

**പതിനാലാം കേരള നിയമസഭ**

**പതിനഞ്ചാം സമ്മേളനം**

നക്ഷത്രചിഹ്നമിടാത്ത ചോദ്യം നം.990

10.06.2019 -ലെ മറുപടി

**ഭൂഗർഭജലനിരപ്പിലെ കുറവ്**

ചോദ്യം

മറുപടി

**ശ്രീ. മുല്ലക്കര രതാകരൻ**

**കെ. കൃഷ്ണൻകുട്ടി  
(ജലവിഭവ വകുപ്പുമന്ത്രി)**

<p>എ) ഭൂഗർഭജലനിരപ്പ് വരുന്നതുമായി വകുപ്പുതലപഠനങ്ങൾ നടത്തിയിട്ടുണ്ടോ; വിശദാംശങ്ങൾ വെളിപ്പെടുത്തുമോ?</p>	<p>എ) ഉണ്ട്. സംസ്ഥാനത്തിന്റെ വിവിധ സ്ഥലങ്ങളിൽ സ്ഥാപിച്ചിട്ടുള്ള 756 നിരീക്ഷണകിണറുകളിൽ നിന്നുമുള്ള ജലവിതാന ഡാറ്റാ (Water Level Data) എല്ലാ മാസവും ശേഖരിച്ചു പഠനങ്ങൾ നടത്തി വരുന്നു. മാർച്ച് 2019-ലെ ജലവിതാന റിപ്പോർട്ട് ഉള്ളടക്കം ചെയ്യുന്നു.</p>
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**സെക്ഷൻ ഓഫീസർ**

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**GOVERNMENT OF KERALA  
GROUNDWATER DEPARTMENT**

**NATIONAL HYDROLOGY PROJECT**

**GROUNDWATER LEVEL MONITORING REPORT**

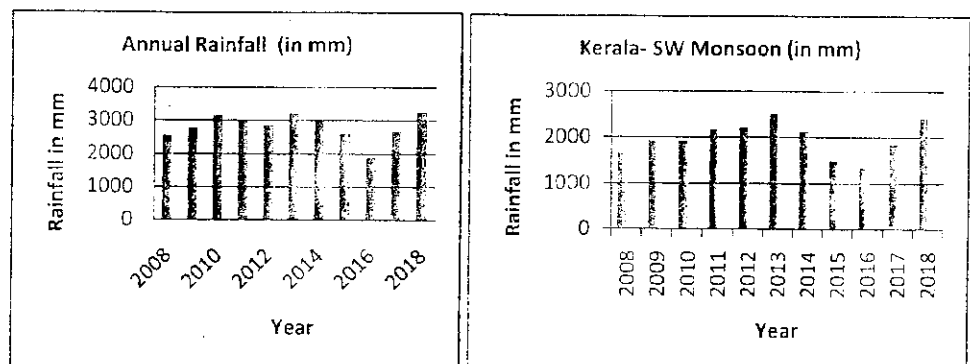
**MARCH 2019**

## GROUNDWATER LEVEL MONITORING REPORT -MARCH 2019

Rainfall is the primary source of 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 to May), Monsoon (South-West) June to September and Post-monsoon (North-East) from October to December. Kerala State has an average annual precipitation of about 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 rainfall received in the state during 2018 is 3520 mm, which is 18 % excess with that of the decadal mean of annual rainfall received during the last 10 years (2874 mm) and 4 % excess with that of the Normal Rainfall (3000 mm). The abnormal high rainfall received during the last year (from 1st June 2018 to 19th August 2018) resulted in severe flooding in the State. As per IMD data, Kerala received 2346.6 mm of rainfall from 1st June 2018 to 19th August 2018 in contrast to an expected 1649.5 mm of rainfall. This rainfall was about 42% above the normal.

The rainfall received in the state during jan-feb 2019 is 13.1 mm, which is 46 % deficient with that of normal rainfall (24.4mm). The rainfall received in the state during March 2019 is 13 mm, which is 46 % deficient with that of normal rainfall (24.2mm)



**Geology :** Kerala, the southernmost state of Indian peninsula, is having a geographical area of 38863 km<sup>2</sup>. The land area extends between north latitude 8<sup>o</sup>17' 30" and 12<sup>o</sup>27' 40" and east longitude 74<sup>o</sup> 51' 57" and 77<sup>o</sup> 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 Achaean 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 utilised through dug wells, whereas the semi-confined and confined aquifer are developed through tube wells in sedimentary terrain and through bore wells in hard rock areas.

**Groundwater monitoring network:** Groundwater Department has an observation well network comprised of dug wells, and purpose built piezometers ( borewells and tubewells) from which water level data has been collected monthly and water quality analysis has been done periodically.

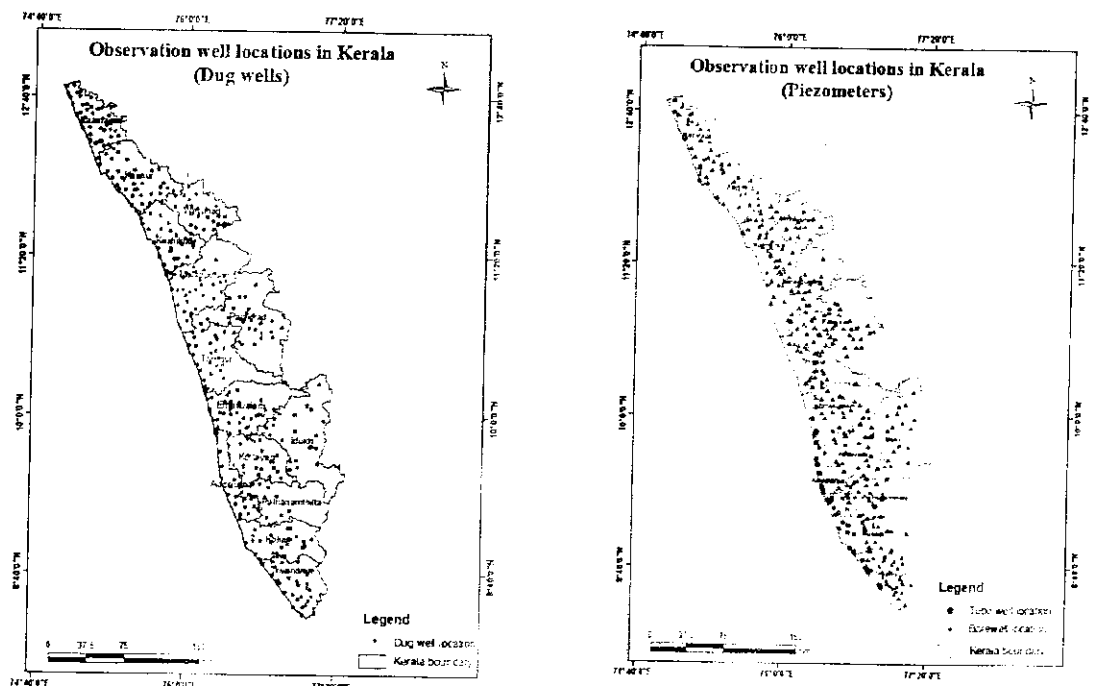


Fig.1.Location map of monitoring wells

### **Analysis of groundwater level data- March 2019**

During the month of March 2019, 369 dug wells and 392 purpose built piezometers (bore wells-349 and tube wells-43 ) were monitored. The data collected from the observation wells during the month of March, 2019 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 March 2019**

**Dugwells-** The depth to groundwater level in the observation dug wells during the month of March 2019 ranges from a minimum of (-)0.13m to a maximum of 16.87mbgl (meters below ground level ) .

Out of 369 dugwells monitored water level in 11 % of dug wells shows a depth to water level ranges from 0-2 m, 35 % ranges between 2-5 m, 43 % ranges between 5-10 m, and 11% dugwells recorded depth to water level ranges between 10-20 mbgl,

**Borewells (hardrock terrain ):-**The depth to groundwater level in the observation bore wells during the month of March 2019 ranges from a minimum of 0.1m to a maximum of 42.39 mbgl (meters below ground level ) .

Out of 349 borewells monitored water level in 4 % of bore wells shows a depth to water level ranges from 0-2 mts. , 17 % ranges between 2-5 mts. 40 % ranges between 5-10 mts. , 29 % of borewells ranges between 10-20 m. and 10% ranges more than 20 m

**Tubewells (coastal sedimentary terrain) -** The depth to groundwater level in the observation tubewells during the month of March 2019 range from a minimum of 0.84 m to a maximum of 34.45 mbgl (meters below ground level ) .

Out of 43 tube wells monitored in the state, water level in 18 % of tube wells shows a depth to water level range from 0-2 m, 40 % of tube wells ranges between 2-5 m, 16 % of tube wells ranges between 5-10 m, , 19 % of tube wells ranges between 10-20 m, and 7% ranges more than 20 m

## II. Comparison of groundwater Level in March 2019 with respect to March 2018

Comparison of the groundwater level in March 2019 with respect to the corresponding month in the previous year, indicates that 55 % of observation dug wells show a fall in water level, and 45 % of the wells shows marginal rise in water level .

Out of 55% of the dugwells shows a falling trend, majority ( 66 % ) recorded fall in water level less than 0.5m , 19 % of dug wells show fall in the range between 0.5-1m ,8% of dug wells show fall in the range between 1-1.5 m, 4 % of dug wells show a fall in range between 1.5 to 2 m , and 3% dug wells show a fall between 2- 3m .

Comparison of the water level in observation bore wells (hard rock terrain in midland and high land areas) in March 2019 with that of the previous year, it has been noticed that 58 % of bore wells show fall in water level and 42 % of the wells shows marginal rise of water level .

Out of 58 % of the borewells shows a falling trend , majority (60 % )of the bore wells recorded fall in water level less than 0.5m. 16 % of bore wells show fall in the range between 0.5 - 1m, 9% of bore wells show fall in the range between 1 – 1.5 m, 5% of bore wells show a fall in range between 1.5-2m , 3% of bore wells show a fall in range between 2-3 , 3% of bore wells show a fall in range between 3-4,2 % of bore wells show a fall in range between 4-5 and 3% of bore wells show more than 5m

Comparison of the water level in observation tube wells (in the coastal sedimentary areas)during March 2019 with that of the previous year reveals that 50 % of tube wells recorded a falling trend and 50 % of the wells shows marginal rise of water level .

Out of 49 % of the tube wells shows a falling trend, majority (78 % )of the tube wells recorded fall in water level less than 0.5m . 5 % wells show fall in the range between 0.5 - 1m , 16% wells show fall in the range between 1-1.5 m.

### III. Comparison of Groundwater level in March 2019 with respect to Decadal mean( 2009- 18)

Comparison of the water level in March 2019 with respect to the decadal mean. it has been noticed that 55 % of observation dug wells recorded a fall in water level and 45 % of the wells shows marginal rise of water level .

Out of 55 % of the dugwells shows a falling trend, majority (62 % ) of the dug wells recorded fall in water level less than 0.5m ,22 % of dug wells show fall in the range between 0.5 - 1m, 8 % of dug wells show fall in the range between 1 – 1.5 m, 4 % of dug wells show a fall in range between 1.5 to 2m..and 4 % of dug wells show a fall in range between 2 to 3m..

Comparison of the water level in the observation bore wells during March 2019 with that of the decadal mean. It has been noticed that 58 % of bore wells show fall in water level, and 42 % of the wells shows marginal rise of water level .

Out of 58 % of the bore wells shows a falling trend , majority ( 48 % ) of the bore wells show fall in water level less than 0.5m, 18 % of bore wells show fall in the range between 0.5 - 1m, 3% of bore wells show fall in the range between 1 – 1.5 m, 6% of bore wells show a fall in range between 1.5 to 2m , 9% of bore wells show a fall in range between 2-3 m, 4% of bore wells showing a fall between 3-4m , 5% of bore wells showing a fall between 4- 5m and 7% of bore wells show more than 5 m

Comparison of the water level in the observation tube wells during March 2019 with that of the decadal mean reveals that 47 % of tube wells recorded a falling trend and 53 % of the tube wells shows marginal rise in water level .

Out of 47 % of the tube wells shows a falling trend , majority ( 85 % ) of the tube wells show fall in water level less than 0.5m, 5 % tube wells show fall in the range between 0.5 - 1m , 5% tube wells show fall in the range between 1–1.5 m and 5% tube wells show fall in the range from 1.5-2m.

## Sum up

### Rainfall

- The rainfall received in the state during 2018 is 3520 mm, which is 18 % excess with that of the decadal mean of annual rainfall received during the last 10 years (2874 mm) and 4 % excess with that of the Normal Rainfall (3000 mm).
- The abnormally high rainfall from 1st June 2018 to 19th August 2018 resulted in severe flooding in 13 out of 14 districts in the State. (received 2346.6 mm of rainfall from 1st June 2018 to 19th August 2018 in contrast to an expected 1649.5 mm of rainfall.)
- The rainfall received in the state during jan-feb 2019 is 13.1 mm, which is 46 % deficient with that of normal rainfall (24.4mm).
- The rainfall received in the state during March 2019 is 13 mm, which is 46 % deficient with that of normal rainfall (24.2mm)

### Groundwater level

- The depth to groundwater level in the observation dug wells during the month of March 2019 range from a minimum of (-).13m to a maximum of 16.87mbgl , in bore wells 0.1m to a maximum of 42.39 mbgl and in the tubewells 0.84 m to a maximum of 34.45 mbgl .
- Comparison of the water level in March 2019 with respect to the previous year, reveals that 55 % of observation dug wells, 58 % of bore wells and 50 % of tube wells recorded a falling trend . Majority of the wells shows decline of water level less than 0.5 m
- Comparison of groundwater level in March 2019 with respect to the decadal mean, reveals that 55 % of observation dug wells ,58 % of bore wells and 47% of tube wells recorded a falling trend Majority of the wells shows decline of water level less than 0.5 m
- The reason for the decline of groundwater level even though excess rainfall received in the state during the year 2018 may be attributed to the extent of groundwater recharge area due to urbanisation . change in the rainfall pattern, unusual rise in the atmospheric temperature etc



## District wise well frequency and depth range of Water Level

District	well frequency	well type	No.	Depth range of water level during March-2019 ( m bgl )					Minimum	Maximum
				0-2	2-5	5-10	10-20	>20		
Thiruvananthapuram	28	Dugwell	28	2	7	14	5	0	1.31	14.45
	33	Borewell	33	2	4	18	8	1	0.47	22.01
	4	Tube well	4	0	2	1	1		4.28	10.64
Kollam	25	Dugwell	25	3	7	12	3	0	1.28	11.86
	15	Borewell	15	1	1	11		2	1.78	10.8
	9	Tube well	9	0	2	1	3	3	3.64	34.45
Pathanamthitta	14	Dugwell	14	1	10	3			1.95	9.55
	25	Borewell	25	2	6	9	8		0.79	15.92
Alappuzha	20	Dugwell	20	5	12	2	1		0.19	12.35
	2	Borewell	2	0	2	0			2.52	4.1
	29	Tube well	29	8	13	5	3		0.84	18.18
Kottayam	21	Dugwell	21	3	8	7	3		0.13	10.82
	25	Borewell	25	2	8	10	3	2	1.29	25.34
Idukki	19	Dugwell	19	3	10	6			0.87	9.6
	24	Borewell	24	1	6	9	3	5	0.4	35.33
Ernakulam	37	Dugwell	37	10	9	17	1		0.49	10.09
	24	Borewell	24	3	7	11	3		0.1	12.36
	1	Tube well	1	0	0	0	1			
Thrissur	24	Dugwell	24	2	10	9	3		1.76	12.71
	37	Borewell	37	0	4	13	15	5	2.7	33.23
malappuram	27	Dugwell	27	0	6	15	6		3.52	15.2
	29	Borewell	29	0	6	14	5	4	2.34	42.39
palakkad	31	Dugwell	31	1	11	16	3		1.54	11.23
	34	Borewell	34	0	4	11	15	4	2.6	25.35
Kozhikkode	17	Dugwell	17	0	5	11	1		2.5	13.38
	33	Borewell	33	1	8	9	11	4	1.9	32.12
wayanad	26	Dugwell	26	1	8	12	5		1.15	11.7
	19	Borewell	19	0	2	6	10	1	2.61	23.24
kannur	36	Dugwell	36	4	5	19	8		1.56	16.87
	28	Borewell	28	1	1	12	12	2	1.34	25.82
kasaragod	44	Dugwell	44	5	21	18			3.16	16.2
	21	Borewell	21	0	1	5	11	4	3.51	25.95
TOTAL	369	Dugwell	369	40	129	161	39		0.13	16.87
	349	Borewell	349	13	60	138	104	34	0.1	42.39
	43	Tube well	43	8	17	7	8	3	0.84	34.45

Groundwater level monitoring report \_ March 2019

Comparison of Water Level in Dugwells, Borewells, Tube wells during March 2019 wr to March 2018

Dug wells														
Wells monitored	water level status	Total	Range of water level fluctuation (m)										Total	
			0-5	0.5-1	1-1.5	1.5-2	2-2.5	2.5-3	3-5	3-5.4	4-4.5	4.5-5		>5
361	Rise	151	113	20	11	7	6	1	1	1	0	0	1	
	Fall	200	132	37	16	8	3	2	0	2				
	Rise %	44.60	70.19	12.42	6.83	4.35	3.73	0.62	0.62	0.62				
	Fall %	55.40	66.00	18.50	8.00	4.00	1.50	1.00	0.00	1.00				
Total														99.38
Total														100

Bore wells														
Wells monitored	water level status	Total	Range of water level fluctuation (m)										Total	
			0-5	0.5-1	1-1.5	1.5-2	2-2.5	2.5-3	3-5	3-5.4	4-4.5	4.5-5		>5
341	Rise	143	84	25	15	7	3	2	0	1	1	0	5	
	Fall	198	119	32	18	10	3	2	4	2	0	3	5	
	Rise %	41.94	58.74	17.48	10.49	4.90	2.10	1.40	0.00	0.70	0.70	0.00	3.50	100
	Fall %	58.06	60.10	16.16	9.09	5.05	1.52	1.01	2.02	1.01	0.00	1.52	2.53	100
Total														100

Tube wells														
Wells monitored	water level status	Total	Range of water level fluctuation (m)										Total	
			0-5	0.5-1	1-1.5	1.5-2	2-2.5	2.5-3	3-5	3-5.4	4-4.5	4.5-5		>5
38	Rise	19	15	1	2	1								
	Fall	19	15	1	3									
	Rise %	50	78.95	5.26	10.53	5.26								100
	Fall %	50	78.95	5.26	15.79									100
Total														100

Comparison of Water Level in Dugwells, Borewells, Tube wells during March 2019 wr to Deadal Mean (2009-2018)

Dug wells														
Wells monitored	water level status	Total	Range of Water level fluctuation (m)										Total	
			0-5	0.5-1	1-1.5	1.5-2	2-2.5	2.5-3	3-5	3-5.4	4-4.5	4.5-5		>5
365	Rise	164	98	35	14	10	4	2	0	1				164
	Fall	201	124	44	17	8	5	3						201
	Rise %	44.93	59.76	21.34	8.54	6.10	2.44	1.22	0.00	0.61				100
	Fall %	55.07	61.69	21.89	8.46	3.98	2.49	1.49						100

Bore wells														
Wells monitored	water level status	Total	Range of Water level fluctuation (m)										Total	
			0-5	0.5-1	1-1.5	1.5-2	2-2.5	2.5-3	3-5	3-5.4	4-4.5	4.5-5		>5
346	Rise	145	98	28	5	7	0	1	0	1	0	1	4	145
	Fall	201	97	37	6	12	6	12	3	4	5	6	13	201
	Rise %	41.91	67.59	19.31	3.45	4.83	0.00	0.69	0.00	0.69	0.00	0.69	2.76	100
	Fall %	58.09	48.26	18.41	2.99	5.97	2.99	5.97	1.49	1.99	2.49	2.99	6.47	100

Tube wells														
Wells monitored	water level status	Total	Range of Water level fluctuation (m)										Total	
			0-5	0.5-1	1-1.5	1.5-2	2-2.5	2.5-3	3-5	3-5.4	4-4.5	4.5-5		>5
43	Rise	23	16	1	4	2								
	Fall	20	17	1	1	1								
	Rise %	53.49	69.57	4.35	17.39	8.70								100
	Fall %	46.51	85.00	5.00	5.00	5.00								100

*[Signature]*  
Section Officer