

**GOVERNMENT OF KERALA**  
**GROUNDWATER DEPARTMENT**

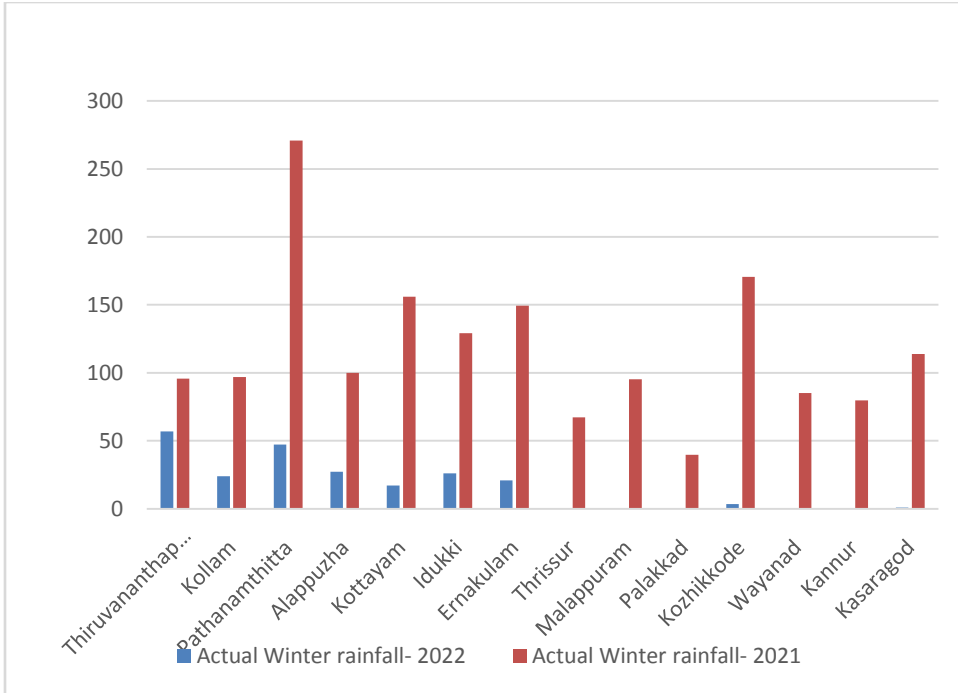
**GROUNDWATER LEVEL MONITORING REPORT – February 2022**

**Water** is a replenishable natural resource which is essential for the existence of all living beings. In the past, the demand of water is mostly limited to domestic and in the agricultural sector. Due to the developments in agricultural and industrial sector the demand of water is increasing many folds since last few decades. Surface water resource alone couldn't meet the increasing demand and hence persuaded to depend on groundwater resource during the past few decades made stress on groundwater regime. In order to sustain the groundwater resources, proper groundwater management practices are needed.

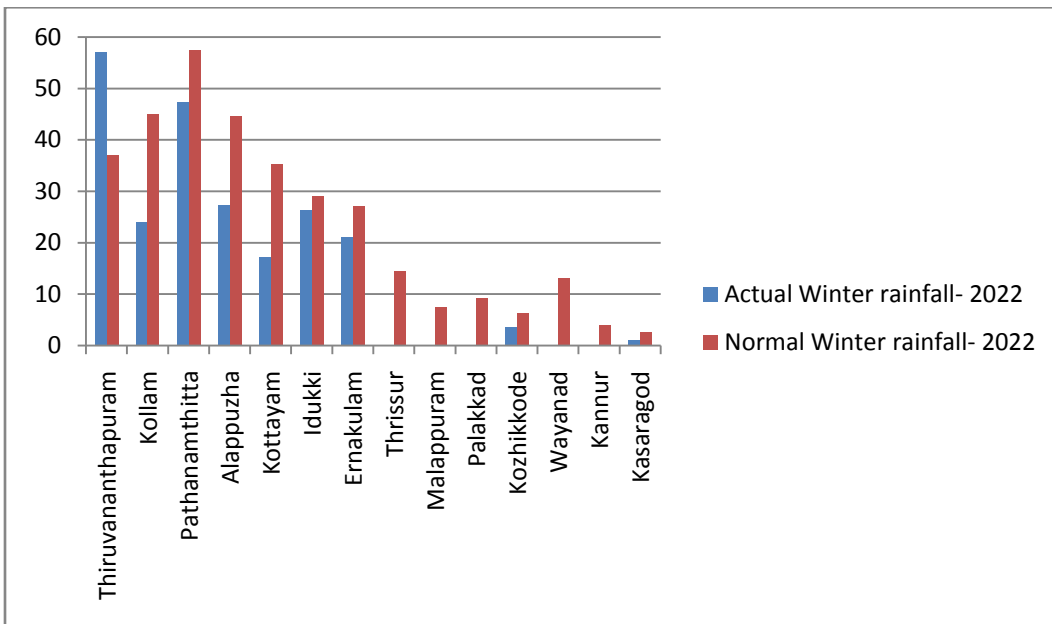
**Rainfall** is the primary source for groundwater recharge and has a vital role in the sustainability of groundwater resource in the state. Groundwater level fluctuation results from the seasonal availability of rainfall. Kerala state experiences four distinct seasons namely winter (January-February), Pre-monsoon (March-May), Monsoon (South-West) June to September and Post-monsoon (North-East) from October to December. Average annual precipitation in the state is nearly 3107 mm; some 7,030 crore m<sup>3</sup> of water. The rainfall in the State is controlled primarily by the South-West and North-East monsoons. About 90% of the rainfall occurs during six monsoon months (South-West monsoon contributes major portion of rainfall (65-70%) and about 16% from the North-East) and remaining from summer showers.

The winter rainfall (January-February) occurred in the state during 2021 (January - February) is 114.1mm, which is 410% large excess than that of the normal rainfall. All the districts got Large Excess rainfall during this period. Most of the locations in the state get recharged from the excess rainfall occurred during this season.

The winter rainfall (January-February) occurred in the state during 2022 (January - February) is 14.9mm, which is -33% Deficient than that of the normal rainfall(22.4mm). Only Thiruvananthapuram district got Excess rainfall (57.1mm). Pathanamthitta and Idukki districts got normal rainfall, 47.3mm and 26.3mm respectively. Even though it is in normal category it is also lesser than the Normal rain fall of the districts ie -18 and -9 respectively. All the other districts got Deficient and Large deficient rainfall



**Fig:1. Comparison of actual winter rainfall occurred during January-February2022 wrt 2021**



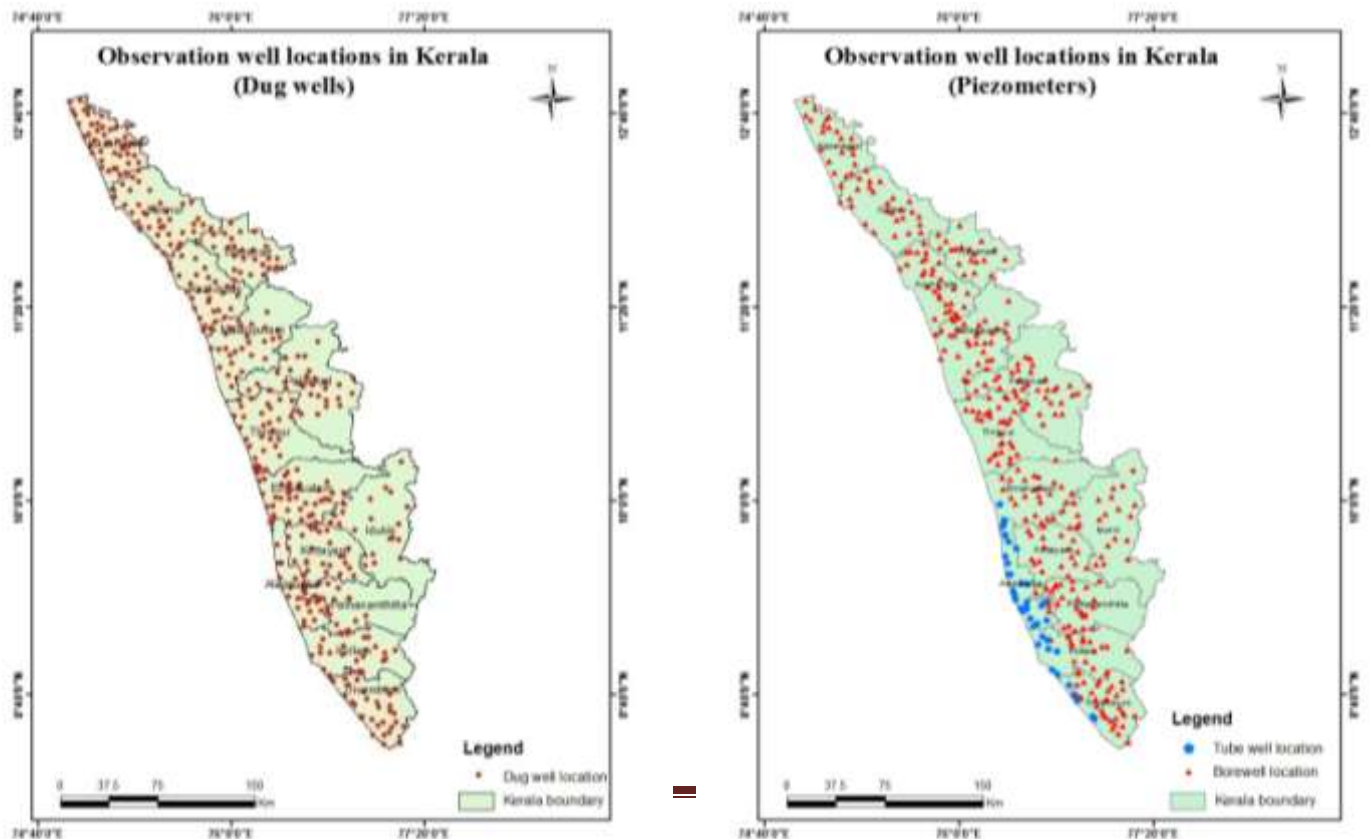
**Fig:2. Comparison of actual rainfall occurred January-February2022 wrt Normal Rainfall**

**Geology:** Kerala, the southernmost state of Indian peninsula, is having a geographical area of 38863 km<sup>2</sup>. The land area extends between latitude 8°17'30" and 12°27'40" and longitude 74°51'57" and 77°24'47". Physiographically, Kerala state is sandwiched between Western Ghats on the east and Arabian Sea on the west. Being the part of the southern Indian peninsula, the peninsular geological formations exist in the state. The major geological formations in the state comprises crystalline rocks of Archaean Age, sedimentary rock formations of tertiary age and sub recent to recent rock formations of quaternary age.

**Occurrence of Groundwater resource:** Groundwater occurs under phreatic, semi-confined and confined conditions, Groundwater in unconfined aquifer is mainly utilized through tube wells in sedimentary terrain and through bore wells in hard rock areas.

**Groundwater monitoring network:** Short term and long term changes in the climatic conditions influence the groundwater scenario of an area. Groundwater level data are the principal information required for assessing the groundwater status and groundwater resource estimation.

Groundwater Department is maintaining a network of observation wells throughout the state representing various hydro geological units. Observation wells includes dug wells (owned by public and private) and purpose built piezometer (bore wells and tube wells). Water level data has been collected monthly and water samples collected and analysis done periodically.



**Fig: 3. Location map of observation dug wells and piezometers (bore wells & tube wells)**

### **Analysis of Groundwater level data –February 2022**

During the month of February2022, groundwater level in 474 dug wells and 381purpose built piezometers (bore wells- 337 and tube wells – 44) has been monitored. The data collected from the observation wells during the month of February 2022 has been compared with previous year’s corresponding month data and also with respect to decadal mean data of the corresponding month to assess the groundwater scenario in the state.

#### **I. Depth to Groundwater level during February 2022**

Dug wells:-The depth to groundwater level in the observation dug wells during the month of February 2022 ranges from a minimum of 0.06 m Wayanad to a maximum of 17.18 mbgl Kannur. Out of 474 dug wells monitored water level in 13% of dug wells shows a depth to water level ranges from  $\leq 2$  m, 32% ranges between 2-5 m, 45% ranges between 5-10 m and 10% dug wells recorded depth to water level ranges between 10-20 mbgl. Dug wells inIdukki and Kollam show water level less than 10m.None of the wells in the state show water level above 20m. Table showing well frequency during February 2022 is appended. (Annexure-I)

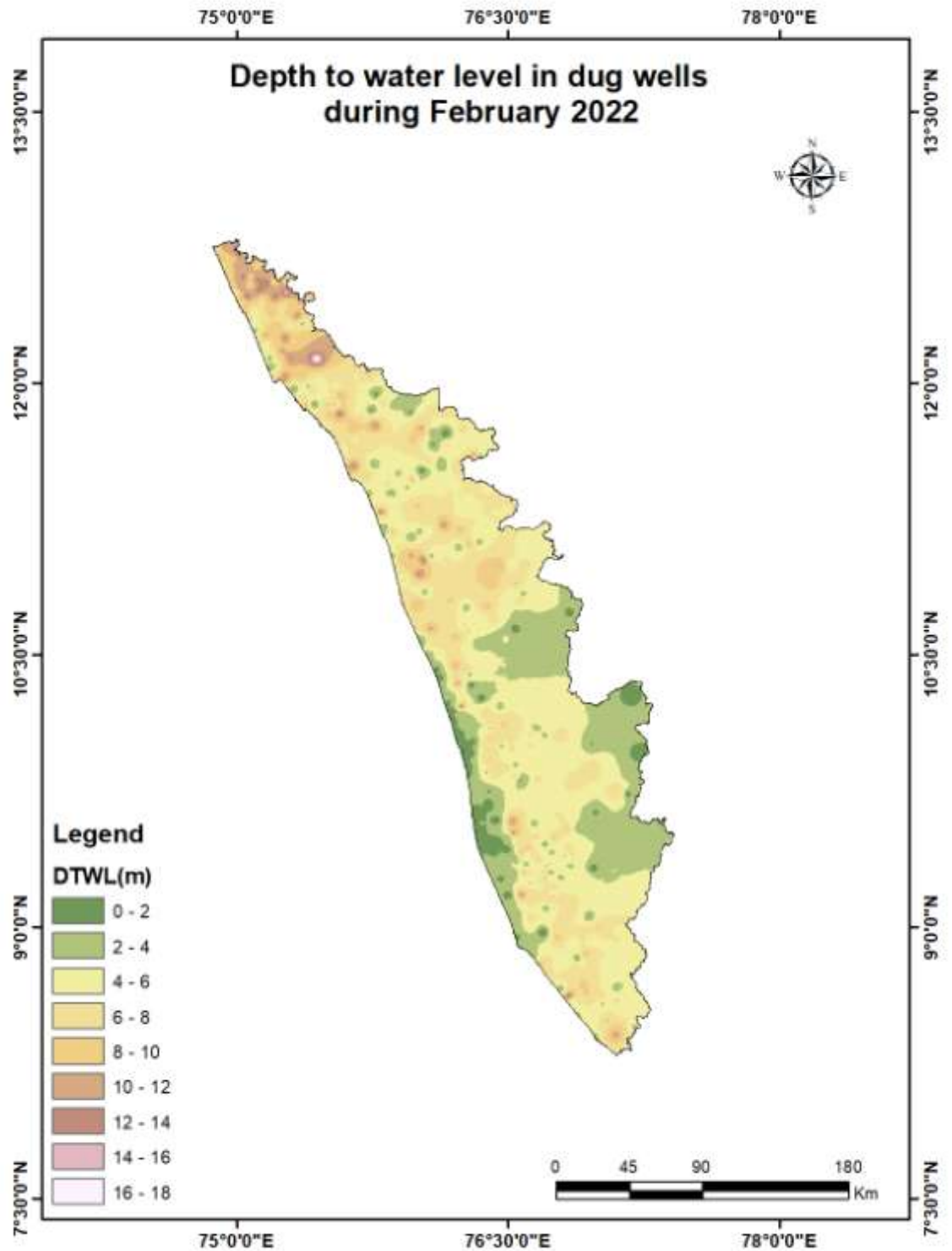


Fig:4. Depth to water level in Dug wells during February2022

Bore wells (hard rock terrain):-The depth to groundwater level in the observation bore wells during the month of February 2022 ranges from a minimum of -0.05m to a maximum of 45.73m bgl. Out of 337bore wells monitored, water level in 5% of bore wells shows a depth to water level range from 0-2 m, 21 % ranges between 2-5 m, 40% ranges between 5-10 m, 26% of bore wells ranges between 10-20 m, and 8% ranges more than 20 m. Bore wells in Trivandrum, Kollam and Alappuzha districts show water level below20 mbgl. Table showing well frequency during February 2022 is appended. (Annexure-I)

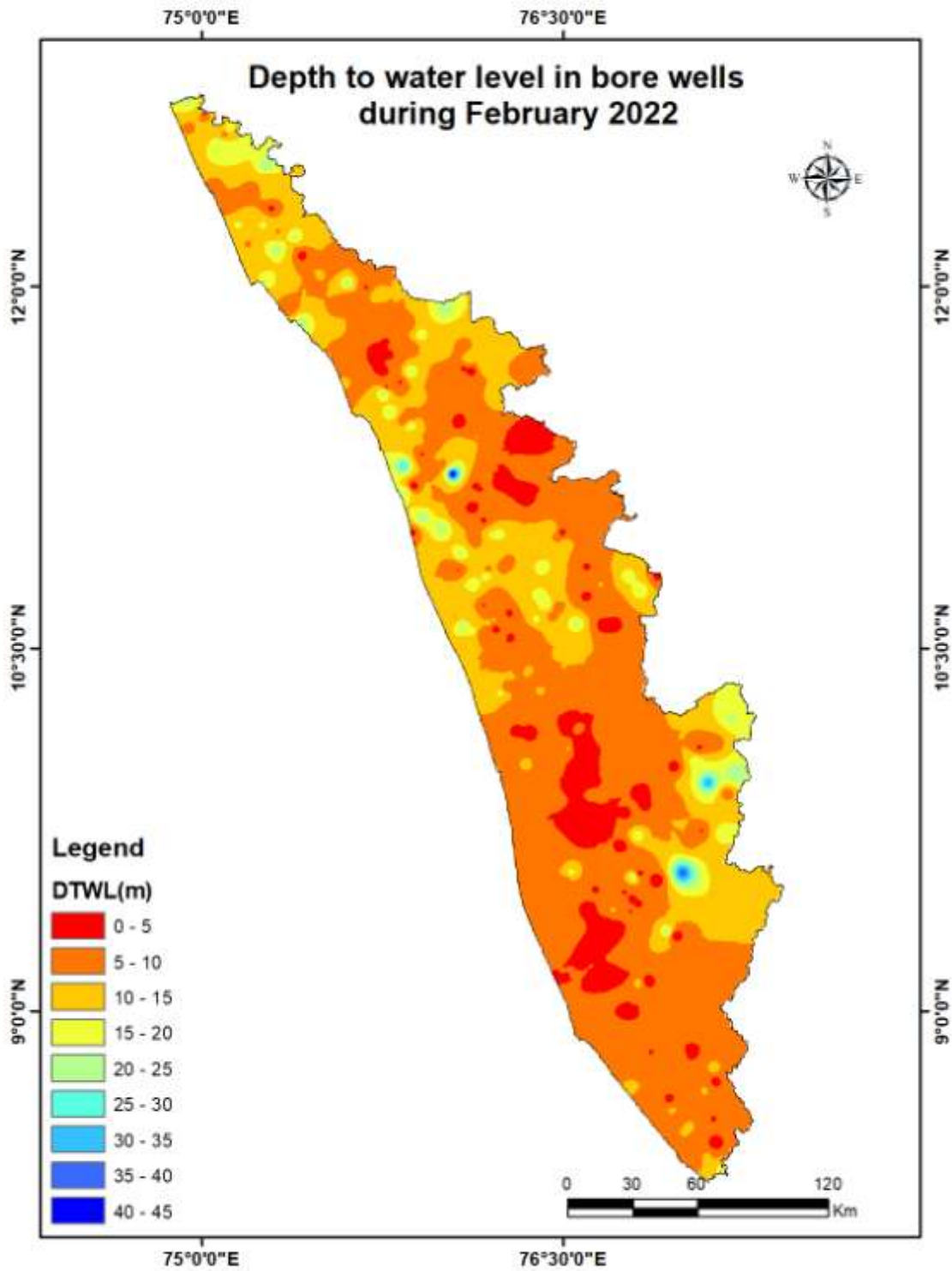


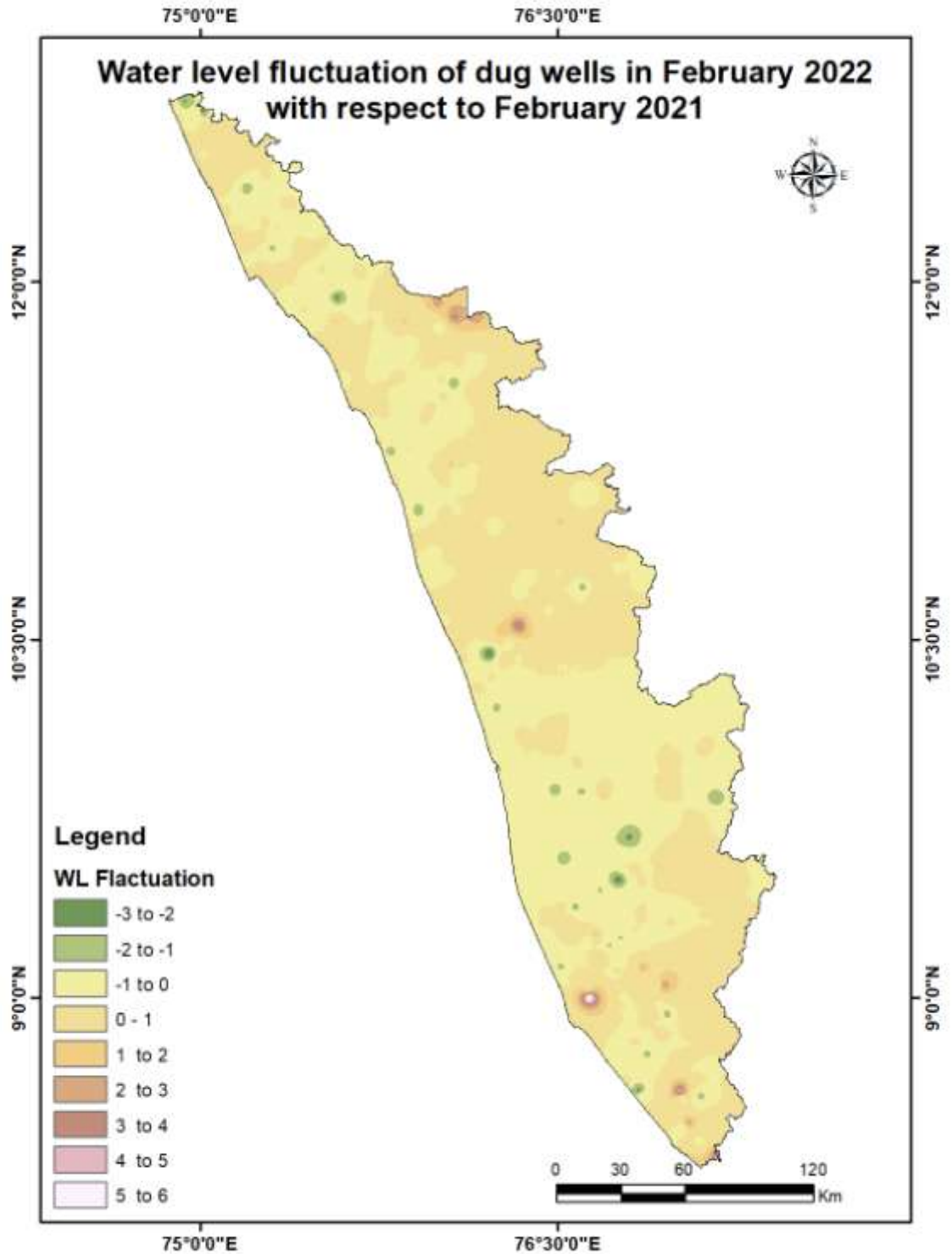
Fig:5. Depth to water level in Bore wells during February 2022

Tubewells (coastal sedimentary terrain):-The depth to groundwater level in the observation tubewells during the month of February 2022 ranges from a minimum of -0.5m Alappuzha to a maximum of 33.75mbgl, Kollam. Out of 44tube wells monitored in the state, water level in 23 % of tube wells ranges between 0-2m, 34 % of tube wells ranges between 2-5 m, 27% ranges between 5-10 m and9%ranges between10-20 and 7% ranges more than 20m.Table showingtube well frequency is appended.(Annexure-I )

## **II.Comparison of Groundwater level February 2022with respect toFebruary 2021**

Comparison of the groundwater level in February2022with respect to the corresponding month in the previous year indicates that 51 % of observation dug wells show a fall in water level and 49 % of the dug wells show no remarkable change /marginal rise in water level.Out of 51% of the dugwells showing falling trend, 72% recorded fall in water level less than 0.5m, 14 % of dug wells show fall in the range between 0.5-1m, 5% of dug wells show fall in the range between 1-1.5 m, 5% of dug wells show a fall in the range between 1.5 -2m and 3% of the dug wells show a fall in water level more than 2m. Table showing water level comparison of dug wells during February 2022 with respect to February 2021is appended. (Annexure-II).





**Fig.6. Comparison of water level in Dug wells duringFebruary 2022with respect toFebruary 2021**

Comparison of the water level in observation bore wells (hard rock terrain in midland and high land areas) in **February 2022** with that of the previous year, it has been noticed that 44% of bore wells show fall in water level and 56 % of the wells shows no remarkable change/marginal rise in water level. Out of 44 % of the bore wells showing falling trend, 56% of the bore wells recorded fall in water level less than 0.5m, 19% show fall in the range between 0.5 - 1m, 9% of bore wells show fall in the range between 1 - 1.5m, 3% of bore wells show a fall in range between 1.5-2m, 13% of bore wells show a fall in water level more than 2m. Table showing water level comparison of bore wells during February 2022 with respect to February 2021 (Annexure-II) is appended

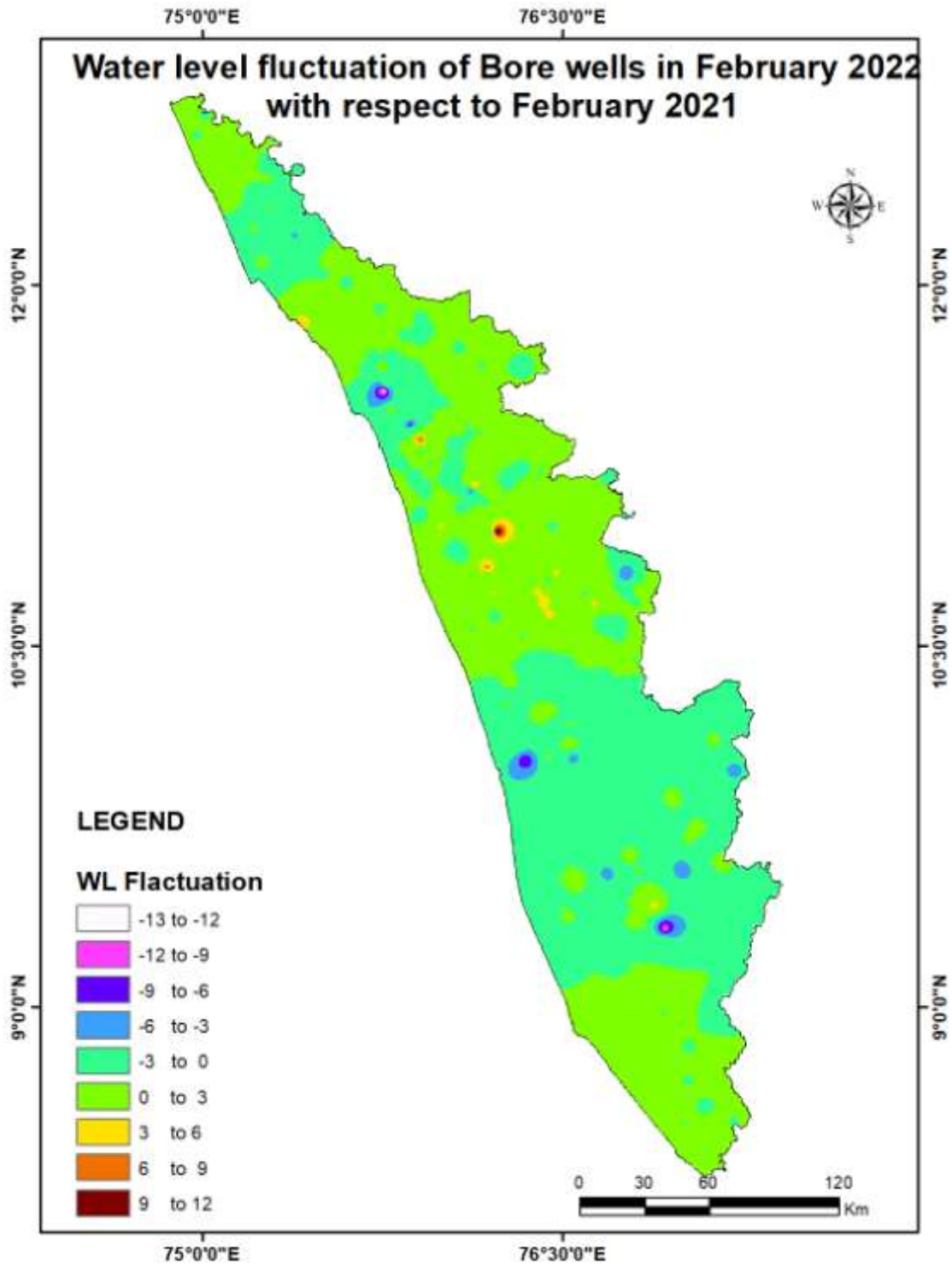


Fig:7. Comparison of water level in Bore wells during February 2022 wrt February 2021

Comparison of the water level in observation tube wells (in the coastal sedimentary areas)during February 2022with that of the previous year reveals that 43 % of tube wells recorded a falling trend and 57 % of the wells shows no remarkable change /marginal rise of water level.Out of 43% of the tube wells showing a falling trend, 90% of wells recorded fall in range between 0 to 0.5m 5% show fall in the range between 0.5 - 1m, 5% of bore wells show a fall in range between 1.5-2m. None of the bore wells show a fall inwater level more than 2m..Table showing comparison of water level during February 2022with respect to February 2021is appended. (Annexure-II)

### **III.Comparison of Groundwater level in February 2022with respect to Decadal mean(2012- 21)**

On comparison of the water level inFebruary 2022with respect to the decadal mean, it has been noticed that 21% of observation dug wells recorded a fall in water level and 79% of the wells shows marginal rise /no remarkable change in water level.Out of 21% of the dugwells show a falling trend, 65% of the dug wells recorded fall in water level less than 0.5m,19% show fall in the range between 0.5-1m, 6% of dug wells show fall in the range between1-1.5m, 5% of dug wells show a fall in range between 1.5-2m and 5% of dug wells show a fall in range more than 2m.Table showing water level comparison of dug wells during February 2022with respect to decadal mean is appended. (Annexure-III)

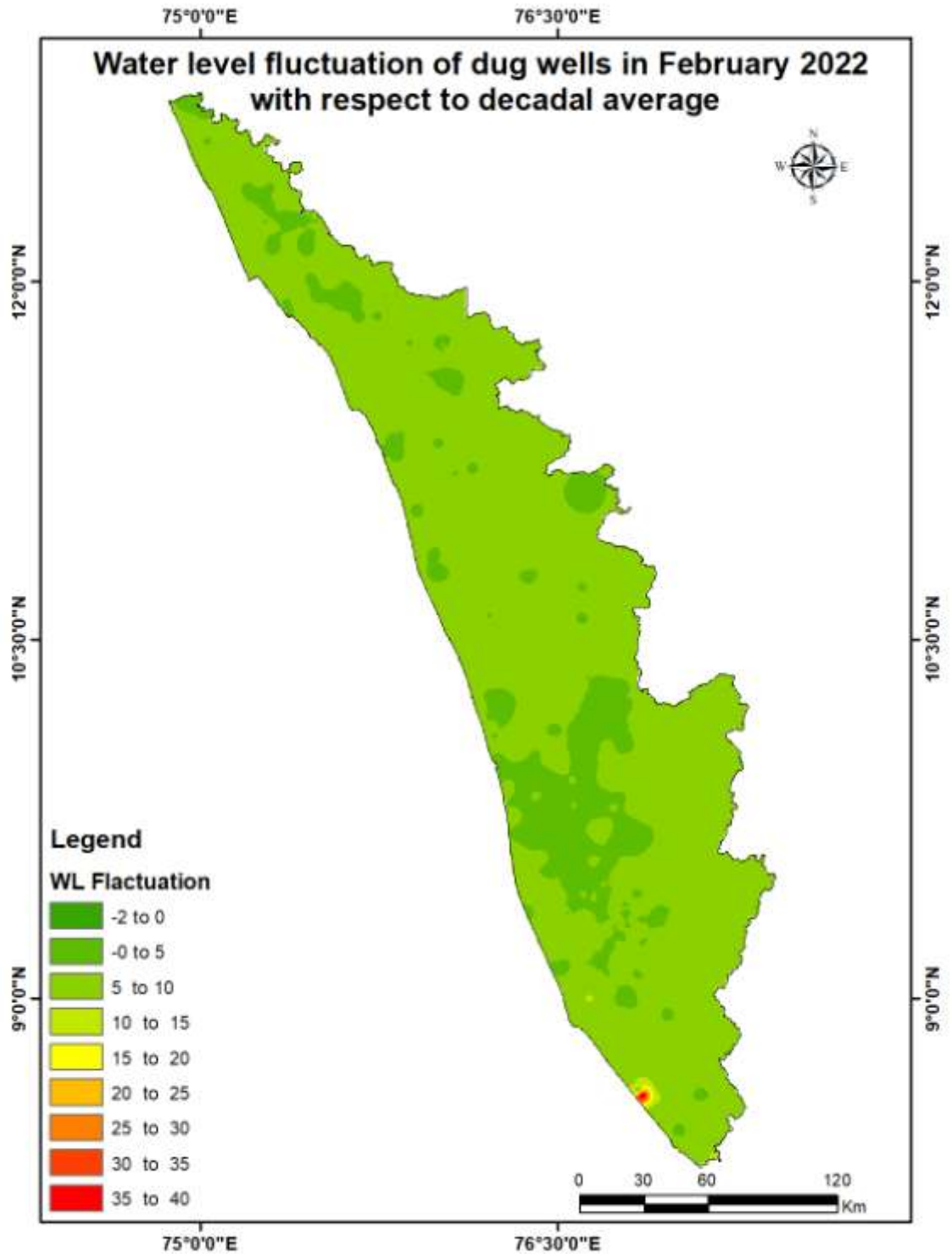
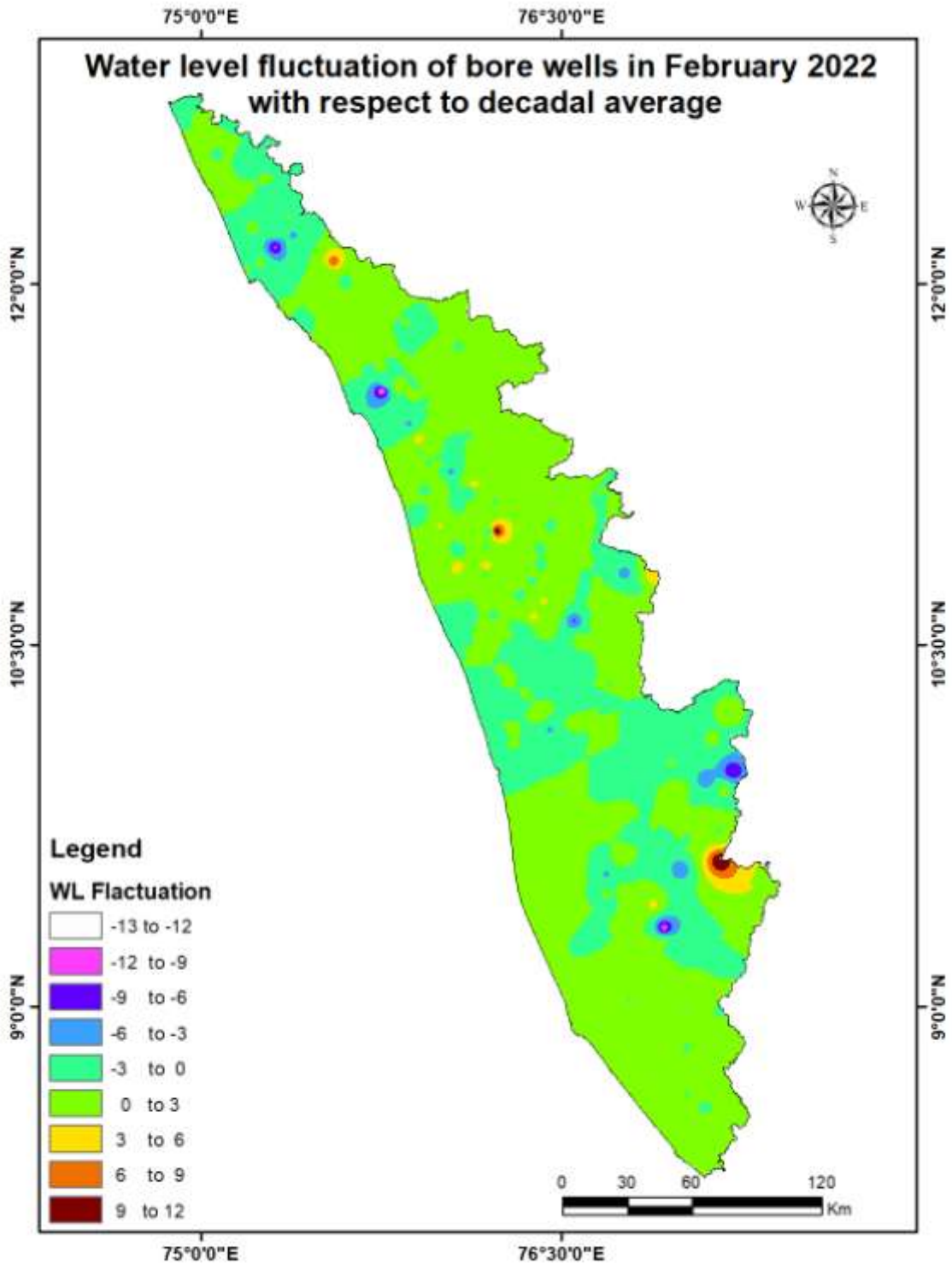


Fig:7. Comparison of water level in Dug wells during February 2022 wrt Decadal mean

Compared water level in the observation bore wells during February 2022 with that of the decadal mean. It has been noticed that 34% of bore wells show fall in water level, and 66% of the wells shows marginal rise, no remarkable change in water level. Out of 34% of the bore wells shows a falling trend, 43% shows a fall in water level less than 0.5m, 21 % show fall in the range between 0.5 - 1m, 10% show fall in the range between 1-1.5 m, 6 % of wells show a fall in range between 1.5 - 2m, 21% show a fall in water level more than 2 m. Table showing water level comparison of bore wells during February 2022 with respect to decadal mean is appended. (Annexure-III)



**Fig:8. Comparison of water level in Bore wells during February 2022wrt Decadal mean**

Comparison of the water level in the observation tube wells during February 2022 with that of the decadal mean reveals that 24 % of tube wells recorded a falling trend and 76 % of the tube wells show marginal rise/no remarkable change in water level. Out of 24 % of the tube wells shows a falling trend, 80% of the tube wells show fall in water level less than 0.5m and 10 % of wells show fall in the range 0.5-1 m and 10 % of wells show fall in the water level more than 2m. Table showing water level comparison of tube wells during February 2022 with respect to decadal mean is appended. (Annexure-III)

Dug wells showing more than 2m fluctuation are appended (annexure IV). Dug Well no. KTM-OW-11 at Poonjar, Kottayam show more than 2m fluctuation on comparison with the previous year's same month water level and with decadal average.

## Summary

### Rainfall

- The winter rainfall occurred in the state during 2021 (January - February) is 114.1mm, which is 410% large excess than that of the normal rainfall.
- The Actual winter rainfall (January-February) occurred in the state during 2022 is 14.9 mm, which is -33% deficient than that of the normal Rainfall (22.4 mm).
- Only Thiruvananthapuram District got more rain fall than the normal rain fall. All other districts got winter rain fall less than the district normal rain fall

### Groundwater level

- The depth to groundwater level in the observation dug wells during the month of February 2022 range from a minimum of -1 m to a maximum of 15.04mbgl, in bore wells -1 m to a maximum of 42.42mbgl and in the tubewells-0.80m to a maximum of 33.70mbgl.
- Comparison of groundwater level in February 2022 with respect to the previous year reveals that 51% of observation dug wells, 44 % of bore wells and 43 of tube wells recorded a falling trend. 47% of total observation wells (396 out of 830) show falling trend. 67% of the observation wells with falling trend (266 out of 396) show decline in water level less than 0.5 m.



- Comparison of the water level in February 2022 with the, decadal mean reveals that 21 % of observation dug wells (83 out of 389), 34% of bore wells (115 out of 340) and 24% of tube wells recorded a falling trend. 27% of all the observation wells (208 out of 771) show decline in water level. 53% of all the observation wells (111 out of 208) with falling trend show decline in water level less than 0.5 m.
- Dug wells showing decline of water level more than 2 m during long term analysis will be monitored closely. 7 nos of open wells show more than 2m fluctuation on comparison of water level during the month with the previous year's same month data and 4 nos open wells show more than 2m fluctuation on comparison of water level during the month with the decadal mean water level. Dug Well no. KTM-OW-11 at Poonjar, Kottayam show more than 2m fluctuation in both analyses.

**Districtwise Observation well Frequency on February 2022**

**Annexure I**

District	Well Type	No. of WL measured	DTWL(mbg l)		Location		Depth range of wells (mts)				
			Min	Max	Min	Max	0 to 2	2 to 5	5 to 10	10 to 20	>20
Thiruvananthapuram	Dug well	30	1.40	15.40	TVM OW01,Athiyannur,Thiruvananthapuram	TVM OW28,Kazhakkootam,Thiruvananthapuram	2	9	17	2	0
	Bore well	30	0.44	16.83	3,Perumkadavila,Thiruvananthapuram	25,Parassala,Thiruvananthapuram	2	4	17	7	0
	Tube well	4	3	9.56	36,Chirayinkeezhu,Thiruvananthapuram	37,Chirayinkeezhu,Thiruvananthapuram	0	1	3	0	0
Kollam	Dug well	24	1.30	9.32	OW-31,Neendakara,KOLLAM	OW_22,Kadakkal,KOLLAM	3	7	14	0	0
	Bore well	16	1.20	9.61	KLM/6,Kottarakkara Municipality,KOLLAM	KLM/8,Kadakkal,KOLLAM	1	1	14	0	0
	Tube well	9	3	33.75	KLM/25,Panmana,KOLLAM	KLM/29,Sasthamkotta,KOLLAM	0	2	3	1	3
Pathanamthitta	Dug well	73	0.60	11.26	10 Seethathode,Ranni,Pathanamthitta	20 Civil Station,Adoor Municipality,PATHANAMTHITTA	5	27	39	2	0
	Bore well	24	0.75	23.30	PTA/02,Kalanjoor,PATHANAMTHITTA	PTA/15,Chittar,PATHANAMTHITTA	2	8	9	4	1
Alappuzha	Dug well	20	0.19	11.63	OW-06 Pulinkunnu,Veliyanad,Alappuzha	OW-02 Kattanam,Bharanikkavu,Alappuzha	10	7	2	1	0
	Bore well	1	4.56	4.56	35 Pennukkara,Ala,ALAPPUZHA	35 Pennukkara,Ala,ALAPPUZHA	0	1	0	0	0
	Tube	30	-	17.29	25 Thaikkal,Cherthala	04	10	12	6	2	0

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	well		0.50		south,ALAPPUZHA	Charumoodu,Chunakkara,ALAPP UZHA					
Kottayam	Dug well	19	1.08	11.75	KTM-OW- 5,Kumarakom,Kottayam	KTM-OW-4_,Kottayam Municipality,Kottayam	4	5	8	2	0
	Bore well	20	0.05	22.44	10,Veliyannoor,Kottayam	03,Kanjirappally,Kottayam	3	7	7	2	1
Idukki	Dug well	20	0.70	8.06	73,Santhanpara,IDUKKI	IDK08,Kattappana Municipality,Kattappana	5	9	6	0	0
	Bore well	22	2.69	37.84	SO415,Udumbannoor,ID UKKI	SO428,Peermade,IDUKKI	0	6	8	4	4
Ernakulam	Dug well	60	0.32	10.64	E88,Chellanam,Ernakula m	SHE_OW19,Kalamassery Municipality,ERNAKULAM	12	18	29	1	0
	Bore well	25	0.37	11.33	BW 101,Asamannur,ERNAKU LAM	BW 116,Thrakkakara Municipality,ERNAKULAM	3	7	13	2	0
	Tube well	1	10.9 1	10.91	TW 01,Kochi Corporation,ERNAKULAM	TW 01,Kochi Corporation,ERNAKULAM	0	0	0	1	0
Thrissur	Dug well	31	1.19	14.53	TSROW16,Valapad,THRIS SUR	TSROW21,Poyya,THRISSUR	6	11	10	4	0
	Bore well	36	2.18	24.84	TSR119,Madakkathara,T HRISSUR	TSR136,Kandanassery,THRISSUR	0	6	14	13	3
Malappura m	Dug well	26	2.33	13.35	MPM.OW.18,Kondotty,M alappuram	MPM.OW23,Vengara,Malappur am	0	12	9	5	0
	Bore well	30	1.45	45.73	MPM185,Nilambur,Mala ppuram	MPM174,Areekode,Malappura m	1	10	10	5	4
Palakkad	Dug well	30	0.76	10.22	PKD S-2,Alathur,Palakkad	135,Mannarkad,Palakkad	2	15	11	2	0
	Bore well	33	2.10	21.18	160 PKD- 12,Kuzhalmannam,Palakk ad	145,Nemmara,Palakkad	0	7	10	13	3

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Kozhikkode	Dug well	33	1.38	13.50	QKKDO54,Chelannur,Kozhikode	QKKDO63,Kozhikode(corporation),Kozhikode	2	13	15	3	0
	Bore well	33	1.05	30.20	KKDPZ 197,Ramanattukara Municipality,Kozhikode	KKDPZ 210,Kozhikode (corporation ),Kozhikode	2	9	10	7	5
Wayanad	Dug well	26	0.06	11.62	SOW-10,Poothadi,WAYANAD	167,Panamaram,WAYANAD	5	6	13	2	0
	Bore well	19	1.96	22.55	WYD216,Muttill,WAYANAD	WYD223,Thirunelly,WAYANAD	1	2	6	9	1
Kannur	Dug well	36	1.25	17.18	KNR-POW-C14,Aralam,KANNUR	KNR-POW-C8,Chapparappadavu,KANNUR	6	5	18	7	0
	Bore well	27	1.69	23.64	KNRPz239,Thaliparamba, KANNUR	KNR-Pz228,Padiyoor,KANNUR	1	2	11	9	4
Kasaragod	Dug well	46	2.62	15.18	KSOW-22,Parappa,Kasaragod	200,Karadka,Kasaragod	0	6	23	17	0
	Bore well	21	3.43	24.86	PZKGD241,Parappa,Kasaragod	PZKGD242,Karadka,Kasaragod	0	1	6	11	3

## Comparison of Water level February 2022 with respect to February 2021

## Annexure II

District	Well Type	No. of WL Measured	Water level	Total	0 - 0.5 m	0.5 - 1 m	1-1.5m	1.5 - 2 m	>2 m
					No.	No.	No.	No.	No.
Thiruvananthapuram	Dug well	31	Rise	17	11	2	0	1	3
			Fall	14	8	2	2	1	1
	Bore well	36	Rise	28	19	6	2	0	1
			Fall	8	7	0	1	0	0
	Tube well	4	Rise	3	2	1	0	0	0
			Fall	1	1	0	0	0	0
Kollam	Dug well	24	Rise	15	11	2	0	0	2
			Fall	9	7	0	1	1	0
	Bore well	16	Rise	11	10	0	1	0	0
			Fall	5	4	1	0	0	0
	Tube well	9	Rise	7	1	2	1	0	3
			Fall	2	2	0	0	0	0
Pathanamthitta	Dug well	72	Rise	20	17	2	0	0	1
			Fall	52	40	7	2	2	1
	Bore well	24	Rise	10	6	2	1	0	1
			Fall	14	9	3	1	0	1
Alappuzha	Dug well	20	Rise	7	5	1	1	0	0
			Fall	13	11	2	0	0	0
	Bore well	1	Rise	0	0	0	0	0	0
			Fall	1	1	0	0	0	0
	Tube well	28	Rise	13	12	1	0	0	0
			Fall	15	13	1	0	1	0
Kottayam	Dug well	19	Rise	4	3	1	0	0	0
			Fall	15	9	3	1	0	2

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	Bore well	20	Rise	6	4	1	1	0	0
			Fall	14	9	2	1	1	1
Idukki	Dug well	20	Rise	10	8	0	2	0	0
			Fall	10	7	2	0	1	0
	Bore well	21	Rise	5	2	3	0	0	0
			Fall	16	2	7	3	0	4
Ernakulam	Dug well	36	Rise	8	7	1	0	0	0
			Fall	28	20	5	2	1	0
	Bore well	25	Rise	8	6	1	0	0	1
			Fall	17	11	2	0	1	3
	Tube well	1	Rise	1	1	0	0	0	0
			Fall	0	0	0	0	0	0
Thrissur	Dug well	31	Rise	19	13	4	0	1	1
			Fall	12	9	1	1	0	1
	Bore well	35	Rise	24	9	6	1	0	8
			Fall	11	4	1	3	1	2
Malappuram	Dug well	26	Rise	14	7	6	1	0	0
			Fall	12	6	5	0	1	0
	Bore well	30	Rise	18	12	3	0	0	3
			Fall	12	5	4	0	1	2
Palakkad	Dug well	31	Rise	23	14	8	1	0	0
			Fall	8	0	1	0	0	7
	Bore well	33	Rise	25	9	8	3	1	4
			Fall	8	5	2	0	0	1
Kozhikkode	Dug well	33	Rise	14	12	2	0	0	0
			Fall	19	17	0	1	1	0
	Bore well	33	Rise	14	8	5	0	0	1
			Fall	19	13	4	0	0	2
Wayanad	Dug well	26	Rise	21	11	5	2	0	3
			Fall	5	2	2	0	1	0

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	Bore well	19	Rise	15	13	1	0	0	1
			Fall	4	3	0	1	0	0
Kannur	Dug well	36	Rise	19	17	1	1	0	0
			Fall	17	13	2	1	0	1
	Bore well	27	Rise	15	9	3	0	2	1
			Fall	12	8	1	0	0	3
Kasaragod	Dug well	42	Rise	27	23	4	0	0	0
			Fall	15	10	2	0	2	1
	Bore well	21	Rise	13	4	4	2	3	0
			Fall	8	3	1	3	1	0

**Comparison of Water level February 2022 with respect to 10 yrs mean      Annexure III**

District	Well Type	No. of WL Measured	Water level	Total	0 - 0.5 m	0.5 - 1 m	1 - 1.5 m	1.5 - 2 m	<2 m
					No.	No.	No.	No.	No.
Thiruvananthapuram	Dug well	31	Rise	28	6	13	2	0	7
			Fall	3	1	0	1	1	0
	Bore well	34	Rise	29	10	9	7	0	3
			Fall	5	4	1	0	0	0
	Tube well	4	Rise	4	3	1	0	0	0
			Fall	0	0	0	0	0	0
Kollam	Dug well	24	Rise	18	7	8	2	0	1
			Fall	6	3	3	0	0	0
	Bore well	16	Rise	11	8	1	1	1	0
			Fall	5	5	0	0	0	0
	Tube well	9	Rise	8	1	2	0	0	5
			Fall	1	1	0	0	0	0
Pathanamthitta	Dug	13	Rise	10	10	0	0	0	0

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	well		Fall	3	3	0	0	0	0
	Bore well	24	Rise	19	10	5	2	0	2
			Fall	5	3	1	0	0	1
	Dug well	18	Rise	15	9	6	0	0	0
			Fall	3	3	0	0	0	0
	Bore well	1	Rise	0	0	0	0	0	0
			Fall	1	0	1	0	0	0
Alappuzha	Tube well	28	Rise	20	12	5	1	1	1
			Fall	8	7	0	0	0	1
	Dug well	19	Rise	10	6	3	1	0	0
			Fall	9	3	2	1	1	2
Kottayam	Bore well	20	Rise	14	9	2	2	1	0
			Fall	6	2	1	2	0	1
	Dug well	20	Rise	18	8	7	3	0	0
			Fall	2	2	0	0	0	0
Idukki	Bore well	22	Rise	10	3	4	1	0	2
			Fall	12	3	6	0	0	3
	Dug well	36	Rise	20	17	2	1	0	0
			Fall	16	10	6	0	0	0
	Bore well	23	Rise	12	11	0	0	0	1
			Fall	11	7	2	1	0	1
Ernakulam	Tube well	1	Rise	0	0	0	0	0	0
			Fall	1	0	1	0	0	0
	Dug well	31	Rise	28	23	5	0	0	0
			Fall	3	2	0	0	1	0
Thrissur	Bore well	37	Rise	20	8	6	2	1	3
			Fall	17	4	5	2	2	4
	Dug well	26	Rise	21	6	7	8	0	0
			Fall	5	4	1	0	0	0
Malappuram	Bore	30	Rise	20	7	7	2	1	3



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	well		Fall	10	5	0	0	1	4
Palakkad	Dug well	31	Rise	27	11	10	4	0	2
			Fall	4	2	1	1	0	0
	Bore well	33	Rise	23	2	7	3	3	8
			Fall	10	2	3	1	1	3
Kozhikkode	Dug well	33	Rise	30	18	10	1	0	1
			Fall	3	2	0	0	0	1
	Bore well	33	Rise	22	14	6	0	0	2
			Fall	11	5	2	1	0	3
Wayanad	Dug well	26	Rise	22	9	8	2	1	2
			Fall	4	2	0	2	0	0
	Bore well	19	Rise	17	11	3	2	1	0
			Fall	2	1	0	0	0	1
Kannur	Dug well	36	Rise	22	14	6	1	0	1
			Fall	14	13	0	0	1	0
	Bore well	27	Rise	17	10	4	0	2	1
			Fall	10	4	1	1	1	3
Kasaragod	Dug well	45	Rise	37	19	9	6	1	2
			Fall	8	4	3	0	0	1
	Bore well	21	Rise	11	3	6	2	0	0
			Fall	10	4	1	3	2	0

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Water Level Data & Fluctuation( more than 2m fall) Annexure IV															
SN o	District	Block	GP/Municipality/Corporation	WellNo	Well_Type	Latitude(° )	Longitude(° )	Feb-2022	Feb-2021	Feb-2020	Decadal Avg(2012-2021)		Fluctuation in Feb-2022 wrt.		
											WL	Yrs	Feb-2021	Feb-2020	Decadal Avg
1	Thiruvananthapuram	Chirayinkeezhu	Kazhakkootam	TVMOW28	Dug Well	8.61333	76.83778	15.405	12.820	15.690	15.024	10	<b>-2.585</b>	0.285	-0.381
2	PATHANA MTHITTA	Mallappally	Thiruvalla Municipality	54 Civil Thiruvalla	Dug Well	9.38152	76.56963	8.630	5.930	8.820	7.375	2	<b>-2.700</b>	0.190	-1.255
3	Kottayam	Erattupetta	Poonjar	KTM-OW-11	Dug Well	9.67236	76.79691	4.830	2.570	4.490	2.115	10	<b>-2.260</b>	0.340	<b>-2.715</b>
4	Kottayam	Pallom	Kottayam Municipality	KTM-OW_6	Dug Well	9.58197	76.52125	11.740	10.310	9.980	9.206	10	-1.430	1.760	<b>-2.534</b>
5	Kottayam	vazhoor	Vellavoor	KTM-OW-17	Dug Well	9.49439	76.75077	8.780	5.830	8.830	9.534	9	<b>-2.950</b>	0.050	0.754
6	THRISSUR	Thrissur	Cherpu	TSROW22	Dug Well	10.44194	76.21056	10.410	7.340	10.700	10.491	10	<b>-3.070</b>	0.290	0.081
7	KANNUR	Iritty	Mattannur Municipality	KNR-MOW173	Dug Well	11.93056	75.57219	10.510	8.030	11.830	8.956	10	<b>-2.480</b>	1.320	-1.554
8	Kasaragod	Manjeshwar	Manjeshwar	208	Dug Well	12.75139	74.93333	10.910	8.740	10.320	8.154	10	<b>-2.170</b>	0.590	<b>-2.756</b>
9	Kozhikode	Kozhikode	Kozhikode(corporation)	QKKDO63	Dug Well	11.28528	75.79556	13.500	11.750	8.530	10.627	10	-1.750	4.970	<b>-2.873</b>

**Observation well frequency on February 2022**

**Abstract I**

Well Type	No of WL measured	DTWL (mbgl)		Location		Depth range of wells (m)				
		min	max	min	max	0 to 2	2 to 5	5 to 10	10 to 20	>20
Dug well	474	0.06	17.18	SOW-10,Poothadi,WAYANAD	KNR-POW-C8,Chapparappadavu,KANNUR	62 13.08%	150 31.65%	214 45.15%	48 10.13%	0 0.00%
Bore well	337	-0.05	45.73	10,Veliyannoor,Kottayam	MPM174,Areekode,Malappuram	16 4.75%	71 21.07%	135 40.06%	86 25.52%	29 8.61%
Tube well	44	-0.5	33.75	25 Thaikkal,Cherthala south,ALAPPUZHA	KLM/29,Sasthamkotta,KOLLAM	10 22.73%	15 34.09%	12 27.27%	4 9.09%	3 6.82%

**Comparison of Water level February 2022 with respect to February 2021**

**Abstract II**

Well type	No. of WL Measured	Water level	Total	0 - 0.5 m	0.5 - 1 m	1 - 1.5 m	1.5 - 2 m	>2 m
Dug well	447	Rise	218	159	39	8	2	10
		%	49%	73%	18%	4%	1%	5%
		Fall	229	166	33	11	12	7
		%	51%	72%	14%	5%	5%	3%
Bore well	341	Rise	192	111	43	11	6	21
		%	56%	58%	22%	6%	3%	11%
		Fall	149	84	28	13	5	19
		%	44%	56%	19%	9%	3%	13%
Tube well	42	Rise	24	16	4	1	0	3
		%	57%	67%	17%	4%	0%	13%
		Fall	18	16	1	0	1	0
		%	43%	90%	5%	0%	5%	0%

## Comparison of Water level February 2022 with respect to 10 yrs mean

## Abstract III

Well type	No. of WL Measured	Water level	Total	0 - 0.5 m	0.5 - 1 m	1 - 1.5 m	1.5 - 2 m	>2 m
Dug well	389	Rise	306	163	94	31	2	16
		%	79%	53%	31%	10%	1%	5%
		Fall	83	54	16	5	4	4
		%	21%	65%	19%	6%	5%	5%
Bore well	340	Rise	225	106	60	24	10	25
		%	66%	47%	27%	11%	4%	11%
		Fall	115	49	24	11	7	24
		%	34%	43%	21%	10%	6%	21%
Tube well	42	Rise	32	16	8	1	1	6
		%	76%	50%	25%	3%	3%	19%
		Fall	10	8	1	0	0	1
		%	24%	80%	10%	0%	0%	10%