GOVERNMENT OF KERALA
GROUNDWATER DEPARTMENT

GROUNDWATER LEVEL MONITORING REPORT – AUGUST 2020

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 3000 mm. 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 2019 is 13.1 mm, which is 46% deficient than that of the normal Rainfall (24.4 mm). The state received 169.1mm pre-monsoon rainfall during 2019, which is 55.5% deficient with that of the normal rainfall (379.70mm). During June-August 2019, the state received 1869.9 mm rainfall, which is 5% more than that of the actual rainfall (1780.5mm).

While the winter rainfall occurred in the state during 2020 (January - February) is 9.6mm, which is 57% deficient than that of the Normal Rainfall. But the pre-monsoon rainfall occurred in the state during 2020 is 387.5mm, which is 7% more than that of the normal rainfall in this season. During June-August 2020 the state received normal rainfall (1766.5 mm)

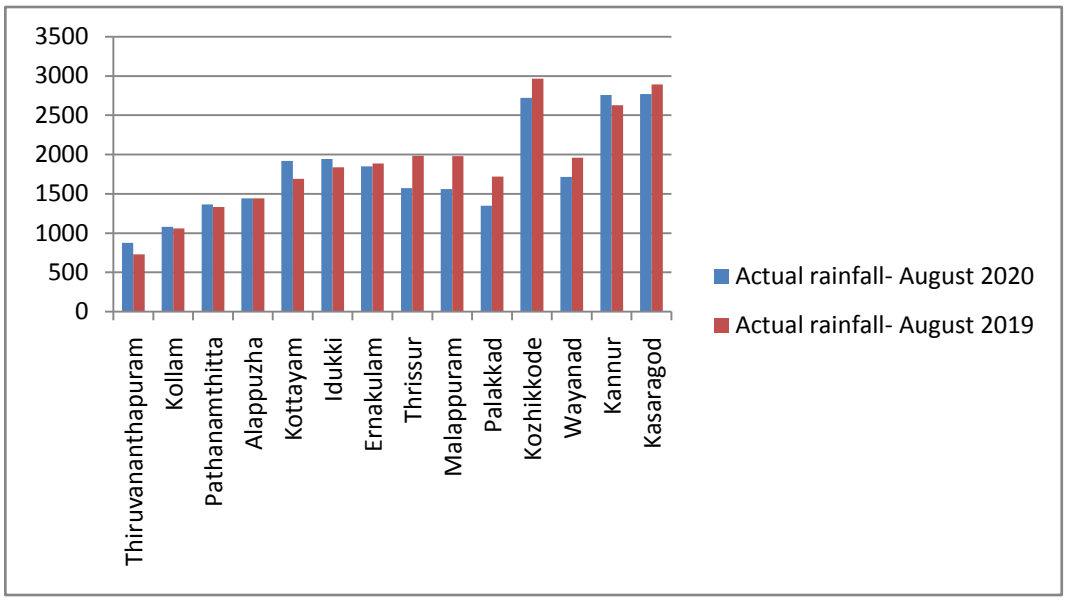


Fig:1. Comparison of actual rainfall occurred during August 2020 wrt 2019

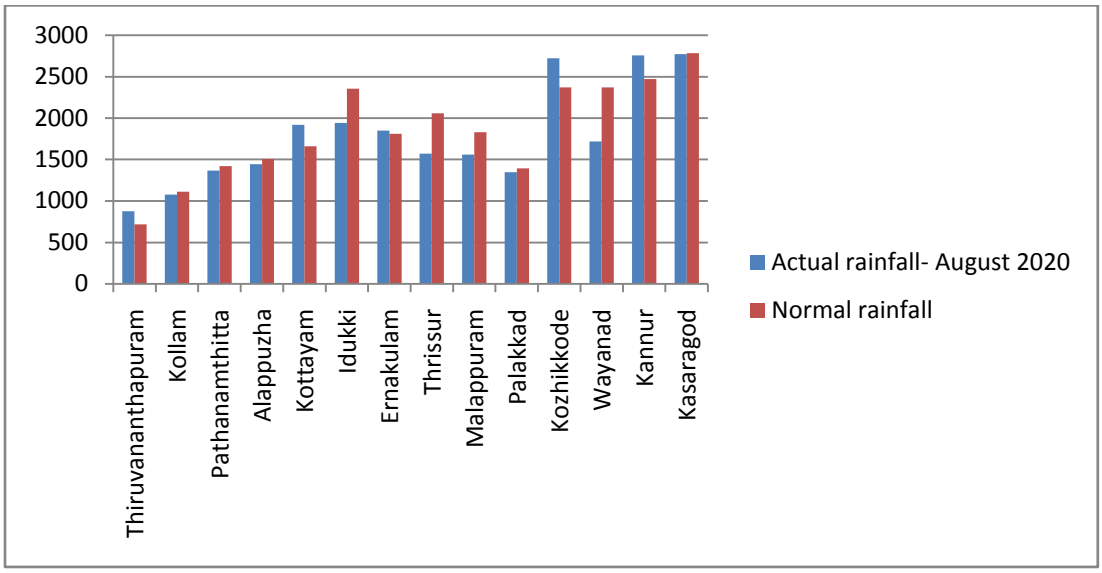


Fig:2. Comparison of actual rainfall occurred during August 2020 wrt Normal Rainfall

Geology: Kerala, the southernmost state of Indian peninsula, is having a geographical area of 38863 km^2. 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 hydrogeological units. Observation wells includes dug wells (owned by public and private) and purpose built piezometers (bore wells and tube wells). Water level data has been collected monthly and water samples collected and analysis done periodically.

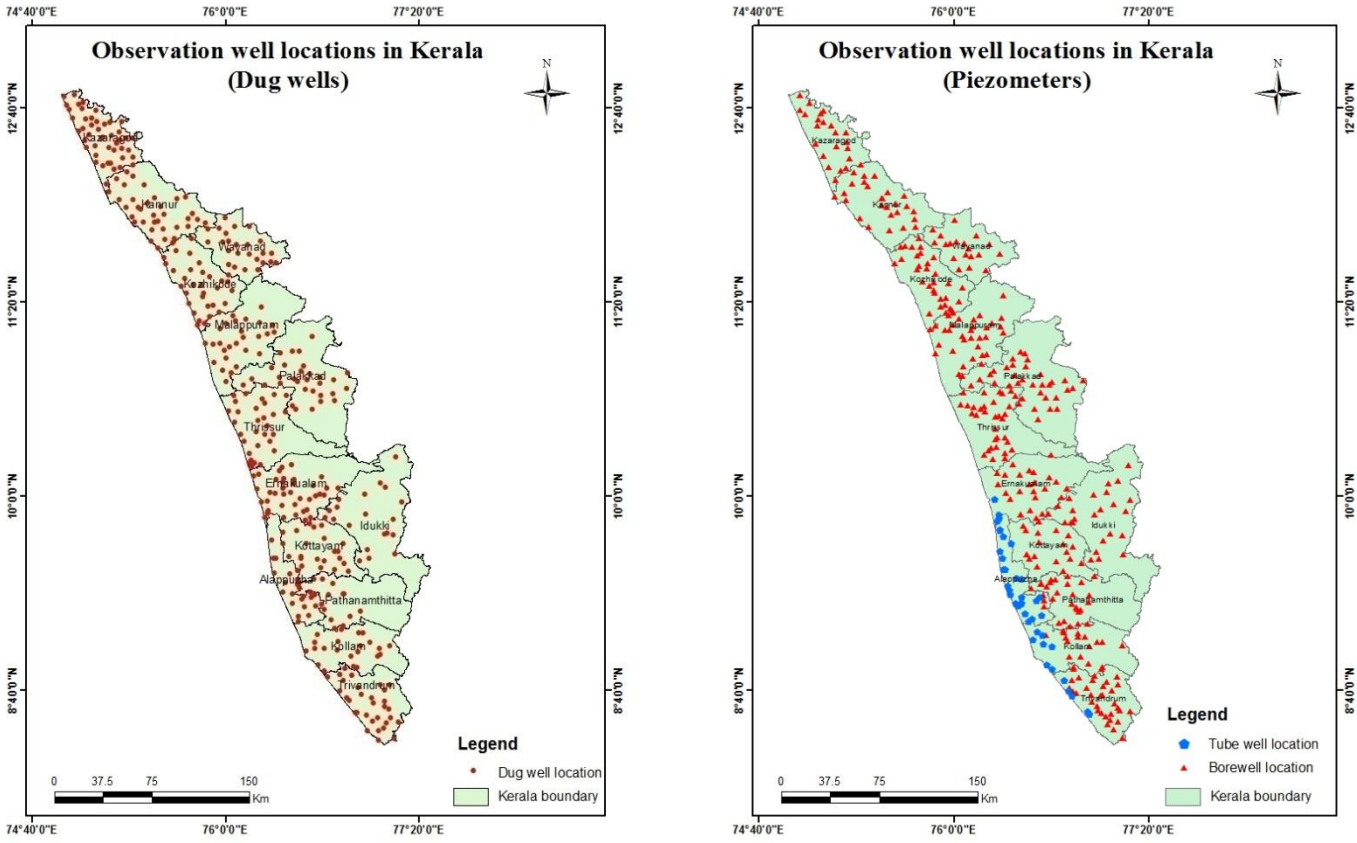


Fig:3. Location map of observation dug wells and piezometers (bore wells & tube wells)

Analysis of Groundwater level data – August 2020

During the month of August 2020, groundwater level in 364 dug wells and 388 purpose built piezometers (bore wells- 332 and tube wells – 56) has been monitored. The data collected from the observation wells during the month of August 2020 has been compared with previous year's corresponding month and also with respect to decadal mean of the corresponding month to assess the groundwater scenario in the state.

I. Depth to Groundwater level during August 2020

Dug wells- The depth to groundwater level in the observation dug wells during the month of August 2020 ranges from a minimum of -0.02 m to a maximum of 14.8 mbgl. Out of 364 dug wells monitored water level in 39% of dug wells shows a depth to water level ranges from 0-2 m, 38% ranges between 2-5 m, 20% ranges between 5-10 m and 3% dug wells recorded depth to water level ranges between 10-20 mbgl. Table showing well frequency during August 2020 is appended. (Annexure-I)

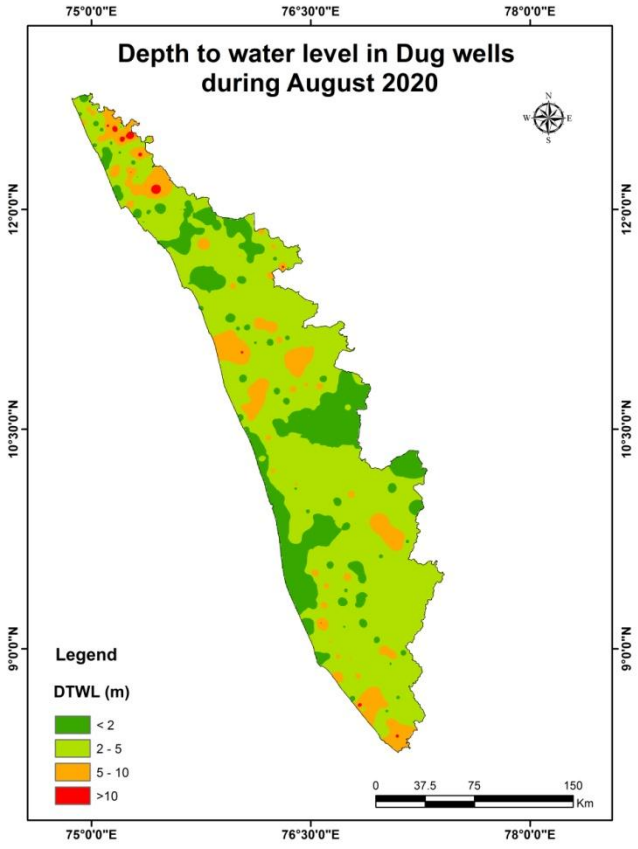


Fig:4. Depth to water level in Dug wells during August 2020

Borewells (hardrock terrain):- The depth to groundwater level in the observation bore wells during the month of August 2020 ranges from a minimum of -0.24 m to a maximum of 41.29 mbgl. Out of 332 bore wells monitored, water level in 19% of bore wells shows a depth to water level range from 0-2 m, 33 % ranges between 2-5 m, 31% ranges between 5-10 m, 13% of bore wells ranges between 10-20 m, and 4% ranges more than 20 m . Table showing well frequency during August 2020 is appended. (Annexure-I)

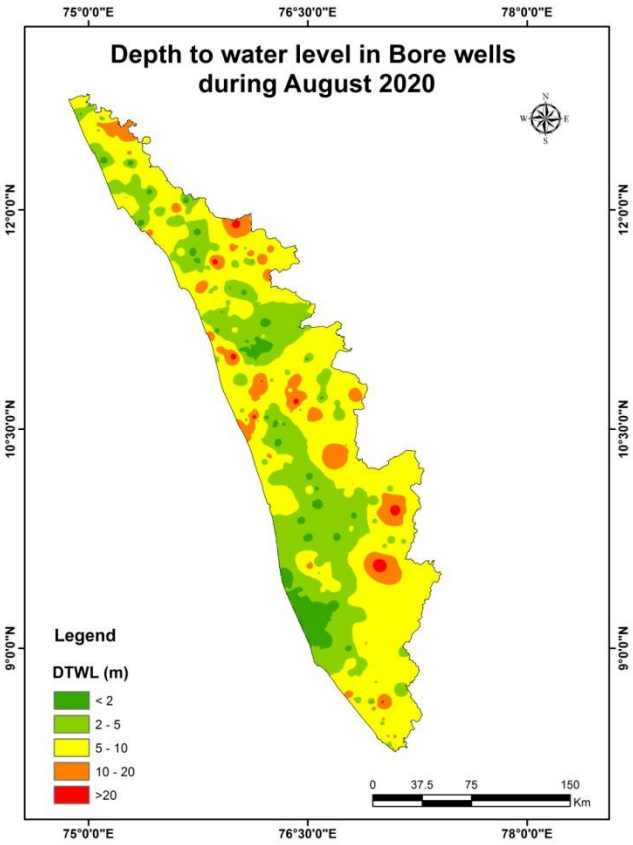


Fig:5. Depth to water level in Bore wells during August 2020

Tube wells (coastal sedimentary terrain) - The depth to groundwater level in the observation tube wells during the month of August 2020 range from a minimum of -0.14 m to a maximum of 34.49 mbgl . Out of 56 tube wells monitored in the state, water level in 45 % of tube wells shows a depth to water level range from 0-2m, 30% of tube wells ranges between 2-5 m, 13 % of tube wells ranges between 5-10 m , 7% ranges between 10-20 m and 5% ranges more than 20m.Table showing well frequency is appended.(Annexure-I)

II. Comparison of Groundwater level in August 2020 with respect to August 2019

Comparison of the groundwater level in August 2020 with respect to the corresponding month in the previous year, indicates that 22 % of observation dug wells show a fall in water level and 78 % of the wells shows no remarkable change /marginal rise in water level. Out of 22% of the dug wells shows a falling trend, majority (54%) recorded fall in water level less than 0.5m , 27 % of dug wells show fall in the range between 0.5-1m ,11 % of dug wells show fall in the range between 1-1.5 m, 4% of dug wells show a fall in the range between 1.5 - 2m, 3% dug wells show a fall in water level between 2 - 2.5m and 1% dug wells show a fall in water level between 3.5-4 m. Table showing water level comparison of dug wells during August 2020 with respect to August 2019 is appended. (Annexure-II).

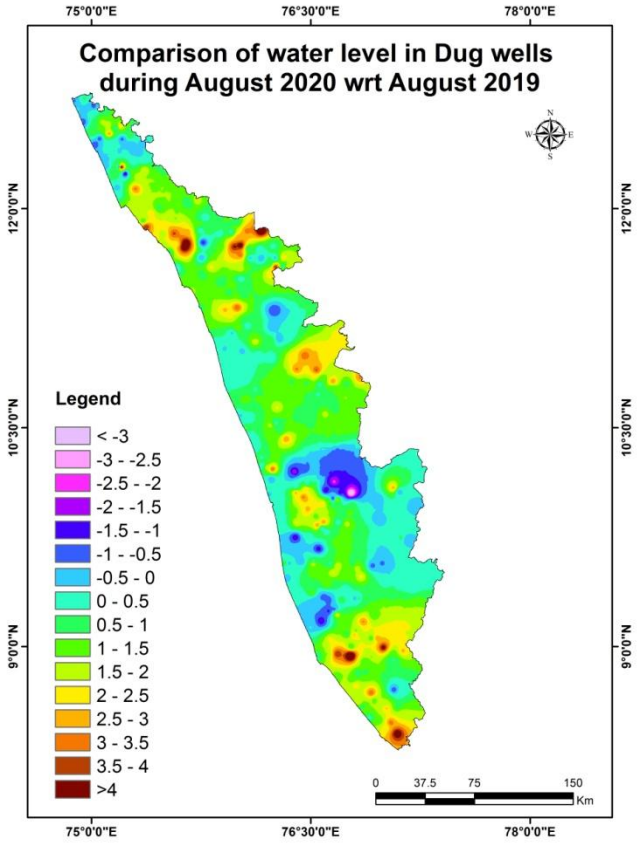


Fig:6. Comparison of water level in Dug wells during August 2020 wrt August 2019

Comparison of the water level in observation bore wells (hard rock terrain in midland and high land areas) in August 2020 with that of the previous year, it has been noticed that 16% of bore wells show fall in water level and 84 % of the wells shows no remarkable change / marginal rise in water level. Out of 16 % of the bore wells shows a falling trend , 42 % of the

bore wells recorded fall in water level less than 0.5m, 21 % show fall in the range between 0.5 - 1m, 13 % of bore wells show fall in the range between 1 - 1.5m, 6 % of bore wells show a fall in range between, 1.5-2m, 6% of bore wells show a fall in range between 2- 2.5m, 2% of bore wells show a fall in range between 2.5-3m, 4% of bore wells show a fall in range between 3.5-4m and 6% of bore wells show a fall in water level more than 4m. Table showing water level comparison of bore wells during August 2020 with respect to August 2019 is appended. (Annexure-II)

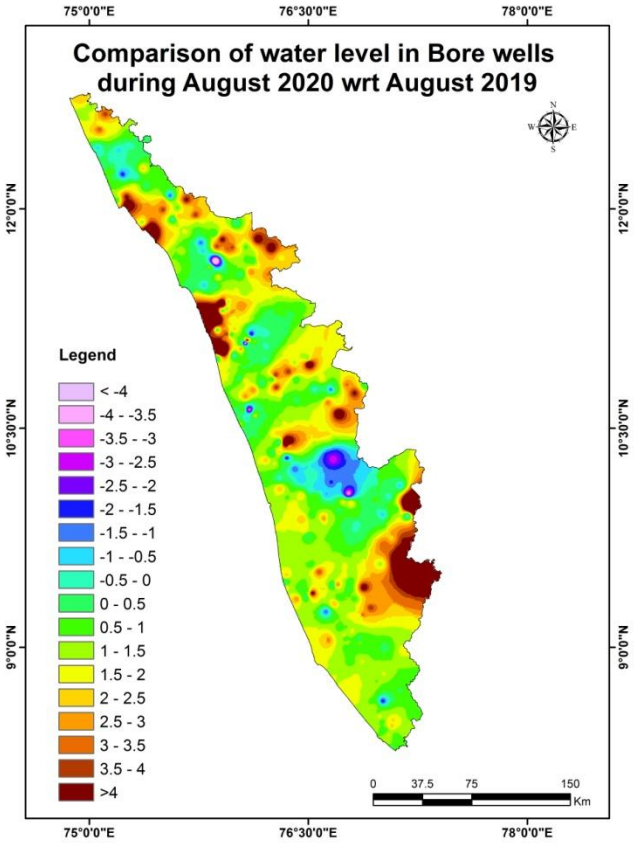


Fig:7. Comparison of water level in Bore wells during August 2020 wrt August 2019

Comparison of the water level in observation tube wells (in the coastal sedimentary areas) during August 2020 with that of the previous year reveals that 44 % of tube wells recorded a falling trend and 56 % of the wells shows no remarkable change /marginal rise of water level. Out of 44% of the tube wells showing a falling trend, 86% wells recorded fall in water level less than 0.5m and 14% wells shows a fall in range between 0.5 to 1m. Table showing comparison of water level during August 2020 with respect to August 2019 is appended. (Annexure-II)

III. Comparison of Groundwater level in August 2020 with respect to Decadal mean (2010- 19)

Comparison of the water level in August 2020 with respect to the decadal mean, it has been noticed that 15 % of observation dug wells recorded a fall in water level and 85% of the wells shows marginal rise /no remarkable change in water level. Out of 15% of the dugwells shows a falling trend, 66% of the dug wells recorded fall in water level less than 0.5m, 22% show fall in the range between 0.5-1m, 6% of dug wells show fall in the range between 1-1.5m, 4 % of dug wells show a fall in range between 1.5-2m and 2% of dug wells show a fall in range between 2 - 2.5m. Table showing water level comparison of dug wells during August 2020 with respect to decadal mean is appended. (Annexure-III)

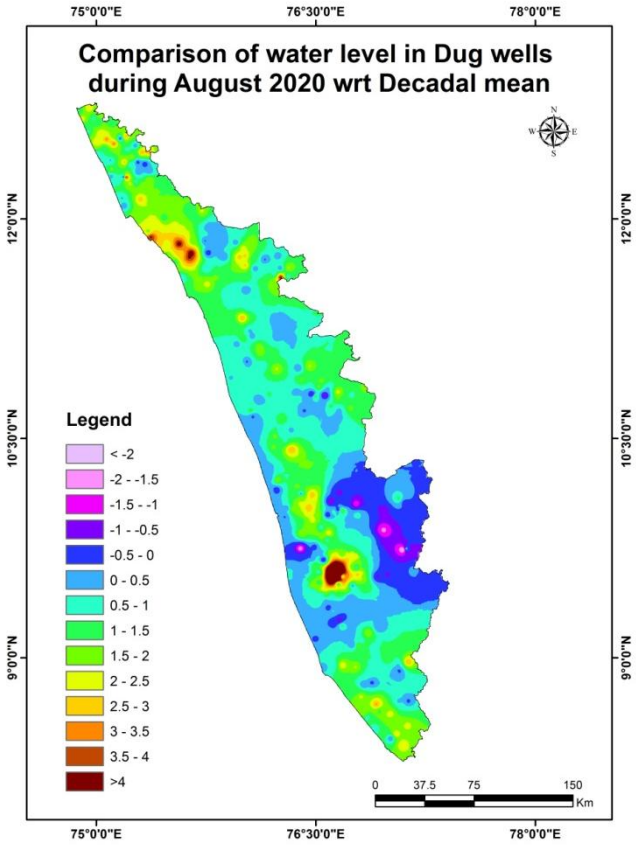


Fig:7. Comparison of water level in Dug wells during August 2020 wrt Decadal mean

Comparison of the water level in the observation bore wells during August 2020 with that of the decadal mean. It has been noticed that 23% of bore wells show fall in water level, and 77% of the wells shows marginal rise, no remarkable change in water level. Out of 23 % of the bore wells shows a falling trend , 37 % shows a fall in water level less than 0.5m, 17 % show

fall in the range between 0.5 - 1m, 16% show fall in the range between 1-1.5 m, 8% of wells show a fall in range between 1.5 - 2m ,4% show a fall in range between 2-2.5 m, 1% of bore wells show a fall in range between 2.5-3 m ,1% of bore wells show a fall in range between 3-3.5m, 3% of bore wells show a fall in range between 3.5-4m and 12% of bore wells show a fall in water level more than 4 m. Table showing water level comparison of bore wells during August 2020 with respect to decadal mean is appended. (Annexure-III)

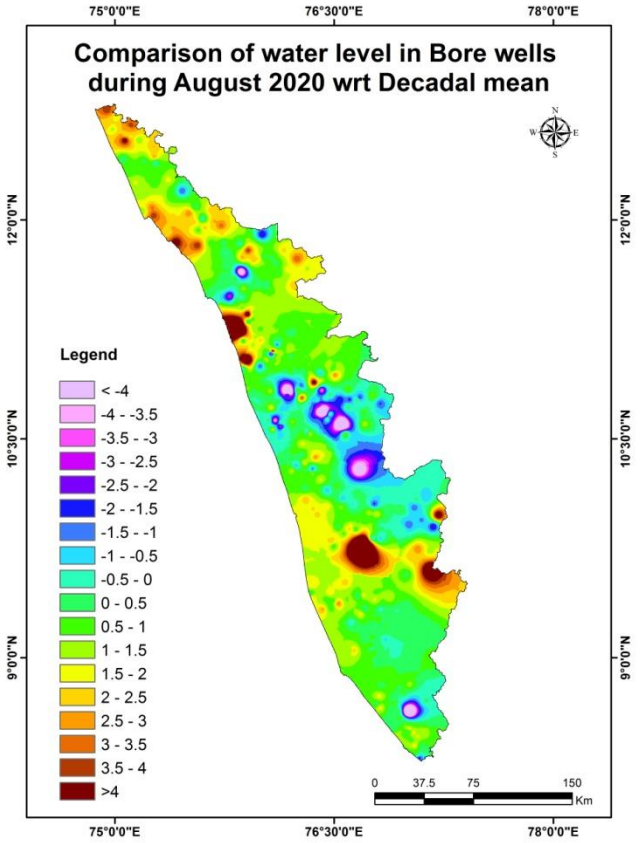


Fig:8. Comparison of water level in Bore wells during August 2020 wrt Decadal mean

Comparison of the water level in the observation tube wells during August 2020 with that of the decadal mean reveals that 33 % of tube wells recorded a falling trend and 67 % of the tube wells show marginal rise/no remarkable change in water level. Out of 33 % of the tube wells shows a falling trend, 64% of the tube wells show fall in water level less than 0.5m, 18% of tube wells show fall in the range between 0.5 - 1m, 9% show fall in the range between 1-1.5 m and 9% of wells show a fall in range between 1.5 - 2m. Table showing water level comparison of

tube wells during August 2020 with respect to decadal mean is appended. (Annexure-III)

Summary

Rainfall

- The state received 169.1mm pre-monsoon rainfall during 2019, which is 55.5% deficient with that of the normal rainfall (379.70mm).
- The pre-monsoon rainfall occurred in the state during 2020 is 387.5mm, which is 7% more than that of the normal rainfall in this season.
- During June-August 2020 the state received normal rainfall (1766.5 mm).

Groundwater level

- The depth to groundwater level in the observation dug wells during the month of August 2020 range from a minimum of -0.02 m to a maximum of 14.8 mbgl , in bore wells -0.24 m to a maximum of 41.29 mbgl and in the tube wells -0.14 m to a maximum of 34.49 mbgl.
- Comparison of the water level in August 2020 with respect to the previous year, reveals that 22 % of observation dug wells, 16 % of bore wells and 44% of tube wells recorded a falling trend. Among the wells showing decline in water level, majority of the observation wells show decline in water level less than 0.5 m.
- Comparison of groundwater level in August 2020 with respect to the decadal mean reveals that 15 % of observation dug wells, 23 % of bore wells and 33% of tube wells recorded a falling trend. Majority of the observation dug wells and tube wells show decline in water level less than 0.5 m.
- Wells showing decline of water level more than 4 m during long term analysis will be monitored closely.
- Most of the wells in the state get recharged in this year from the sufficient rainfall occurred during the monsoon months.

Districtwise Observation well Frequency on August 2020 **Annexure I**

District	Well Type	No. of WL measured	DTWL(mbgl)		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	22	0.55	12.7	Sarkara-Chirayinkeezhu	Veiloor-Murukkumpuzha	3	10	7	2	0
	Bore well	28	0.35	21.47	Peringamala (Venkolla)	Anad	2	8	11	6	1
	Tube well	4	2.55	6.05	Azhoor	Sarkara-Chirayinkeezhu	0	2	2	0	0
Kollam	Dug well	22	0.55	7.28	Neendakara	Thenmala	7	8	7	0	0
	Bore well	14	0	10.47	Kottarakkara	Vilakudy	1	6	6	1	0
	Tube well	7	2.31	34.49	Panmana	Mynagappally	0	2	1	1	3
Pathanamthitta	Dug well	14	0.26	5.93	Peringara	Kunnamthanam	6	7	1	0	0
	Bore well	25	0.13	13.5	Kidangannoor	Ezhamkulam	7	8	9	1	0
Alappuzha	Dug well	20	-0.14	10.36	Nedumudi	Kattanam	13	5	1	1	0
	Bore well	1	2.7	2.7	Venmony	Venmony	0	1	0	0	0
	Tube well	44	-0.14	16.98	Nedumudi	Charummoodu	25	13	3	3	0
Kottayam	Dug well	19	-0.1	8.3	Koottikkal	Panachikkad	9	8	2	0	0
	Bore well	24	-0.42	15.8	Erumeli North	Muttampalam	11	8	3	2	0

	Dug well	19	1.02	9.7	Udumbanchola	Ayyappancoil	5	11	3	0	0
Idukki	Bore well	22	1.24	29.5	Udumbannoor	Rajakkad	3	10	5	2	2
	Dug well	38	0.13	6.07	Chellanam	Neriyamangalam	17	17	4	0	0
	Bore well	23	-0.54	8.9	Velloorkunnam(vazhapilly)	Rayamangalam	4	12	7	0	0
Ernakulam	Tube well	1	9.52	9.52	Cochin	Cochin	0	0	1	0	0
	Dug well	24	0	9.1	Valappad	Kunnamkulam	12	7	5	0	0
Thrissur	Bore well	36	-0.24	27.19	Madakkathara	Vadakkethara	5	13	11	5	2
	Dug well	23	0.44	10.65	Kavanoor	Othukkungal	7	8	7	1	0
Malappuram	Bore well	28	0	41.29	Wandoor	Areekode	9	10	3	3	3
	Dug well	29	0.07	7.84	Kozhinjampara	Parli	11	10	8	0	0
Palakkad	Bore well	32	0.84	21.55	Pottassery-II	Pattambi	2	8	16	5	1
	Dug well	34	0.11	9.38	Perambra	Vanimel	13	15	6	0	0
Kozhikkode	Bore well	33	-0.25	26.6	Ramanattukara	Chempanoda	6	13	9	4	1
	Dug well	26	0.05	11.55	Kunnathidavaka	Cheeral	11	9	5	1	0
Wayanad	Bore well	19	1.19	23.43	Muttil North	Thirunelly	2	3	7	6	1
	Dug well	30	-0.1	13.11	Malapattam	Kooveri	15	9	5	1	0
Kannur	Bore well	26	0.15	20.87	Vayathur	Kalliad	6	7	11	1	1

Kasaragod	Dug well	44	-0.02	14.8	Periya	Bandadka	14	14	10	6	0
	Bore well	21	-0.4	15.54	Beemanady	Bandadka	4	4	7	6	0

Comparison of Water level Aug 2020 with respect to Aug 2019 **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 - 2.5 m	2.5 - 3 m	3 - 3.5 m	3.5 - 4 m	>4 m
					No.	No.	No.	No.	No.	No.	No.	No.	No.
Thiruvananthapuram	Dug well	20	Rise	19	4	2	3	4	2	1	2	0	1
			Fall	1	0	1	0	0	0	0	0	0	0
	Bore well	27	Rise	26	5	6	5	7	3	0	0	0	0
			Fall	1	0	0	0	0	1	0	0	0	0
	Tube well	4	Rise	3	1	0	1	0	0	0	1	0	0
			Fall	1	1	0	0	0	0	0	0	0	0
Kollam	Dug well	22	Rise	22	3	4	8	0	1	3	0	0	3
			Fall	0	0	0	0	0	0	0	0	0	0
	Bore well	13	Rise	12	3	3	3	3	0	0	0	0	0
			Fall	1	1	0	0	0	0	0	0	0	0
	Tube well	7	Rise	6	1	3	1	0	0	0	0	0	1
			Fall	1	1	0	0	0	0	0	0	0	0
Pathanamthitta	Dug well	14	Rise	13	1	5	4	1	1	0	1	0	0
			Fall	1	1	0	0	0	0	0	0	0	0
	Bore well	25	Rise	24	3	6	3	3	2	2	1	0	4
			Fall	1	1	0	0	0	0	0	0	0	0
Alappuzha	Dug well	15	Rise	2	1	1	0	0	0	0	0	0	0
			Fall	13	8	3	1	1	0	0	0	0	0
	Bore well	1	Rise	0	0	0	0	0	0	0	0	0	0
			Fall	1	0	0	1	0	0	0	0	0	0
	Tube well	20	Rise	8	8	0	0	0	0	0	0	0	0
			Fall	12	10	2	0	0	0	0	0	0	0

	Dug well	19	Rise	14	3	2	4	2	2	1	0	0	0
			Fall	5	3	0	2	0	0	0	0	0	0
	Bore well	23	Rise	21	6	3	2	4	1	1	3	1	0
Kottayam			Fall	2	2	0	0	0	0	0	0	0	0
	Dug well	19	Rise	11	4	4	1	1	0	1	0	0	0
			Fall	8	5	3	0	0	0	0	0	0	0
	Bore well	22	Rise	16	6	2	2	0	2	0	1	0	3
Idukki			Fall	6	4	2	0	0	0	0	0	0	0
	Dug well	38	Rise	28	11	2	2	3	4	3	3	0	0
			Fall	10	1	3	2	1	2	0	0	1	0
	Bore well	22	Rise	13	2	4	1	2	2	2	0	0	0
			Fall	9	2	1	4	1	0	0	0	1	0
	Tube well	1	Rise	1	0	0	1	0	0	0	0	0	0
Ernakulam			Fall	0	0	0	0	0	0	0	0	0	0
	Dug well	24	Rise	22	7	5	5	1	2	1	0	1	0
			Fall	2	2	0	0	0	0	0	0	0	0
	Bore well	36	Rise	29	8	7	5	2	5	1	0	0	1
Thrissur			Fall	7	3	1	0	0	1	1	0	1	0
	Dug well	23	Rise	17	11	2	3	0	1	0	0	0	0
			Fall	6	4	1	1	0	0	0	0	0	0
	Bore well	28	Rise	19	9	1	3	0	2	0	1	1	2
Malappuram			Fall	9	5	1	0	0	1	0	0	0	2
	Dug well	29	Rise	29	4	8	8	2	2	0	4	1	0
			Fall	0	0	0	0	0	0	0	0	0	0
	Bore well	32	Rise	30	7	3	6	4	0	1	3	1	5
Palakkad			Fall	2	1	0	0	1	0	0	0	0	0
	Dug well	17	Rise	15	2	7	1	1	2	1	0	1	0
			Fall	2	1	0	1	0	0	0	0	0	0
	Bore well	33	Rise	28	8	3	6	4	1	1	2	1	2
Kozhikkode			Fall	5	1	2	1	0	0	0	0	0	1

Wayanad	Dug well	26	Rise	22	7	3	1	2	2	1	2	0	4
			Fall	4	3	1	0	0	0	0	0	0	0
	Bore well	19	Rise	19	5	1	2	2	1	0	2	3	3
			Fall	0	0	0	0	0	0	0	0	0	0
Kannur	Dug well	24	Rise	24	4	1	4	5	3	1	2	1	3
			Fall	0	0	0	0	0	0	0	0	0	0
	Bore well	25	Rise	22	2	4	2	3	4	1	0	2	4
			Fall	3	1	1	1	0	0	0	0	0	0
Kasaragod	Dug well	44	Rise	22	9	5	3	1	2	0	1	0	1
			Fall	22	12	8	1	1	0	0	0	0	0
	Bore well	20	Rise	15	3	3	3	2	1	1	0	2	0
			Fall	5	1	3	0	1	0	0	0	0	0

Comparison of Water level Aug 2020 with respect to 10 yrs mean **Annexure III**

District	Well Type	No. of Well Measured	Water level	Total	0 - 0.5 m	0.5 - 1 m	1 - 1.5 m	1.5 - 2 m	2 - 2.5 m	2.5 - 3 m	3 - 3.5 m	3.5 - 4 m	>4 m
					No.	No.	No.	No.	No.	No.	No.	No.	No.
Thiruvananthapuram	Dug well	22	Rise	18	2	2	3	4	6	0	1	0	0
			Fall	4	4	0	0	0	0	0	0	0	0
	Bore well	28	Rise	23	8	4	4	6	1	0	0	0	0
			Fall	5	3	0	0	0	1	0	0	0	1
	Tube well	4	Rise	4	2	1	0	0	0	1	0	0	0
			Fall	0	0	0	0	0	0	0	0	0	0
Kollam	Dug well	22	Rise	19	5	6	4	1	2	1	0	0	0
			Fall	3	3	0	0	0	0	0	0	0	0
	Bore well	14	Rise	10	3	5	2	0	0	0	0	0	0
			Fall	4	4	0	0	0	0	0	0	0	0
	Tube well	7	Rise	1	0	0	0	0	0	0	0	0	1
			Fall	6	2	2	1	1	0	0	0	0	0
Pathanamthitta	Dug well	8	Rise	7	1	3	2	1	0	0	0	0	0
			Fall	1	1	0	0	0	0	0	0	0	0
	Bore well	18	Rise	15	4	4	3	3	0	0	1	0	0
			Fall	3	2	1	0	0	0	0	0	0	0
Alappuzha	Dug well	15	Rise	9	7	1	1	0	0	0	0	0	0
			Fall	6	5	1	0	0	0	0	0	0	0
	Bore well	1	Rise	0	0	0	0	0	0	0	0	0	0
			Fall	1	1	0	0	0	0	0	0	0	0
	Tube well	21	Rise	17	13	3	1	0	0	0	0	0	0
			Fall	4	4	0	0	0	0	0	0	0	0

	Dug well	19	Rise	16	3	2	4	3	2	1	0	0	1
			Fall	3	1	1	0	1	0	0	0	0	0
	Bore well	24	Rise	23	2	7	3	5	4	1	0	0	1
Kottayam			Fall	1	1	0	0	0	0	0	0	0	0
	Dug well	19	Rise	9	5	3	1	0	0	0	0	0	0
			Fall	10	4	4	0	1	1	0	0	0	0
	Bore well	22	Rise	12	5	1	1	1	1	0	1	0	2
Idukki			Fall	10	3	2	4	0	1	0	0	0	0
	Dug well	38	Rise	29	7	3	3	5	7	3	1	0	0
			Fall	9	5	2	2	0	0	0	0	0	0
	Bore well	23	Rise	19	5	4	2	2	6	0	0	0	0
			Fall	4	0	2	1	1	0	0	0	0	0
	Tube well	1	Rise	0	0	0	0	0	0	0	0	0	0
Ernakulam			Fall	1	1	0	0	0	0	0	0	0	0
	Dug well	24	Rise	22	11	5	2	2	1	0	1	0	0
			Fall	2	2	0	0	0	0	0	0	0	0
	Bore well	36	Rise	21	6	6	3	5	0	1	0	0	0
Thrissur			Fall	15	4	3	4	0	0	1	0	0	3
	Dug well	23	Rise	21	8	8	2	2	1	0	0	0	0
			Fall	2	2	0	0	0	0	0	0	0	0
	Bore well	28	Rise	20	3	4	6	4	1	0	0	0	2
Malappuram			Fall	8	2	1	1	1	0	0	0	1	2
	Dug well	29	Rise	27	8	6	5	6	2	0	0	0	0
			Fall	2	0	1	1	0	0	0	0	0	0
	Bore well	32	Rise	19	6	5	4	1	0	1	0	1	1
Palakkad			Fall	13	2	3	1	4	0	0	0	1	2

	Dug well	17	Rise	16	2	6	5	1	1	0	1	0	0
			Fall	1	1	0	0	0	0	0	0	0	0
	Bore well	33	Rise	28	8	5	11	2	0	0	0	0	2
Kozhikkode			Fall	5	3	0	0	0	0	0	1	0	1
	Dug well	26	Rise	24	8	5	3	2	2	3	0	0	1
			Fall	2	1	1	0	0	0	0	0	0	0
	Bore well	19	Rise	17	5	2	2	1	3	2	1	1	0
Wayanad			Fall	2	1	0	0	0	1	0	0	0	0
	Dug well	30	Rise	29	6	1	2	9	4	2	0	1	4
			Fall	1	1	0	0	0	0	0	0	0	0
	Bore well	26	Rise	24	2	4	3	2	6	1	3	1	2
Kannur			Fall	2	0	1	1	0	0	0	0	0	0
	Dug well	43	Rise	39	7	8	5	6	4	5	3	0	1
			Fall	4	3	1	0	0	0	0	0	0	0
	Bore well	21	Rise	19	2	3	3	4	1	3	0	1	2
Kasaragod			Fall	2	2	0	0	0	0	0	0	0	0

Observation well frequency on August 2020 **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
						143	138	71	12	0
Dug well	364	-0.02	14.8	Periya (Kasaragod)	Bandadka (Kasaragod)	39%	38%	20%	3%	0%
						62	111	105	42	12
Bore well	332	-0.24	41.29	Madakkathara (Thissur)	Areekode (Malappuram)	19%	33%	31%	13%	4%
						25	17	7	4	3
Tube well	56	-0.14	34.49	Nedumudi (Alappuzha)	Mynagappally (Kollam)	45%	30%	13%	7%	5%

Comparison of Water level August 2020 with respect to August 2019 **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 - 2.5 m	2.5 - 3 m	3 - 3.5 m	3.5 - 4 m	>4 m
		Rise	260	71	51	47	23	24	13	15	4	12
		%	78%	27%	20%	18%	9%	9%	5%	6%	1%	5%
		Fall	74	40	20	8	3	2	0	0	1	0
Dug well	334	%	22%	54%	27%	11%	4%	3%	0%	0%	1%	0%
		Rise	274	67	46	43	36	24	10	13	11	24
		%	84%	24%	17%	16%	13%	9%	4%	5%	4%	8%
		Fall	52	22	11	7	3	3	1	0	2	3
Bore well	326	%	16%	42%	21%	13%	6%	6%	2%	0%	4%	6%
		Rise	18	10	3	3	0	0	0	1	0	1
		%	56%	56%	17%	17%	0%	0%	0%	5%	0%	5%
		Fall	14	12	2	0	0	0	0	0	0	0
Tube well	32	%	44%	86%	14%	0%	0%	0%	0%	0%	0%	0%

Comparison of Water level August 2020 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 - 2.5 m	2.5 - 3 m	3 - 3.5 m	3.5 - 4 m	>4 m
Dug well	335	Rise	285	80	59	42	42	32	15	7	1	7
		%	85%	28%	21%	15%	15%	11%	5%	2%	0.35%	2%
		Fall	50	33	11	3	2	1	0	0	0	0
		%	15%	66%	22%	6%	4%	2%	0%	0%	0%	0%
Bore well	325	Rise	250	59	54	47	36	23	9	6	4	12
		%	77%	24%	22%	19%	14%	9%	4%	2%	1%	5%
		Fall	75	28	13	12	6	3	1	1	2	9
		%	23%	37%	17%	16%	8%	4%	1%	1%	3%	12%
Tube well	33	Rise	22	15	4	1	0	0	1	0	0	1
		%	67%	68%	17%	5%	0%	0%	5%	0%	0%	5%
		Fall	11	7	2	1	1	0	0	0	0	0
		%	33%	64%	18%	9%	9%	0%	0%	0%	0%	0%