



# 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**

**Nanjangud Taluk, Mysore District, Karnataka**

दक्षिण पश्चिमी क्षेत्र, बेंगलुरु  
South Western Region, Bengaluru

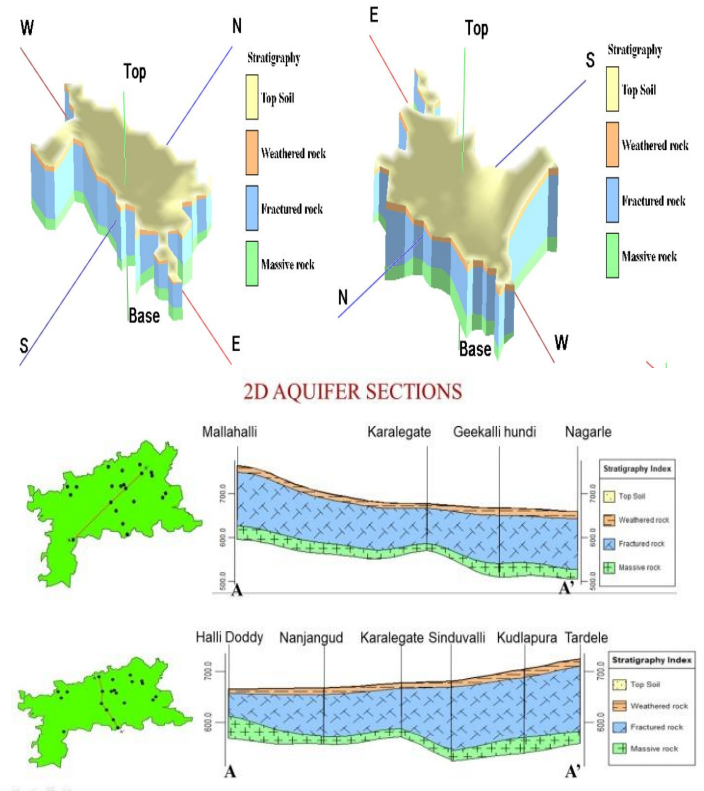
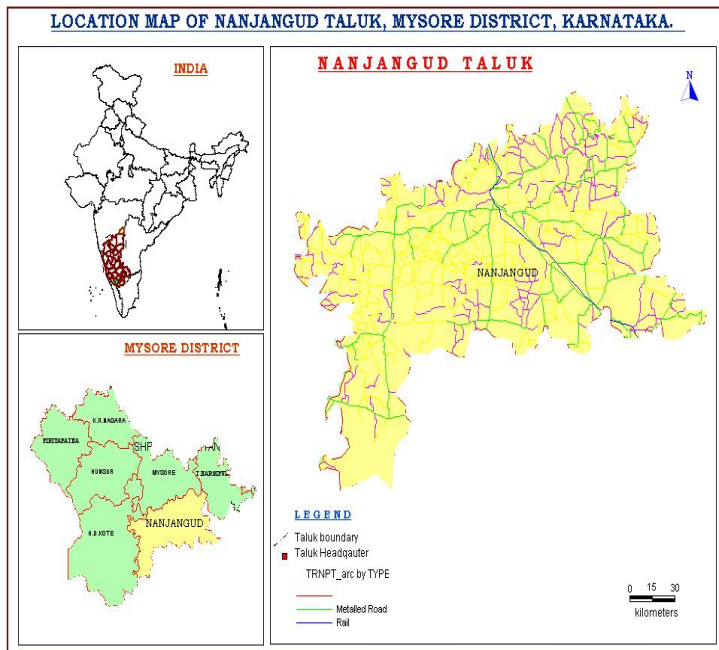
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# AQUIFER MAPS AND MANAGEMENT PLAN, NANJANGUD TALUK, MYSURU DISTRICT, KARNATAKA STATE

(AAP: – 2021-2022)



By

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**AUGUST 2022**

# AQUIFER MAPS AND MANAGEMENT PLAN, NANJANGUD TALUK, MYSURU DISTRICT, KARNATAKA STATE

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# AQUIFER MAPS AND MANAGEMENT PLAN, NANJANGUD TALUK, MYSURU DISTRICT, KARNATAKA STATE

## 1 SALIENT FEATURES

Name of the Taluk: NANJANGUD

District: Mysuru

State: Karnataka

Area: 974 Sq.Kms.

Population: 3,84,922

Annual Normal Rainfall: 730 mm

### 1.1 Study area

Aquifer Mapping Studies have been carried out in Nanjangud taluk, Mysore district of Karnataka, covering an area of 985.41sq.kms under National Aquifer Mapping Project. The Nanjangud taluk is located between North Latitudes 12°01'14.79'' and 12°03'57.61'' and East Longitudes between 76° 33'13.03'' to 76°46'40.41''. The study area is bounded on the East by Narasipura taluk of Mysore District, on the North by Mysore Taluk of Mysore District, on the South by Gundlupet taluk of Chamrajnagara District, on the West by HD Kote of Mysore district. Location map of Nanjangud taluk of Mysore district is presented in Fig-1. Nanjangud is taluk headquarters. There are 190 villages and 45 Gram panchayats in this taluk.

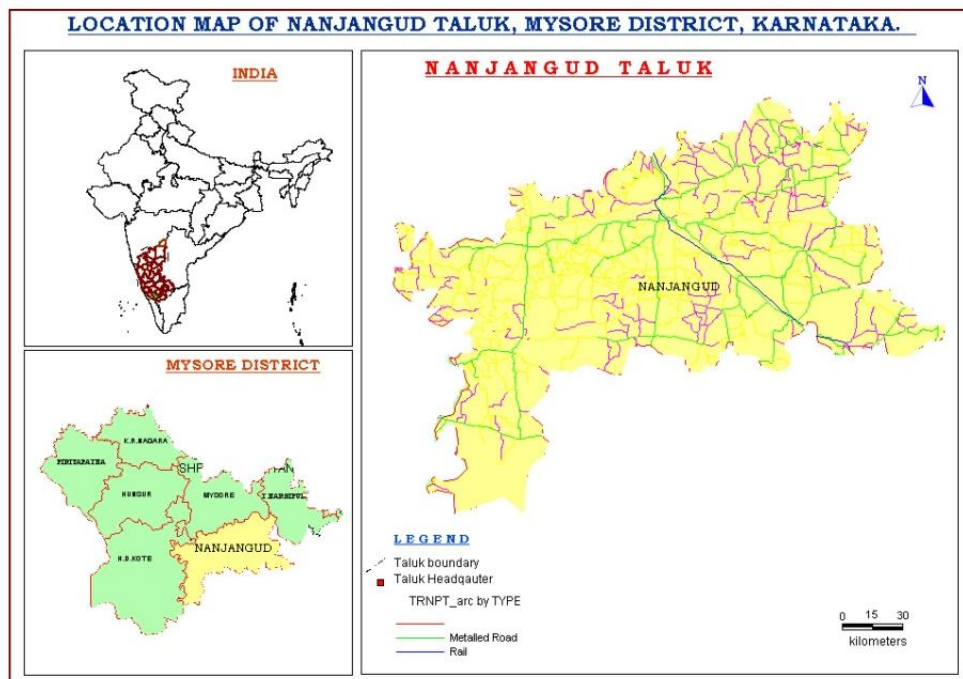


Fig. 1: Location Map

## 1.2 Population

According to 2011 census, the population in Nanjangud taluk is 3,84,922, in which 1,93,038 male population and 1,91,884 is the female population . The taluk has an overall population density of 394 persons per Sq.Kms. The decadal variation in population from 2001-2011 is 6.85% in Nanjangud taluk (Table.1).

**Table-1: Population details**

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
3,84,922	1,93,038	1,91,884	12.83	3,34,324	50,598	6.85	7.15	4.7

**Source:** District at a Glance 2020-21, Govt. of Karnataka

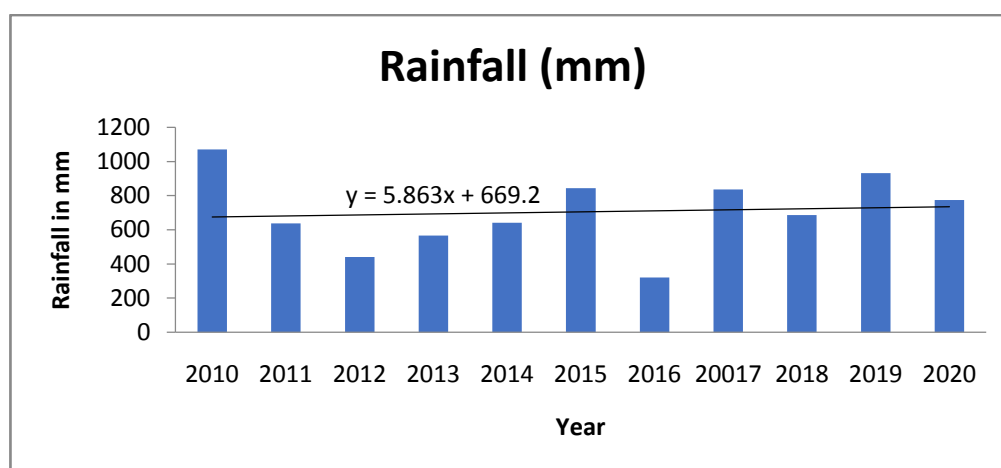
## 1.3 Rainfall

Nanjangud taluk enjoys semi-arid climate. The normal annual rainfall in Nanjangud taluk for the period 1961 to 2010 is 730 mm. The year is usually divided into four seasons: summer from March to May; rainy season or south-west monsoon season from June to September; post-monsoon season covering the months of October and November and dry or winter Season from December to February.

**Table-2 Actual Annual rainfall (mm) in rain gauge station from 2010 to 2020**

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Rainfall (mm)	1071	638	440	567	642	843	320	836	686	932	774

**Source:** District at a Glance 2020-21, Govt. of Karnataka



**Fig. 2: Rainfall Trend Analysis**

## 1.4 Agriculture & Irrigation

Agriculture is the main occupation in Nanjangud taluk. Major crops are Paddy, Maize, Ragi Tur, Pulses, Tobacco, Fruits and Vegetables. Water intensive crops like Sugarcane, Paddy and Tobacco are grown in Nanjangud Taluk (Table 3).

**Table-3: Cropping pattern in Nanjangud taluk as per 2019-2020 (Ha)**

Crops	Cereals (Area in Ha)				Pulses (Area in Ha)						
	Paddy	Jowar	Ragi	Maize	Tur	Horse gram	Black gram	Green gram	Avare	Cowpea	Bengal gram
	15,968	7,414	1,516	857	549	14,151	4,067	3,689	666	3,742	279
<b>Total</b>	<b>25,755</b>				<b>27,143</b>						
<b>Total Food grains – 29,656</b>											

Fruits (Area in Ha)	Veg (Area in Ha)	Oil seeds (Area in Ha)				Commercial crops (Ha)		
		Groundnuts	Sun flower	Castor	Sesame	Cotton	Sugarcane	Tobacco
<b>4,218</b>	<b>3,011</b>	318	403	130	216	12,250	2,562	963
		<b>Total Oil seeds – 1,067</b>				<b>Total – 15,775</b>		

**Source:** District at a Glance 2020-21, Govt. of Karnataka

It is observed that net sown area accounts 58,535 (Ha) and area sown more than once is 29,617 (Ha) of total geographical area 98,541 (Ha) in Nanjangud taluk (**Table-4**). Area under Forest is 3,688 (Ha) Area not available for cultivation and Fallow land cover 15,267 (Ha) and 15,537 (Ha) of total geographical area respectively. 12,738(Ha) of net area is irrigated from surface water and 28,674 (Ha) are irrigated from Groundwater (**Table-5**).

**Table-4: Details of land use in Nanjangud Taluk as per 2019-2020 (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
98,541	3,688	15,267	5,514	15,537	58,535	29,617	88,352

**Source:** District at a Glance 2020-21, Govt. of Karnataka

**Table-5: Irrigation details in Nanjangud taluk as per 2019-2020 (Ha)**

Sl.No	Source		Length in Km/No of structures	Gross area irrigated	Net area irrigated
1	Surface water	Canals	362	13,803	11,286
		Tanks	34	1,666	1,452
		Lift irrigation	0	0	0
	<b>Total</b>			<b>15,469</b>	<b>12,738</b>
2	Ground water	Dug wells	14	1,080	0
		Bore wells	6,343	18,116	15,936
	<b>Total</b>			<b>19,196</b>	<b>15,936</b>
<b>Grand Total</b>				<b>34,665</b>	<b>28,674</b>

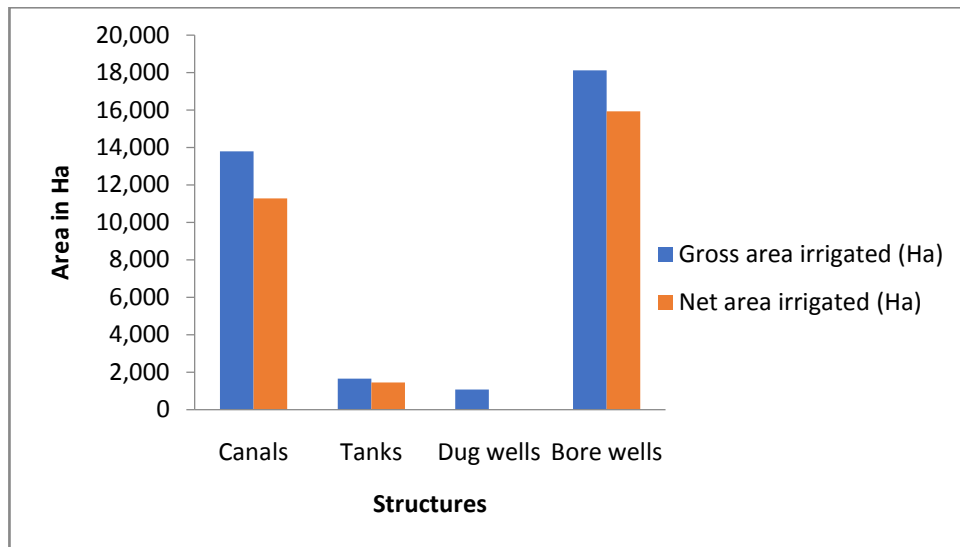


Fig. 3: Sources of Irrigation

### 1.5 Geomorphology, Physiography & Drainage

The geomorphology of the Nanjangud is formed by various land forms like hills and plateaus, piedmont zone, plains and river/stream, etc. Plain region is covered all over the taluk. The elevation in the taluk varies from 656m to 769m in the taluk. The taluk is endowed with a number of perennial and non-perennial rivers/streams. The rivers/streams which flow towards North to East direction. The drainage system is well developed in the taluk. 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 Nanjangud taluk falls in Cauvery and Kabini river basin. The Drainage pattern is dendritic to subdendritic (Fig.-5).



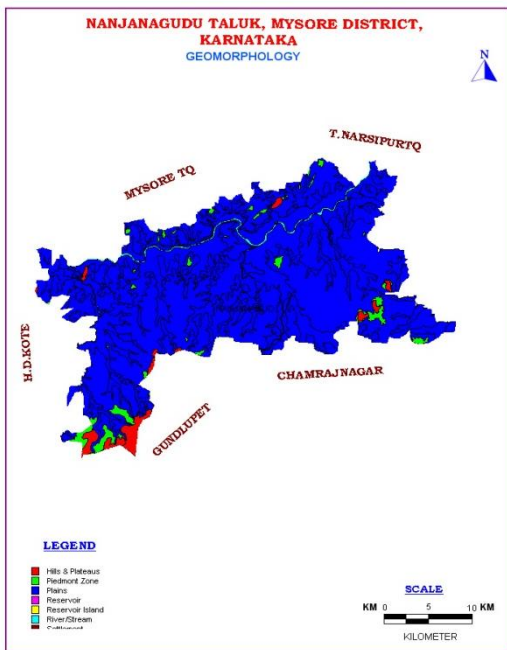


Fig-4: Geomorphology Map

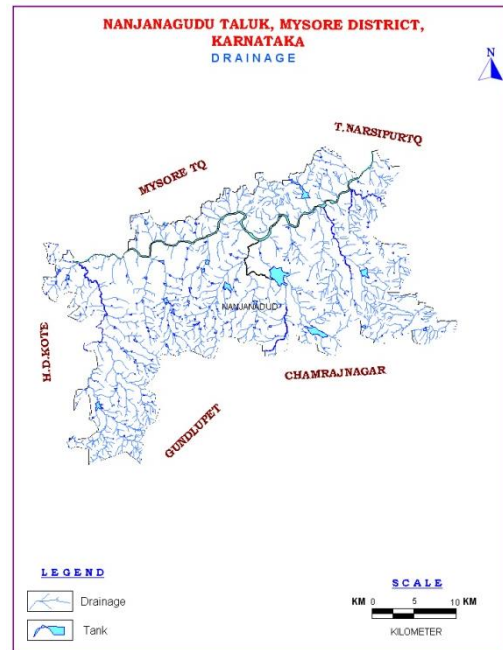


Fig-5: Drainage Map

## 1.6 Geology, Soil and Landuse

Geologically, the taluk is mainly composed of igneous and metamorphic rocks of Pre-Cambrian age either exposed at the surface or covered with a thin mantle of residual and transported soils. The rock formation in the taluk falls into two groups, gneissic complex and schistose formation. The geology map has been given in Fig. 6.

The soils of Nanjanagudu taluk can broadly be classified into Clayey soils and Clayey Skeletal soils and Loamy soils. These soils vary in depth and texture, depending on the parent rock type, physiographic settings and climatic conditions (Fig-7) and mainly this taluk covered by agricultural land. Land Use and Land Cover map also included (Fig.8)



Fig-6: Geology Map

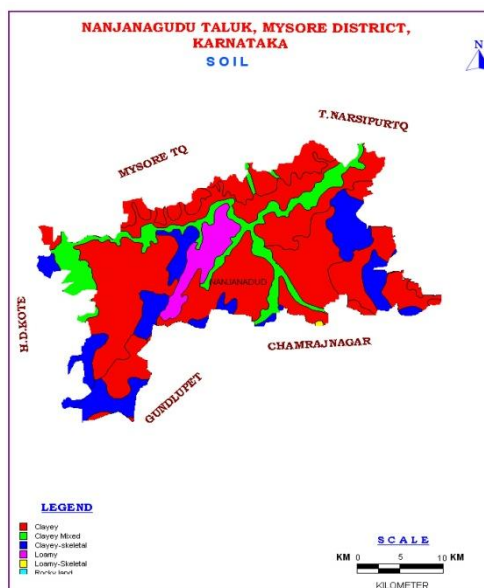


Fig-7: Soil Map

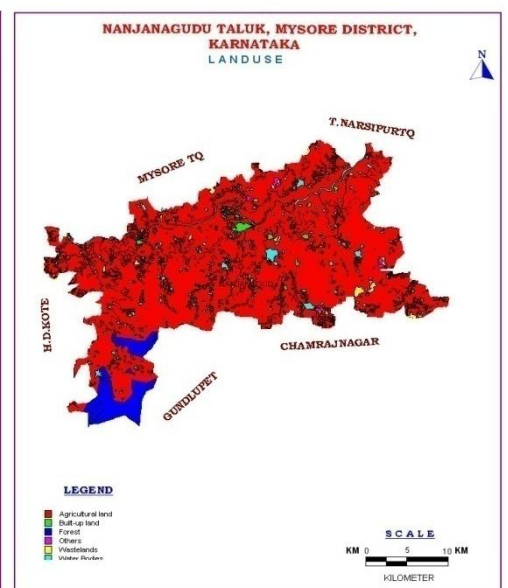


Fig-8: Land use Map



## 1.7 Ground water resource availability and extraction

As per the ground water resource estimation 2017 (Table 6a), the data on ground water resources shows that the net annual ground water availability is 10,658ham. The existing gross groundwater for irrigation Domestic and Industrial is 4,762 ham. The stage of groundwater development is 45% and falling under 'Safe' category.

**Table-6a. Detail of Dynamic Ground Water resource, (March 2017 Ham)**

Annual Extractable GW Resource (Ham)	GW Extraction for Irrigation Use (Ham)	GW Extraction for Domestic and Industrial Use (Ham)	Total Extraction (Ham)	Annual GW Allocation for Domestic and Industrial Use for next 25Yaers (Ham)	Net GW Availability for future Irrigation Development (Ham)	Stage of GW Extraction (%)	Categorization
10,658	3,523	1,239	4,762	2,197	4,977	45	Safe

Aquifer-wise total ground water resources down to 150 m depth are given in Table-6b below as per 2017 estimations.

**Table-6b: 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 150m)	
Nanjangud	10,658			Dynamic + Phreatic in-storage + fractured
		10,191	2,276	23,126

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

As per the GWRA 2017, the net ground water availability is 10,658 ham and the total ground water draft for all uses is 4,762 ham with stage of development at 45% and the taluk falls in Safe category. The domestic (Industrial sector) demand for next 25 years is estimated at 2,197 Ham.

The details of dynamic (Phreatic) ground water resources for Nanjangud taluk as on March 2020 is shown in Table-7. It is observed that the stage of ground water extraction is slightly gone up in the taluk from 45 % to 49.25 % from 2017 to 2020.

**Table-7. Detail of Dynamic Ground Water resource, (as on March 2020)**

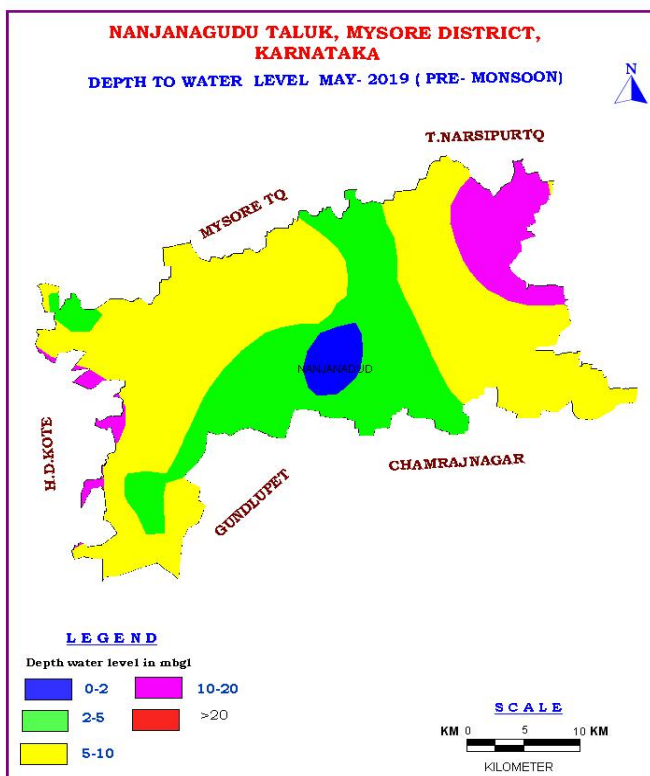
Annual Extractable GW Resource (Ham)	GW Extraction for Irrigation Use (Ham)	GW Extraction for Industrial Use (Ham)	GW Extraction for Domestic Use (Ham)	Total Extraction (Ham)	Annual GW Allocation for Domestic Use as on 2025 (Ham)	Net GW Availability for future use (Ham)	Stage of GW Extraction (%)	Categorization
10,471.70	3,490.18	0	1,667.62	5,157.81	2,418.12	4,825.24	49.25	Safe

## 1.9 Water level behavior

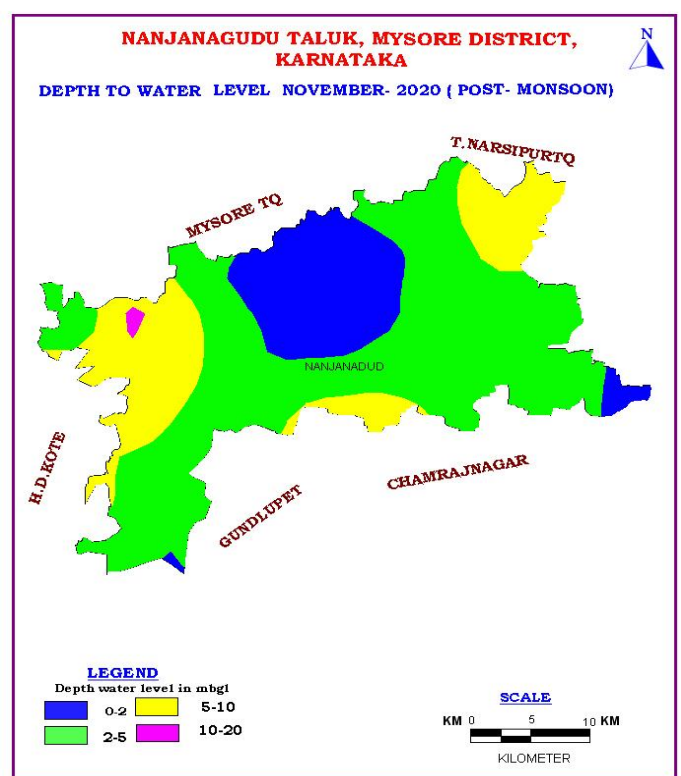
The water level data have been monitored from the representative dug wells monitoring for both pre and post monsoon seasons in Aquifer I (**Table 8**). During Pre Monsoon season water level ranges from 1.97 to 17.47 mbgl, whereas in Post Monsoon it varies from 0.71 to 16.2 mbgl and the maps shown in Fig 9 and 10.

**Table.8 Depth to Water level in Nanjangud Taluk**

	Pre Monsoon		Post Monsoon	
	Aquifer-I	Aquifer-II	Aquifer-I	Aquifer-II
<b>Range</b>	1.97-17.47		0.71-16.2	



**Fig-9: Pre-monsoon Depth to Water Level**



**Fig-10: Post-monsoon Depth to Water Level**

## 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 are Gneisses and Schist 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 Nanjangud taluk, there are mainly two types of aquifer systems

- Aquifer-I (Phreatic aquifer) comprising weathered Gneisses and Schistose.
- Aquifer-II (Fractured aquifer) comprising fractured Gneisses and Schistose.

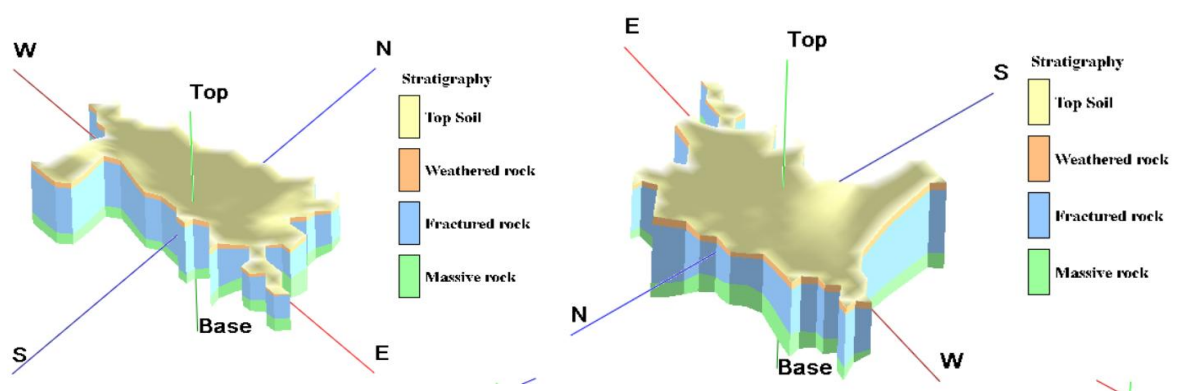
In Nanjangud taluk, Schist and Granitic gneiss are the main water bearing formations (Fig-6). Ground water occurs within the weathered and fractured Schist, Granite and Granitic gneiss under water table condition and semi-confined condition. In Nanjangud taluk bore wells were drilled from a minimum depth of 44mbgl to a maximum of 195mbgl. Depth of weathered zone ranges from 3mbgl to 20mbgl. Ground water exploration reveals that aquifer-II fractured formation was encountered between the depths of 8 to 150mbgl. Yield ranges from Negligible to 1.26lps. The basic characteristics of each aquifer are summarise Table-9.

The 3D aquifer disposition models, 2D aquifer sections and 3D aquifer fence diagrams have been prepared and presented in Fig. 11a, b and c.

**Table-9: Basic characteristics of each aquifer**

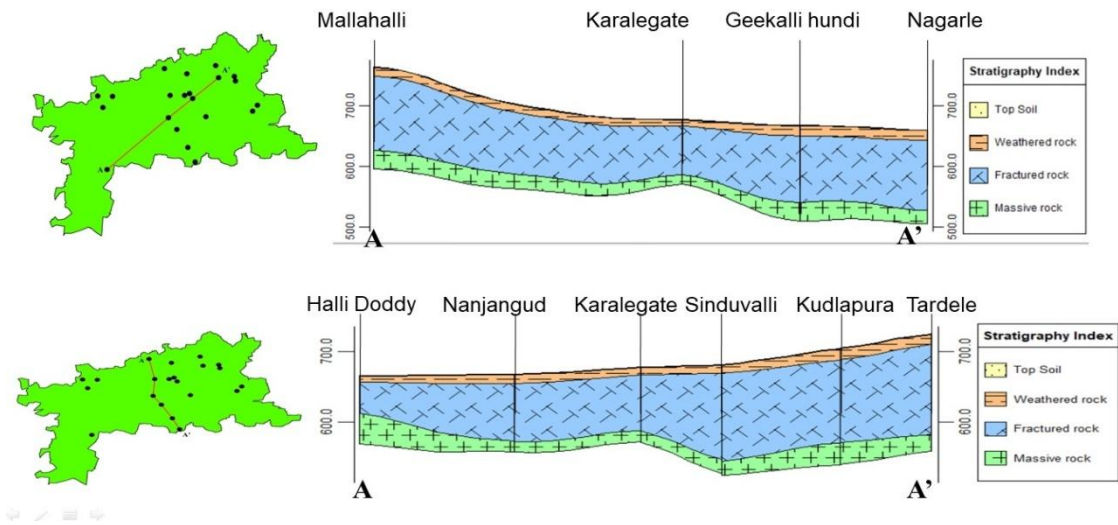
Aquifers	Weathered Zone (Aq.-I)	Fractured Zone (Aq.-II)
Prominent Lithology	Weathered Granitic gneiss	Fractured Granitic gneiss
Thickness range (mbgl)	3-20	Fractures upto 150 mbgl
Depth range of occurrence of fractures (mbgl)	-	8-150
Range of yield potential (lps)	-	<1 – 1.26

## 2.2 3D Aquifer disposition, Aquifer Fence Diagram and 2D Cross-Sections



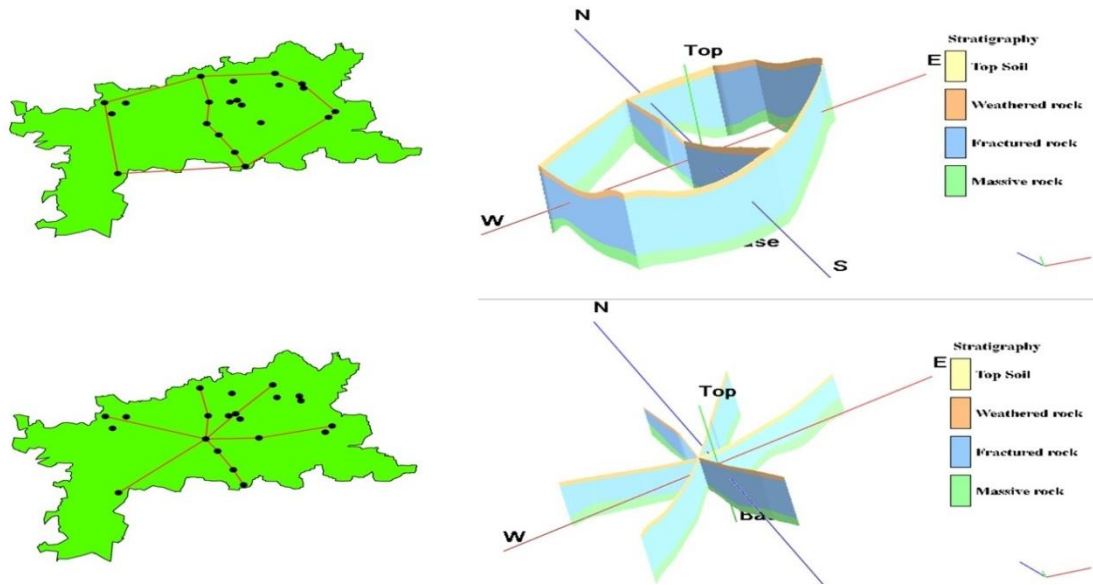
**Fig-11a: 3D Aquifer Dispositions**

## 2D AQUIFER SECTIONS



**Fig-11b: 2D Cross sections in different directions**

## 3D FENCE DIAGRAM



**Fig-11c: 3D Aquifer Fence Diagram**

### 3 GROUND WATER RESOURCE, EXTRACTION, CONTAMINATION AND OTHER ISSUES

The main ground water issues are over exploitation, Limited Ground Water Potential / Limited Aquifer Thickness / Sustainability, deeper water levels especially in Aquifer II, declining water level trend and urbanized areas of Nanjangud city thereby reducing the ground water recharge worthy areas which are all inter-related or inter dependent.

#### 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 10. It is observed that the ground water availability in 2020 is less compare to 2017 due to decrease in rainfall and in water table. It is attributable to the improvement in the irrigation practice, influence of command area and also due to the water conservation / recharge activities carried out in the taluk by various state govt. and other agencies.

**Table-10 Comparison of ground water availability and draft scenario in Nanjangud taluk**

Taluk	GW availability (in ham)	GW draft (Extraction) (in ham)	Stage of GW development	GW availability (in ham)	GW draft (Extraction) (in ham)	Stage of GW development
Nanjangud	<b>2017</b>			<b>2020</b>		
	10,658	4,762	45%	10,471.70	5,157.81	49.25%

#### 3.2 Chemical quality of ground water and contamination

The water samples were collected in different parts of Nanjangud taluk (Aquifer – I) and the Fig 12 given below.

The results of quality parameters shows that

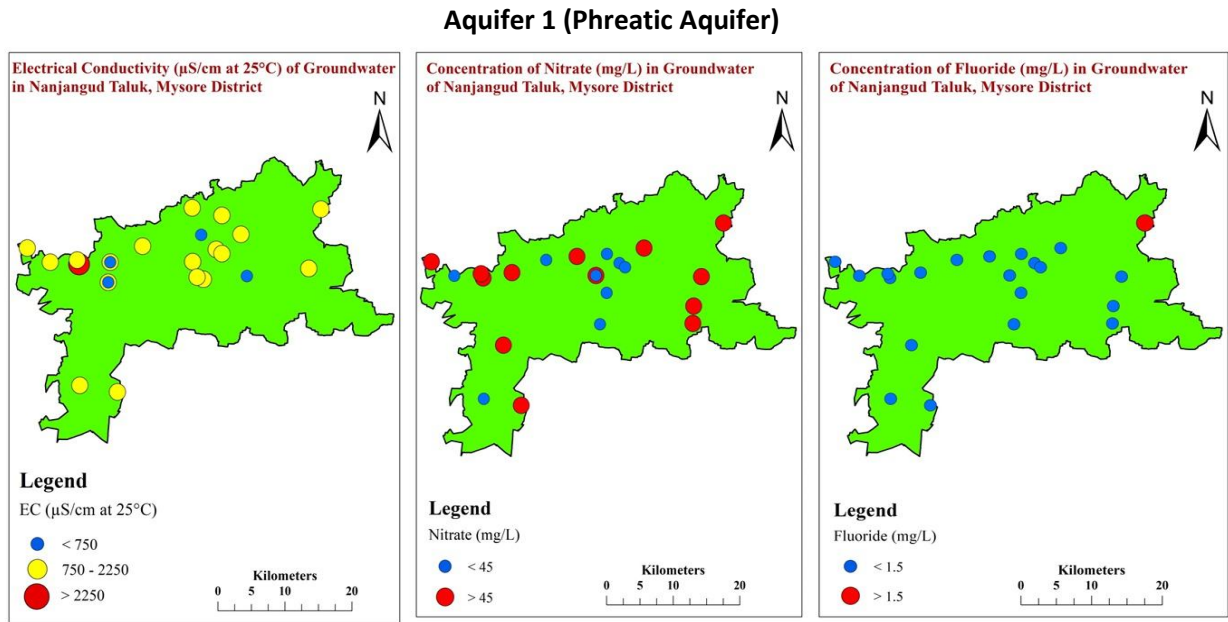
- **Electrical Conductivity:** EC values range from 393 to 1679 $\mu$ S/cm at 25°C.
- **Nitrate:** Nitrate concentration in ground water ranges from 3 to 41 mg/l.
- **Fluoride:** Fluoride concentration in ground water ranges between 0.5 to 1.1 mg/l.

Chemical Analysis result in Nanjangud taluk (Aquifer.II) basic parameters is mentioned below in Table.10:

- **Electrical Conductivity:** EC values range from 480 to 3,210  $\mu$ S/cm at 25°C. The villages which have more EC value than the permissible limit are Hanumanapura, Nerale, Devanuru, Hura, Hanchinapura.
- **Nitrate:** Nitrate concentration in ground water ranges from 2 to 270 mg/l. The villages which have more Nitrate value than the permissible limit are Dasanuru, Nerale, Hedathale, Devanuru, Kasuvinahalli, Hura, Hanchinapura, Hediya, Adda, Karya.
- **Fluoride:** Fluoride concentration in ground water ranges between 0.14 to 1.50 mg/l.

**Table-11 Groundwater Quality data**

Sl. No.	Location	Taluk	District	pH (6.5-8.5)	EC in $\mu\text{S}/\text{Cm}$	TH (600)	Ca (200)	Mg (100)	Na	K	CO <sub>3</sub>	HCO <sub>3</sub>	Cl (1000)	SO <sub>4</sub> (400)	NO <sub>3</sub> (45)	F (1.5)	TDS <sup>&amp;</sup>
1	Thayuru	Nanjangud	Mysuru	7.90	480	200	32	29	14	0.9	0	122	21	80	10	0.14	262
2	Kahalli dw	Nanjangud	Mysuru	7.84	1370	310	64	36	161	11.8	0	421	163	80	9	0.19	783
3	Kalkunda	Nanjangud	Mysuru	7.94	1700	360	48	58	225	1.1	0	506	184	140	32	0.16	998
4	Chinnamballi	Nanjangud	Mysuru	7.75	870	295	28	55	57	1.6	0	336	32	60	34	0.95	472
5	Hanumanapura	Nanjangud	Mysuru	8.07	2470	880	120	141	106	54.2	0	610	369	180	4	0.74	1347
6	Dasanooru	Nanjangud	Mysuru	7.79	1810	730	88	124	76	4.6	0	549	213	80	68	0.27	988
7	Chunchanahalli	Nanjangud	Mysuru	7.87	1220	290	38	47	143	3.9	0	512	78	55	14	0.93	692
8	Nerale	Nanjangud	Mysuru	8.01	2500	840	80	156	175	9.0	0	683	312	120	116	1.10	1385
9	Hedathale	Nanjangud	Mysuru	8.06	2010	620	120	78	161	18.0	0	537	227	140	103	1.10	1175
10	Badavanalu	Nanjangud	Mysuru	7.77	1990	720	72	131	115	15.0	0	512	255	160	36	0.77	1098
11	Devanuru	Nanjangud	Mysuru	7.87	2350	820	72	156	133	6.8	0	488	298	220	66	0.89	1250
12	Alambur	Nanjangud	Mysuru	8.12	800	190	22	33	91	4.5	0	275	43	75	36	0.78	472
13	Sargur dw	Nanjangud	Mysuru	7.57	860	220	40	29	83	16.5	0	342	43	65	19	0.30	503
14	Belagunda	Nanjangud	Mysuru	8.12	1030	165	18	29	149	3.0	0	354	60	115	13	1.50	605
15	Devarasammanahallipalya	Nanjangud	Mysuru	7.65	810	200	38	26	90	1.4	0	323	35	65	0	0.24	453
16	Uppinhalli	Nanjangud	Mysuru	7.89	1230	400	84	46	99	4.3	0	378	106	120	31	0.41	722
17	Kurati	Nanjangud	Mysuru	7.85	1530	480	100	56	120	4.1	0	506	142	100	19	1.50	851
18	Yelichigere	Nanjangud	Mysuru	7.72	1170	330	68	39	104	2.7	0	329	89	120	36	1.40	660
19	Kasuvinahalli	Nanjangud	Mysuru	7.83	1650	450	104	46	156	9.0	0	512	135	110	90	1.20	965
20	Allere	Nanjangud	Mysuru	7.69	1140	380	76	46	81	3.1	0	476	39	85	26	1.40	647
21	Hura	Nanjangud	Mysuru	8.38	2250	640	72	112	156	66.8	12	500	255	180	161	1.10	1317
22	Hanchipura	Nanjangud	Mysuru	7.74	2580	1080	220	129	107	8.9	0	580	210	214	270	0.37	1677
23	Hediyala	Nanjangud	Mysuru	7.81	1416	450	34	89	143	5.8	0	622	92	60	70	0.94	920
24	Madhuvinahalli	Nanjangud	Mysuru	8.05	885	215	34	32	119	6.5	0	500	35	18	2	1.40	575
25	Adda	Nanjangud	Mysuru	7.49	1484	615	70	107	77	4.6	0	525	127	74	106	0.53	965
26	Kadajetti	Nanjangud	Mysuru	7.95	518	210	46	23	33	2.9	0	250	15	48	10	0.33	337
27	Haginavalu	Nanjangud	Mysuru	7.93	663	290	38	47	49	5.4	0	415	22	18	13	0.76	431
28	Karya	Nanjangud	Mysuru	7.88	1048	425	58	68	78	7.1	0	494	35	91	68	0.84	681
29	Hullahalli	Nanjangud	Mysuru	8.11	735	250	30	43	96	7.7	0	512	15	7	5	0.75	478
30	Kanenuru	Nanjangud	Mysuru	7.86	541	240	42	33	28	13.0	0	305	12	32	3	0.27	352



**Figure-12. Groundwater Quality Map**

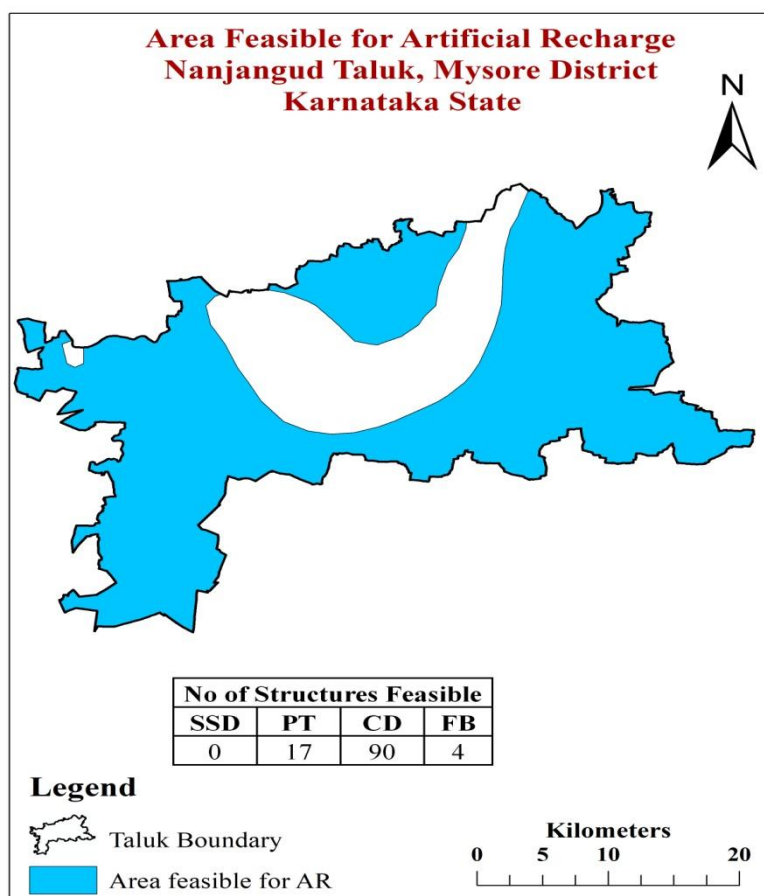
## 4 GROUND WATER RESOURCE ENHANCEMENT

### 4.1 Resource Enhancement by Supply Side Interventions

Recharge dry **phreatic aquifer (Aq-I)** in the taluk, through construction of artificial recharge structures, viz; check dams, percolation tanks & Sub surface dyke (**Table-12**). The choice of recharge structures should be site specific and such structures need to be constructed in areas already identified as feasible for artificial recharge. (**Fig.13**).

**Table-12: Quantity of non-committed surface runoff & expected recharge through AR Structures**

Details of Artificial Recharge structures in Nanjangud Taluk		
Sl.No	Artificial recharge structures available/proposed	
1	Non committed monsoon runoff available in (MCM)	18.685
2	No of sub surface dykes	0
3	No of Check Dams	17
4	No of percolation tanks	90
5	Filter Beds	4
6	Tentative total cost of the project (Rs in lakhs)	1,249.589
7	Expected Recharge in (MCM)	14.014



**Fig-13. Area feasible for Artificial Recharge structures**



### **4.1.1 Benefit of Artificial recharge scheme**

Artificial recharge structures namely check dams, percolation tanks, Filter Beds and Nala bunds can be taken up on large scale in the over-exploited areas as a management plan to tackle falling ground water levels.

- These structures have proved in building-up of ground water levels and sustainability of ground water abstraction structures, mainly in bore wells.
- An increase in the area irrigated by ground water source is also observed in the area of influence.
- Such activities help in providing sustainable drinking water to the rural population. The qualitative result from farmer's perception indicate that, there is rising trend in ground water levels in the area of influence, productivity of crops enhanced and improvement in yield is observed in bore wells.
- The cropping pattern has shown that farm households have resumed growing crops such as grapes which were not previously grown in the area.

## **4.2 Resource Savings by Demand Side Interventions**

### **4.2.1 Advanced irrigation practices**

Nanjangud Taluk falls under Safe category with the stage of groundwater extraction of 49.25%. However Water Use Efficiency (WUE) practices like Drip irrigation needs to be strengthened to save irrigation water by way of precision farming mechanism. This ultimately enhances the area under irrigation potential.

### **4.2.2 Water Use Efficiency by Micro Irrigation Practices**

It is observed that wells and bore wells are the source for 15,936 ha of net irrigation in the taluk. 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 15,936 ha of net irrigated area by wells & bore wells.

The water efficient methodology may be applied for growing Sugarcane which is grown in 2,562 ha and is largely ground water dependent as compared to the other crops which are mainly grown during kharif.

**Table 13: Details of Resource Enhancement after proposed supply side and demand side interventions**

Sl.No	Resource Details	As per 2020 Estimation
1	Net Groundwater Availability in Ham	10,471
2	Existing stage of Ground water development in %	49.25
3	Existing Gross Groundwater Draft for all use in Ham	5,157.81
4	Expected recharge from Artificial recharge projects Ham	1,401
5	Saving due to adopting WUE measures	2,894
6	Expected improvement in stage of ground water development after implementation of project in %	33
7	Expected improvement in overall stage of ground water development in %	12
8	Expected additional irrigational potential in Ha	170

#### **4.2.3 Change in cropping pattern**

Agriculture is the main occupation in Nanjangud taluk. Water intensive crops like Sugarcane and Paddy is grown in 2,562 ha and 15,968 ha respectively of net cropped area of 76,969 ha. However, oil seeds are grown during kharif and rabi period and sugarcane grown only in 2,562 ha of the cropped area. At present (2020), the stage of ground water extraction is 49.25% and taluk has been categorised as Safe, thus change in cropping pattern has not been suggested.

#### **4.3 Regulation and Control**

Nanjangud taluk has been categorized as **Safe**, since the stage of ground water development has reached 49.25% (GEC 2020), it may be encouraged to extract the ground water with care so that further ground water exploitation should not happen in the taluk. However mandatory guideline issued by Government of Karnataka like rain water harvesting and Artificial recharge structures should be constructed. Ground water recharge component needs to be made mandatory in the non-command area of the taluk for further development of ground water.

#### **4.4 Other interventions proposed**

- Periodical maintenance of artificial recharge structures should also be incorporated in the Recharge Plan.
- Excess nitrate concentration is found in ground water samples require remedial measures viz.
  - Dilution of nitrate rich ground water through artificial recharge & water conservation.
- Roof top rain water harvesting.

## 5 SUMMARY AND RECOMMENDATIONS

The summary of Management plan of Nanjangud taluk is given below.

- **Ground water resource enhancement:** Continuous drought, increase in agricultural activity, subjected to excessive ground water withdrawal leading to depletion of ground water level, reduction in yield and deterioration of ground water quality etc., suggests a need for proper ground water management and enhancement of storage capacity of aquifers, protection of ground water quality and proper utilization of ground water. To enhance the storage capacity of aquifers, the dewatered aquifers are to be recharged, for which the artificial recharge structures like Check dams, percolation tanks, point recharge structures etc have to be constructed.
- **Ground Water resource:** As per the resource estimation – 2020, Nanjangud taluk falls under Safe category with the stage of ground water extraction of 49.25 %. However, there is need to formulate management strategy to tackle the water scarcity related issues in the taluk during the summer and scarcity of water during the future days.
- **Ground water resource enhancement:** Increase in agricultural activity, excessive ground water withdrawal, depletion of ground water levels, reduction in yield and ground water quality related issues etc., suggests the need for scientific ground water management, enhancement of storage capacity of the aquifers and protection of ground water quality.
- **Quantity of water available through non-committed surface run-off:** The surplus non-committed monsoon run off is estimated to be approximately 18.685 MCM. This can be used to recharge the aquifer mainly through percolation tanks (about 17), Check Dams (about 90), Filter Beds (about 4) (CGWB, 2020).
- **Advanced irrigation practices:** The important crops grown are Paddy, Jowar, Ragi, Maize, gram, tur, groundnut, sunflower and sugarcane About 129.47 sq.km area is being by canal irrigation and the remaining part of the irrigated area is fed by ground water. In view of this, Water Use Efficiency (WUE) practices like Drip needs and Micro irrigation to be strengthened to save irrigation water by way of precision farming mechanism. This ultimately enhances the area under irrigation potential.
- **Conjunctive use plan in water logged area:** Out of the total 768 sq.km of the canal command area in the taluk, about 3205ha is water logged. About 95ha of this is reclaimed and 3110ha is yet to be reclaimed since inception. (Source: CADA as on March 2021). In addition to this reclamation, conjunctive use plan is also recommended to benefit the tail end area of the irrigation command.
- **Change in cropping pattern:** Farmers are facing inadequacy of groundwater for agriculture during summer and can opt for more rain-fed millets and water efficient Pulses for agricultural production.
- **Drinking water Supply:** In view of ground water contamination with mainly higher concentration Nitrate and fluoride, drinking water supply from surface water needs to be explored/ ensured.
- **Regulation and control:** Taluk is categorized as "Safe". However, the mandatory guidelines like rainwater harvesting and artificial recharge issued by Karnataka Ground Water Authority needs to

be strictly implemented in the taluk, so that quality of ground water will improve in due course of time.

- **Participatory management:** Awareness programmes and practice of participatory approach needs to be strengthened with the involvement of all the stake holders for sustainable management.

