 1448.52 ham. The ground water draft for irrigation purpose is very low @ 1022.69 ham, thus indicating that ground water irrigation needs to be encouraged in the area. Also the less ground water development is most probably linked to the low ground water potential areas, hilly and plateau areas and limited aquifer thickness in Aquifer-II.

The focus of proposed ground water development plan is to up the ante of ground water development from the present 11.67% to 60% in the span of next 3 years in a systematic way by adopting scientific approach. About 3000 dugwells (15-30 m depth; 3 to 5 m diameter @ Rs. 3.00 lakh/dugwell) are recommended to be constructed in feasible areas. Further 2400 borewells (40-100 m depth; 150 mm dia @ Rs. 2.00 lakh/borewell) are also recommended to be drilled in feasible areas. Considering the project span of 3 years, every year a total of 1000 DW's and 800 BW's are proposed to be constructed in the feasible areas. Additional irrigation potential which can be created considering crop water requirement of 0.65 m (Ha) will be 9230 ha. The total expenditure proposed to be incurred will Rs. 155.00 Cr. This will bring an additional area of 9230 ha under command of ground water irrigation, thereby improving the irrigation potential.

Nitrate Contamination: Proper drainage of sewage and scientific disposal of sewage water by the concerned urban/rural agency needs to be adopted along with limited usage of Nitrogenous fertilizers by farmers to avoid nitrate contamination. All the ground water sources for drinking water supply may be checked for ground water quality parameters as per BIS norms.

WUE in Domestic Sector: WUE practices are the prime management option in domestic sector as well in view of having high density clusters of urban households and establishments. In premium apartments and infrastructure projects, use of three-way line for fresh water, bathroom water and toilet water will enable reuse of grey water for gardening, car washing and flushes etc. The water saver fixtures/ aerators can be used for kitchen & bathroom pipes, bath showers and water free urinals.

Regulation and Control: Taluk is categorised as "Safe". However, the mandatory guidelines like rainwater harvesting and artificial recharge issued by Karnataka Ground Water Authority needs to be strictly implemented to avoid the taluk from deteriorating from safe category to semi critical category in the future.

Other Management Options proposed:

- Continuation of augmenting surface water supply (import) from Malaprabha river source to reduce stress on ground water in urban areas.
- Large scale community lift irrigation schemes are recommended from Malaprabha river one or two months after the south west monsoon recedes.
- Periodical maintenance of artificial recharge structures is recommended for better recharge and long life of the structure
- RTRWH from each building and in-situ storage and use /mixing with surface water supply or groundwater in urban areas.
- Priority to promote recycle and reuse of treated wastewater effective in urban pockets.

Annexure-I : Tentative Locations of Proposed Percolation tanks, Khanapur Taluk, Belagavi District

S.No	Longitude	Latitude	Village	Grama Panchayat	Taluk
1	74.6164	15.3959	Nagaraghali	Nagaragali	Khanapur
2	74.5891	15.3976	Kirakoli	Nagaragali	Khanapur
3	74.6254	15.4113	Nagaraghali	Nagaragali	Khanapur
4	74.677	15.4153	Tavaraghatte	Nagaragali	Khanapur
5	74.5217	15.4167	Garali	Mohishet	Khanapur
6	74.5647	15.4178	KumbardaBasthawada	Nagaragali	Khanapur
7	74.5829	15.4234	KumbardaBasthawada	Nagaragali	Khanapur
8	74.6582	15.4373	Balagundha	Godholli	Khanapur
9	74.5531	15.44	Kodagai	Gotagali	Khanapur
10	74.5896	15.4403	Bamanakoppa	Nagaragali	Khanapur
11	74.6279	15.4493	Pasekoppa	Gotagali	Khanapur
12	74.5988	15.4551	Sulegali	Nagaragali	Khanapur
13	74.528	15.4552	Machali	Mohishet	Khanapur
14	74.7222	15.4608	Gundoli	Linganamath	Khanapur
15	74.6552	15.4705	Karajagi	Halaga	Khanapur
16	74.5497	15.4723	ShindholiKurdha	Gotagali	Khanapur
17	74.4486	15.4801	Varakarpati	Mohishet	Khanapur
18	74.6378	15.4807	Karajagi	Halaga	Khanapur
19	74.5748	15.4869	Maliwada	Kapoli Kg	Khanapur
20	74.7166	15.4887	Kakkeri	Kakkeri	Khanapur
21	74.3698	15.4897	Hemmadagi	Shiroli	Khanapur
22	74.4854	15.4947	Watere	Mohishet	Khanapur
23	74.6106	15.4963	Halage	Halaga	Khanapur
24	74.6751	15.4969	Maskenahatti	Bhuranaki	Khanapur
25	74.5211	15.4974	Gose .B.K	Kapoli Kg	Khanapur
26	74.3895	15.4988	Hemmadagi	Shiroli	Khanapur
27	74.4449	15.5016	Varakarpati	Mohishet	Khanapur
28	74.6368	15.5064	Hattharawada	Halaga	Khanapur
29	74.4079	15.5076	Hemmadagi	Shiroli	Khanapur
30	74.4283	15.5104	Varakarpati	Mohishet	Khanapur
31	74.4492	15.528	Dongaragaov	Shiroli	Khanapur
32	74.5761	15.5367	Halasi	Halashi	Khanapur
33	74.6474	15.5393	Golihalli	Beedi	Khanapur
34	74.7251	15.5394	Kerwad (Gundyanati)	Kerawad	Khanapur
35	74.5513	15.5545	Padalawadi	Bijagarni	Khanapur
36	74.5347	15.5553	Nandhagada	Nandagad	Khanapur
37	74.462	15.5587	Thivoli	Shiroli	Khanapur
38	74.7144	15.5588	Kerwad (Gundyanati)	Kerawad	Khanapur
39	74.686	15.5594	Munganakoppa	Mangenkoppa	Khanapur
40	74.4427	15.5601	Shiroli	Shiroli	Khanapur
41	74.5409	15.5783	Nandhagada	Nandagad	Khanapur
42	74.6252	15.5822	Bekavada	Bekawad	Khanapur
43	74.4382	15.5858	Nerase	Nerase	Khanapur

S.No	Longitude	Latitude	Village	Grama Panchayat	Taluk
44	74.5707	15.5925	Hebbala	Hebbal	Khanapur
45	74.3248	15.5971	Gavali	Nerase	Khanapur
46	74.6052	15.6086	Khyrawada	Bekawad	Khanapur
47	74.3304	15.6164	Gavali	Nerase	Khanapur
48	74.448	15.6165	Nerase	Nerase	Khanapur
49	74.5784	15.6185	Shivoli	Hebbal	Khanapur
50	74.51	15.6324	Khanapura		Khanapur
51	74.4394	15.6333	Kavale	Nilawade	Khanapur
52	74.3175	15.6337	Amagaov	Amate	Khanapur
53	74.6446	15.6342	Tholagi	KadatanBagewadi	Khanapur
54	74.2958	15.6352	Amagaov	Amate	Khanapur
55	74.3905	15.6394	Kabanali	Nilawade	Khanapur
56	74.3692	15.6398	Kabanali	Nilawade	Khanapur
57	74.5746	15.6456	Vanakebyla	Chapagaon	Khanapur
58	74.4723	15.6469	Manasapoor	Ramagurawadi	Khanapur
59	74.414	15.6519	Nilavade	Nilawade	Khanapur
60	74.6642	15.6519	Itagi	Itagi	Khanapur
61	74.3785	15.6561	Kapoli .K. Chapoli	Jamboti	Khanapur
62	74.3161	15.6598	Chapoli	Jamboti	Khanapur
63	74.6157	15.6677	Chikkadhinnikoppa	Kodachawad	Khanapur
64	74.3382	15.674	Chapoli	Jamboti	Khanapur
65	74.3635	15.6748	Jambote	Jamboti	Khanapur
66	74.2938	15.682	Gavase	Amate	Khanapur
67	74.4448	15.683	Modekoppa	Nagurda	Khanapur
68	74.3121	15.6848	Gavase	Amate	Khanapur
69	74.4006	15.6893	Olamani	Jamboti	Khanapur
70	74.5882	15.6923	Devalatthi	Devalatti	Khanapur
71	74.3745	15.6927	Jambote	Jamboti	Khanapur
72	74.538	15.6934	Nidagalla	Baragaon	Khanapur
73	74.4653	15.7015	Katagale	Nagurda	Khanapur
74	74.6441	15.7047	Gadikoppa	Hirehattiholi	Khanapur
75	74.3486	15.7057	Hebbanatti	Amate	Khanapur
76	74.4108	15.71	Kalyali	Jamboti	Khanapur
77	74.4933	15.7189	Nitturu	Nittur	Khanapur
78	74.4263	15.7334	Thirthakunde	Bailur	Khanapur
79	74.3628	15.7356	Bylura	Bailur	Khanapur
80	74.3369	15.7374	Bylura	Bailur	Khanapur
81	74.3978	15.7436	Uchavade	Bailur	Khanapur
82	74.3859	15.7553	Moraba	Bailur	Khanapur

(Source: Master Plan, CGWB, 2020. It is likely that the number of structures proposed may vary depending upon the ground truth verification and feasibility criteria)

Annexure-II : Tentative Locations of Proposed Check Dams, Khanapur Taluk, Belagavi District

S.No	Longitude	Latitude	Village	Grama Panchayat	Taluk
1	74.6236	15.3738	Nagaraghali	Nagaragali	Khanapur
2	74.609	15.3787	Kirakoli	Nagaragali	Khanapur
3	74.6338	15.3798	Nagaraghali	Nagaragali	Khanapur
4	74.6396	15.383	Nagaraghali	Nagaragali	Khanapur
5	74.6049	15.384	Kirakoli	Nagaragali	Khanapur
6	74.5921	15.3849	Kirakoli	Nagaragali	Khanapur
7	74.5945	15.3872	Kirakoli	Nagaragali	Khanapur
8	74.6178	15.3877	Kirakoli	Nagaragali	Khanapur
9	74.632	15.3919	Nagaraghali	Nagaragali	Khanapur
10	74.5898	15.3948	Kirakoli	Nagaragali	Khanapur
11	74.6739	15.3973	Tavaraghatte	Nagaragali	Khanapur
12	74.5757	15.398	KumbardaBasthawada	Nagaragali	Khanapur
13	74.6293	15.3989	Nagaraghali	Nagaragali	Khanapur
14	74.609	15.4004	Nagaraghali	Nagaragali	Khanapur
15	74.6867	15.4014	Tavaraghatte	Nagaragali	Khanapur
16	74.6502	15.4017	Nagaraghali	Nagaragali	Khanapur
17	74.58	15.4042	KumbardaBasthawada	Nagaragali	Khanapur
18	74.566	15.4063	Suvathawadi	Nagaragali	Khanapur
19	74.5938	15.407	KumbardaBasthawada	Nagaragali	Khanapur
20	74.6239	15.4071	Nagaraghali	Nagaragali	Khanapur
21	74.569	15.4073	KumbardaBasthawada	Nagaragali	Khanapur
22	74.6309	15.4076	Nagaraghali	Nagaragali	Khanapur
23	74.5526	15.4148	Suvathawadi	Nagaragali	Khanapur
24	74.7002	15.415	Godhageri	Godholli	Khanapur
25	74.6501	15.4154	Majarapai	Godholli	Khanapur
26	74.6868	15.4159	Tavaraghatte	Nagaragali	Khanapur
27	74.7212	15.4181	Pura	Linganamath	Khanapur
28	74.5847	15.4187	KumbardaBasthawada	Nagaragali	Khanapur
29	74.6345	15.4217	Nagaraghali	Nagaragali	Khanapur
30	74.5181	15.422	Garali	Mohishet	Khanapur
31	74.5942	15.4242	KumbardaBasthawada	Nagaragali	Khanapur
32	74.7066	15.4256	Godhageri	Godholli	Khanapur
33	74.5616	15.426	Suvathawadi	Nagaragali	Khanapur
34	74.6556	15.4273	Majarapai	Godholli	Khanapur
35	74.6486	15.428	Majarapai	Godholli	Khanapur
36	74.6714	15.428	Balagundha	Godholli	Khanapur
37	74.5369	15.4284	Chinchewadi	Nagaragali	Khanapur
38	74.5756	15.4291	Tharavada	Gotagali	Khanapur
39	74.6289	15.4295	Pasekoppa	Gotagali	Khanapur
40	74.6412	15.4308	Majarapai	Godholli	Khanapur
41	74.544	15.432	Chinchewadi	Nagaragali	Khanapur
42	74.5785	15.4335	Tharavada	Gotagali	Khanapur
43	74.5368	15.4342	Chinchewadi	Nagaragali	Khanapur

S.No	Longitude	Latitude	Village	Grama Panchayat	Taluk
44	74.5949	15.4374	Bamanakoppa	Nagaragali	Khanapur
45	74.667	15.4383	Balagundha	Godholli	Khanapur
46	74.565	15.4418	Tharavada	Gotagali	Khanapur
47	74.5298	15.4436	MundawadPimpale	Mohishet	Khanapur
48	74.6327	15.4438	Pasekoppa	Gotagali	Khanapur
49	74.6555	15.4445	Balagundha	Godholli	Khanapur
50	74.6102	15.4447	Pasekoppa	Gotagali	Khanapur
51	74.6672	15.4448	Balagundha	Godholli	Khanapur
52	74.6051	15.4455	Sulegali	Nagaragali	Khanapur
53	74.6174	15.4456	Pasekoppa	Gotagali	Khanapur
54	74.7166	15.4465	Gundoli	Linganamath	Khanapur
55	74.543	15.4467	Kodagai	Gotagali	Khanapur
56	74.6728	15.4472	Balagundha	Godholli	Khanapur
57	74.6457	15.4501	Balagundha	Godholli	Khanapur
58	74.5201	15.4512	Sakanali	Mohishet	Khanapur
59	74.5869	15.4515	Jambeghali	Gotagali	Khanapur
60	74.7228	15.4518	Gundoli	Linganamath	Khanapur
61	74.5904	15.4534	Jambeghali	Gotagali	Khanapur
62	74.4994	15.4535	Londa	Londa	Khanapur
63	74.5439	15.4553	Shivatana	Gotagali	Khanapur
64	74.6484	15.4586	Karajagi	Halaga	Khanapur
65	74.5901	15.4596	Jambeghali	Gotagali	Khanapur
66	74.6507	15.4599	Karajagi	Halaga	Khanapur
67	74.5436	15.4603	Shivatana	Gotagali	Khanapur
68	74.6867	15.461	Mudaganura	Linganamath	Khanapur
69	74.6602	15.4612	Balagundha	Godholli	Khanapur
70	74.6675	15.4615	Mudaganura	Linganamath	Khanapur
71	74.6037	15.4623	Basthawada	Nagaragali	Khanapur
72	74.6284	15.4624	Karajagi	Halaga	Khanapur
73	74.6633	15.4628	Balagundha	Godholli	Khanapur
74	74.6409	15.4646	Karajagi	Halaga	Khanapur
75	74.4376	15.465	Varakarpoti	Mohishet	Khanapur
76	74.4792	15.4666	Watere	Mohishet	Khanapur
77	74.6494	15.4679	Karajagi	Halaga	Khanapur
78	74.5414	15.4695	ShindholiBudaruka	Gotagali	Khanapur
79	74.4475	15.4713	Varakarpoti	Mohishet	Khanapur
80	74.6785	15.4733	Maskenahatti	Bhuranaki	Khanapur
81	74.447	15.4738	Varakarpoti	Mohishet	Khanapur
82	74.5637	15.474	Ghotagali	Gotagali	Khanapur
83	74.455	15.475	Mohisetha	Mohishet	Khanapur
84	74.6107	15.4758	Merada	Halaga	Khanapur
85	74.6628	15.4767	Maskenahatti	Bhuranaki	Khanapur
86	74.4197	15.4771	Varakarpoti	Mohishet	Khanapur
87	74.6542	15.4807	Sonenahatti	Bhuranaki	Khanapur

S.No	Longitude	Latitude	Village	Grama Panchayat	Taluk
88	74.6034	15.4808	Merada	Halaga	Khanapur
89	74.3946	15.4813	Varakarpati	Mohishet	Khanapur
90	74.4611	15.4822	Mohisetha	Mohishet	Khanapur
91	74.5446	15.4823	Kapolikunjakheda	Kapoli Kg	Khanapur
92	74.6442	15.4824	Karajagi	Halaga	Khanapur
93	74.6894	15.4828	Karikatte	Kakkeri	Khanapur
94	74.7085	15.4829	Kakkeri	Kakkeri	Khanapur
95	74.4406	15.483	Varakarpati	Mohishet	Khanapur
96	74.6237	15.4848	Karajagi	Halaga	Khanapur
97	74.6027	15.485	Halage	Halaga	Khanapur
98	74.4795	15.4861	Watere	Mohishet	Khanapur
99	74.5162	15.4868	Gose .B.K	Kapoli Kg	Khanapur
100	74.4354	15.4871	Varakarpati	Mohishet	Khanapur
101	74.4837	15.4872	Watere	Mohishet	Khanapur
102	74.4643	15.488	Mohisetha	Mohishet	Khanapur
103	74.375	15.4892	Hemmadagi	Shiroli	Khanapur
104	74.6669	15.4892	Sonenahatti	Bhuranaki	Khanapur
105	74.526	15.49	Potoli	Kapoli Kg	Khanapur
106	74.4925	15.4902	Watere	Mohishet	Khanapur
107	74.5999	15.4902	Halage	Halaga	Khanapur
108	74.4688	15.4908	Watere	Mohishet	Khanapur
109	74.6371	15.491	Karajagi	Halaga	Khanapur
110	74.4335	15.4913	Varakarpati	Mohishet	Khanapur
111	74.4726	15.4915	Watere	Mohishet	Khanapur
112	74.6478	15.4917	Karajagi	Halaga	Khanapur
113	74.4292	15.4922	Varakarpati	Mohishet	Khanapur
114	74.4953	15.4942	Gose(K.H.)	Kapoli Kg	Khanapur
115	74.3878	15.4943	Hemmadagi	Shiroli	Khanapur
116	74.5062	15.4945	Gose(K.H.)	Kapoli Kg	Khanapur
117	74.6587	15.4951	Sonenahatti	Bhuranaki	Khanapur
118	74.4217	15.4953	Varakarpati	Mohishet	Khanapur
119	74.4489	15.4964	Varakarpati	Mohishet	Khanapur
120	74.4429	15.4967	Varakarpati	Mohishet	Khanapur
121	74.4036	15.4985	Varakarpati	Mohishet	Khanapur
122	74.549	15.4998	Kapolikunjakheda	Kapoli Kg	Khanapur
123	74.4245	15.5002	Varakarpati	Mohishet	Khanapur
124	74.4199	15.5025	Varakarpati	Mohishet	Khanapur
125	74.4112	15.5026	Varakarpati	Mohishet	Khanapur
126	74.6473	15.5036	Hattharawada	Halaga	Khanapur
127	74.4282	15.5037	Varakarpati	Mohishet	Khanapur
128	74.6522	15.5104	Golihalli	Beedi	Khanapur
129	74.7001	15.5112	Kukkenahatti .Ramapura	Bhuranaki	Khanapur
130	74.7178	15.512	Surapura	Bhuranaki	Khanapur
131	74.6828	15.513	Munganakoppa	Mangenkoppa	Khanapur

S.No	Longitude	Latitude	Village	Grama Panchayat	Taluk
132	74.6232	15.513	Hattharawada	Halaga	Khanapur
133	74.6413	15.513	Hattharawada	Halaga	Khanapur
134	74.5684	15.5136	Hanagadi	Bijagarni	Khanapur
135	74.4158	15.5139	Hemmadagi	Shiroli	Khanapur
136	74.4122	15.5185	Hemmadagi	Shiroli	Khanapur
137	74.5159	15.5199	Jetage	Kapoli Kg	Khanapur
138	74.4332	15.5211	Dongaragaov	Shiroli	Khanapur
139	74.6504	15.5211	Golihalli	Beedi	Khanapur
140	74.6799	15.522	Munganakoppa	Mangenkoppa	Khanapur
141	74.4349	15.523	Dongaragaov	Shiroli	Khanapur
142	74.5751	15.5235	Halasi	Halashi	Khanapur
143	74.4265	15.5238	Dongaragaov	Shiroli	Khanapur
144	74.4384	15.5259	Dongaragaov	Shiroli	Khanapur
145	74.6481	15.5276	Golihalli	Beedi	Khanapur
146	74.5855	15.5283	Halasi	Halashi	Khanapur
147	74.4406	15.5292	Dongaragaov	Shiroli	Khanapur
148	74.6422	15.5305	Golihalli	Beedi	Khanapur
149	74.4454	15.5328	Dongaragaov	Shiroli	Khanapur
150	74.5409	15.5333	Padalawadi	Bijagarni	Khanapur
151	74.6554	15.5347	Golihalli	Beedi	Khanapur
152	74.6673	15.5349	Golihalli	Beedi	Khanapur
153	74.7236	15.5349	Kerwad (Gundyanati)	Kerawad	Khanapur
154	74.5598	15.5383	Bijagarni	Bijagarni	Khanapur
155	74.56	15.5407	Bijagarni	Bijagarni	Khanapur
156	74.5423	15.5444	Karamjala	Bijagarni	Khanapur
157	74.5337	15.545	Karamjala	Bijagarni	Khanapur
158	74.5294	15.5451	Karamjala	Bijagarni	Khanapur
159	74.5488	15.5458	Padalawadi	Bijagarni	Khanapur
160	74.6797	15.546	Munganakoppa	Mangenkoppa	Khanapur
161	74.5775	15.5464	Bijagarni	Bijagarni	Khanapur
162	74.445	15.5467	Shiroli	Shiroli	Khanapur
163	74.5359	15.5471	Karamjala	Bijagarni	Khanapur
164	74.5536	15.5485	Padalawadi	Bijagarni	Khanapur
165	74.5317	15.5495	Karamjala	Bijagarni	Khanapur
166	74.5449	15.5496	Karamjala	Bijagarni	Khanapur
167	74.7277	15.55	Kerwad (Gundyanati)	Kerawad	Khanapur
168	74.695	15.5546	Kerwad (Gundyanati)	Kerawad	Khanapur
169	74.4182	15.5563	Avanali	Shiroli	Khanapur
170	74.5613	15.5596	Nandhagada	Nandagad	Khanapur
171	74.4313	15.5601	Shiroli	Shiroli	Khanapur
172	74.4504	15.561	Thereghali	Nerese	Khanapur
173	74.6137	15.5625	Nanjanakodla	Nanjankodal	Khanapur
174	74.5729	15.5629	Nandhagada	Nandagad	Khanapur
175	74.55	15.5647	Nandhagada	Nandagad	Khanapur

S.No	Longitude	Latitude	Village	Grama Panchayat	Taluk
176	74.5657	15.5658	Nandhagada	Nandagad	Khanapur
177	74.42	15.5686	Shiroli	Shiroli	Khanapur
178	74.6301	15.5694	Junjawada. K.N	Nanjankodal	Khanapur
179	74.4306	15.5707	Shiroli	Shiroli	Khanapur
180	74.5274	15.5725	Savaraghali	Shindhholli	Khanapur
181	74.5428	15.5726	Nandhagada	Nandagad	Khanapur
182	74.6034	15.5742	Junjawada	KasabaNandagad	Khanapur
183	74.4702	15.5743	Thivoli	Shiroli	Khanapur
184	74.5867	15.5746	Nandhagad	KasabaNandagad	Khanapur
185	74.5432	15.5755	Nandhagada	Nandagad	Khanapur
186	74.5573	15.5756	Nandhagada	Nandagad	Khanapur
187	74.5316	15.5759	Navaga	Hebbal	Khanapur
188	74.442	15.5777	Thereghali	Nerese	Khanapur
189	74.4421	15.5802	Thereghali	Nerese	Khanapur
190	74.6735	15.5803	Kadekoppa	Mangenkoppa	Khanapur
191	74.4314	15.5809	Thereghali	Nerese	Khanapur
192	74.487	15.5833	Dokeghali	Manturga	Khanapur
193	74.4187	15.5864	Nerese	Nerese	Khanapur
194	74.5521	15.5869	Hebbala	Hebbal	Khanapur
195	74.6359	15.5876	Balikodala	Beedi	Khanapur
196	74.6302	15.588	Bekavada	Bekawad	Khanapur
197	74.672	15.5889	Kadekoppa	Mangenkoppa	Khanapur
198	74.428	15.5891	Nerese	Nerese	Khanapur
199	74.5381	15.5912	Navaga	Hebbal	Khanapur
200	74.5426	15.5917	Navaga	Hebbal	Khanapur
201	74.6038	15.5926	Junjawada	KasabaNandagad	Khanapur
202	74.3172	15.5952	Gavali	Nerese	Khanapur
203	74.563	15.5952	Hebbala	Hebbal	Khanapur
204	74.3108	15.5958	Gavali	Nerese	Khanapur
205	74.5647	15.6006	Hebbala	Hebbal	Khanapur
206	74.3145	15.6018	Gavali	Nerese	Khanapur
207	74.5322	15.603	Navaga	Hebbal	Khanapur
208	74.3231	15.6046	Gavali	Nerese	Khanapur
209	74.3031	15.6052	Gavali	Nerese	Khanapur
210	74.5264	15.6055	Koundhala	Karambal	Khanapur
211	74.3075	15.6067	Gavali	Nerese	Khanapur
212	74.3185	15.6076	Gavali	Nerese	Khanapur
213	74.4479	15.6077	Nerese	Nerese	Khanapur
214	74.3418	15.608	Gavali	Nerese	Khanapur
215	74.3243	15.6087	Gavali	Nerese	Khanapur
216	74.4667	15.61	Mantharga	Manturga	Khanapur
217	74.3421	15.6106	Gavali	Nerese	Khanapur
218	74.3277	15.6111	Gavali	Nerese	Khanapur
219	74.4388	15.6113	Nerese	Nerese	Khanapur

S.No	Longitude	Latitude	Village	Grama Panchayat	Taluk
220	74.4518	15.6116	Nerase	Nerase	Khanapur
221	74.5102	15.6118	Honakala	Shindhल्ली	Khanapur
222	74.6149	15.6137	Benkibasarikatti	Bekawad	Khanapur
223	74.3442	15.6141	Gavali	Nerase	Khanapur
224	74.2997	15.6142	Amagaov	Amate	Khanapur
225	74.4568	15.6142	Mantharga	Manturga	Khanapur
226	74.6161	15.617	Benkibasarikatti	Bekawad	Khanapur
227	74.2959	15.6172	Amagaov	Amate	Khanapur
228	74.4889	15.6181	Asoga	Manturga	Khanapur
229	74.389	15.6182	Kabanali	Nilawade	Khanapur
230	74.5613	15.6191	Karalaga	Hebbal	Khanapur
231	74.4292	15.6206	Kavale	Nilawade	Khanapur
232	74.3244	15.621	Amagaov	Amate	Khanapur
233	74.636	15.6215	Kadathanabagewadi	KadatanBagewadi	Khanapur
234	74.5739	15.6234	Shivoli	Hebbal	Khanapur
235	74.3189	15.6239	Amagaov	Amate	Khanapur
236	74.3073	15.6243	Amagaov	Amate	Khanapur
237	74.4667	15.6254	Asoga	Manturga	Khanapur
238	74.5868	15.6267	Allehola	Chapagaon	Khanapur
239	74.4114	15.6268	Kabanali	Nilawade	Khanapur
240	74.6582	15.627	Tholagi	KadatanBagewadi	Khanapur
241	74.3182	15.627	Amagaov	Amate	Khanapur
242	74.4369	15.627	Kavale	Nilawade	Khanapur
243	74.3354	15.6282	Chapoli	Jamboti	Khanapur
244	74.6688	15.6283	Tholagi	KadatanBagewadi	Khanapur
245	74.451	15.6286	Kanjale	Nilawade	Khanapur
246	74.377	15.6302	Kabanali	Nilawade	Khanapur
247	74.3873	15.6313	Kabanali	Nilawade	Khanapur
248	74.4821	15.6319	Manasapoorra	Ramagurawadi	Khanapur
249	74.3611	15.6325	Kabanali	Nilawade	Khanapur
250	74.3972	15.6328	Kabanali	Nilawade	Khanapur
251	74.3656	15.6332	Kabanali	Nilawade	Khanapur
252	74.635	15.6337	Avrolli	Kodachawad	Khanapur
253	74.3443	15.6338	Chapoli	Jamboti	Khanapur
254	74.3846	15.6355	Kabanali	Nilawade	Khanapur
255	74.3779	15.6358	Kabanali	Nilawade	Khanapur
256	74.3055	15.6359	Amagaov	Amate	Khanapur
257	74.6165	15.6361	Avrolli	Kodachawad	Khanapur
258	74.3638	15.6365	Kabanali	Nilawade	Khanapur
259	74.4696	15.6369	Manasapoorra	Ramagurawadi	Khanapur
260	74.5395	15.637	Kuppatagiri	Baragaon	Khanapur
261	74.3382	15.6371	Chapoli	Jamboti	Khanapur
262	74.606	15.6386	Dheminakoppa	Kodachawad	Khanapur
263	74.3382	15.6397	Chapoli	Jamboti	Khanapur

S.No	Longitude	Latitude	Village	Grama Panchayat	Taluk
264	74.3063	15.6398	Amagaov	Amate	Khanapur
265	74.485	15.6406	Manasapoor	Ramagurawadi	Khanapur
266	74.3057	15.6418	Amagaov	Amate	Khanapur
267	74.3737	15.642	Kabanali	Nilawade	Khanapur
268	74.3262	15.6435	Chapoli	Jamboti	Khanapur
269	74.4588	15.6435	AlloliKanasoli	Nilawade	Khanapur
270	74.3853	15.6461	Kapoli .K. Chapoli	Jamboti	Khanapur
271	74.3571	15.6467	Chapoli	Jamboti	Khanapur
272	74.4002	15.647	Mugavade	Nilawade	Khanapur
273	74.4187	15.6476	Amboli	Nilawade	Khanapur
274	74.382	15.6488	Kapoli .K. Chapoli	Jamboti	Khanapur
275	74.3586	15.6493	Chapoli	Jamboti	Khanapur
276	74.6499	15.6495	Chikkamunavalli	Hiremunavalli	Khanapur
277	74.6578	15.6495	Itagi	Itagi	Khanapur
278	74.5191	15.6506	Khanapura		Khanapur
279	74.4068	15.6513	Mugavade	Nilawade	Khanapur
280	74.3142	15.6515	Chapoli	Jamboti	Khanapur
281	74.4528	15.653	AlloliKanasoli	Nilawade	Khanapur
282	74.3816	15.6531	Kapoli .K. Chapoli	Jamboti	Khanapur
283	74.3279	15.6532	Chapoli	Jamboti	Khanapur
284	74.571	15.6544	Lokoli	Lokolli	Khanapur
285	74.3225	15.6563	Chapoli	Jamboti	Khanapur
286	74.6548	15.6563	Chikkamunavalli	Hiremunavalli	Khanapur
287	74.3666	15.6575	Kapoli .K. Chapoli	Jamboti	Khanapur
288	74.307	15.6581	Gavase	Amate	Khanapur
289	74.3369	15.6602	Chapoli	Jamboti	Khanapur
290	74.3964	15.6603	Gudase	Nilawade	Khanapur
291	74.4181	15.6606	Nilavade	Nilawade	Khanapur
292	74.6673	15.6606	Karavinakoppa	Hiremunavalli	Khanapur
293	74.4656	15.6612	Harasanawadi	Nagurda	Khanapur
294	74.4501	15.6624	AlloliKanasoli	Nilawade	Khanapur
295	74.3462	15.6631	Chapoli	Jamboti	Khanapur
296	74.327	15.6633	Chapoli	Jamboti	Khanapur
297	74.3909	15.6637	Gudase	Nilawade	Khanapur
298	74.3995	15.6637	Gudase	Nilawade	Khanapur
299	74.3598	15.6642	Chapoli	Jamboti	Khanapur
300	74.3418	15.6662	Chapoli	Jamboti	Khanapur
301	74.3576	15.6675	Chapoli	Jamboti	Khanapur
302	74.6809	15.6677	Itagi	Itagi	Khanapur
303	74.6698	15.668	Itagi	Itagi	Khanapur
304	74.4911	15.6688	Ramagurawadi	Ramagurawadi	Khanapur
305	74.3327	15.6689	Chapoli	Jamboti	Khanapur
306	74.3029	15.669	Gavase	Amate	Khanapur
307	74.3507	15.6691	Chapoli	Jamboti	Khanapur

S.No	Longitude	Latitude	Village	Grama Panchayat	Taluk
308	74.2906	15.6699	Gavase	Amate	Khanapur
309	74.3145	15.6706	Chapoli	Jamboti	Khanapur
310	74.402	15.6716	Daroli	Nilawade	Khanapur
311	74.3263	15.6717	Chapoli	Jamboti	Khanapur
312	74.2935	15.6718	Gavase	Amate	Khanapur
313	74.3729	15.6725	Jambote	Jamboti	Khanapur
314	74.3765	15.6726	Kalageri	Jamboti	Khanapur
315	74.3075	15.6728	Gavase	Amate	Khanapur
316	74.2886	15.6732	Gavase	Amate	Khanapur
317	74.4361	15.6736	Otholi	Nilawade	Khanapur
318	74.4415	15.6737	Otholi	Nilawade	Khanapur
319	74.6855	15.6743	Itagi	Itagi	Khanapur
320	74.3181	15.675	Chapoli	Jamboti	Khanapur
321	74.301	15.675	Gavase	Amate	Khanapur
322	74.3264	15.6752	Chapoli	Jamboti	Khanapur
323	74.371	15.6756	Jambote	Jamboti	Khanapur
324	74.3208	15.6758	Chapoli	Jamboti	Khanapur
325	74.388	15.6762	Kalageri	Jamboti	Khanapur
326	74.3714	15.678	Jambote	Jamboti	Khanapur
327	74.3965	15.6783	Kalageri	Jamboti	Khanapur
328	74.3788	15.6806	Jambote	Jamboti	Khanapur
329	74.5858	15.6813	Devalatthi	Devalatti	Khanapur
330	74.4069	15.6816	Kalyali	Jamboti	Khanapur
331	74.6455	15.6816	Hire Hattiholi	Hirehattiholi	Khanapur
332	74.6494	15.6834	Hire Hattiholi	Hirehattiholi	Khanapur
333	74.3479	15.6835	Kalanayakanahatti	Jamboti	Khanapur
334	74.6564	15.6835	HattiholiChikka	Hirehattiholi	Khanapur
335	74.5394	15.684	HosuraSanna	Topinakatti	Khanapur
336	74.4491	15.686	Modekoppa	Nagurda	Khanapur
337	74.6646	15.6861	Ekanur	Hirehattiholi	Khanapur
338	74.3541	15.6863	Kalanayakanahatti	Jamboti	Khanapur
339	74.6081	15.6868	Parishawada	Parishwad	Khanapur
340	74.4107	15.688	Kalyali	Jamboti	Khanapur
341	74.3624	15.6882	Jambote	Jamboti	Khanapur
342	74.336	15.6885	Kalamani	Amate	Khanapur
343	74.3127	15.6904	Amate	Amate	Khanapur
344	74.3077	15.6916	Amate	Amate	Khanapur
345	74.3295	15.6919	Kalamani	Amate	Khanapur
346	74.6301	15.692	Parishawada	Parishwad	Khanapur
347	74.3596	15.6929	Jambote	Jamboti	Khanapur
348	74.4721	15.693	Katagale	Nagurda	Khanapur
349	74.3461	15.6938	Kalanayakanahatti	Jamboti	Khanapur
350	74.5706	15.6943	BidaraBhavi	Topinakatti	Khanapur
351	74.3804	15.6946	Jambote	Jamboti	Khanapur

S.No	Longitude	Latitude	Village	Grama Panchayat	Taluk
352	74.6473	15.6947	Gadikoppa	Hirehattiholi	Khanapur
353	74.5099	15.6947	Iddalahonda	Iddalhonda	Khanapur
354	74.4274	15.6949	Godedurga	Nagurda	Khanapur
355	74.3342	15.6949	Kalamani	Amate	Khanapur
356	74.4727	15.6956	Katagale	Nagurda	Khanapur
357	74.32	15.6969	Kalamani	Amate	Khanapur
358	74.3223	15.6983	Kalamani	Amate	Khanapur
359	74.4165	15.6987	Kalyali	Jamboti	Khanapur
360	74.3777	15.6995	Jambote	Jamboti	Khanapur
361	74.3373	15.6998	Kalamani	Amate	Khanapur
362	74.3979	15.7009	Olamani	Jamboti	Khanapur
363	74.478	15.7012	Katagale	Nagurda	Khanapur
364	74.4442	15.7021	Godedurga	Nagurda	Khanapur
365	74.3882	15.7024	Olamani	Jamboti	Khanapur
366	74.5449	15.7041	Gurlagunji	Garlagunji	Khanapur
367	74.4805	15.7053	Katagale	Nagurda	Khanapur
368	74.3704	15.7066	Jambote	Jamboti	Khanapur
369	74.4293	15.7067	Thirthakunde	Bailur	Khanapur
370	74.498	15.7092	Nitturu	Nittur	Khanapur
371	74.4574	15.7092	Katagale	Nagurda	Khanapur
372	74.4658	15.7136	Katagale	Nagurda	Khanapur
373	74.3727	15.7138	Bylura	Bailur	Khanapur
374	74.3402	15.7142	Devachihatti	Bailur	Khanapur
375	74.4028	15.7172	Uchavade	Bailur	Khanapur
376	74.437	15.7221	Thirthakunde	Bailur	Khanapur
377	74.4214	15.7223	Uchavade	Bailur	Khanapur
378	74.3229	15.7231	Thorale	Golyali	Khanapur
379	74.3607	15.7231	Bylura	Bailur	Khanapur
380	74.3283	15.7234	Thorale	Golyali	Khanapur
381	74.3624	15.7257	Bylura	Bailur	Khanapur
382	74.4356	15.7259	Thirthakunde	Bailur	Khanapur
383	74.3419	15.7286	Bylura	Bailur	Khanapur
384	74.3616	15.7294	Bylura	Bailur	Khanapur
385	74.405	15.7324	Uchavade	Bailur	Khanapur
386	74.4122	15.7326	Uchavade	Bailur	Khanapur
387	74.3882	15.7334	Sonarawadi	Bailur	Khanapur
388	74.3975	15.7355	Uchavade	Bailur	Khanapur
389	74.392	15.7402	Sonarawadi	Bailur	Khanapur
390	74.3722	15.7473	Bylura	Bailur	Khanapur
391	74.3633	15.755	Bylura	Bailur	Khanapur
392	74.3799	15.7573	Moraba	Bailur	Khanapur
393	74.3742	15.7586	Moraba	Bailur	Khanapur

(Source: Master Plan, CGWB, 2020. It is likely that the number of structures proposed may vary depending upon the ground truth verification and feasibility criteria)