CENTRAL GROUND WATER BOARD

MINISTRY OF WATER RESOURCES, RIVER DEVELOPMENT AND GANGA REJUVENATION

GOVERNMENT OF INDIA

STATUS OF GROUND WATER LEVEL SCENARIO, DURING PRE-MONSOON SEASON-2015 (MAY)

(TELANGANA STATE)

GROUND WATER MONITORING CELL
SOUTHERN REGION
HYDERABAD
JUNE-2015

STATUS OF GROUND WATER LEVEL SCENARIO, DURING PRE-MONSOON SEASON-2015 (MAY)

(TELANGANA STATE)

EXECUTIVE SUMMARY

1. During Pre-monsoon season of May 2015, total 729 wells were monitored (356 DW+373 Pz).
2. During the year June-2014-May-2015, state received deficit of 30% rainfall as compared to June-2013-May-2014.
3. The minimum and maximum depth to water level varies from 0.33 to 44.78 m bgl.
4. Water Levels in the range of 5 to 10 m bgl are predominant covering about 48.3% of the total geographical area, represented by 42 % of the wells.
5. Fluctuations in water level during May-2015 WRT May-2014 shows a maximum rise of 19.23 m in Adilabad district and maximum fall of 36.82 m in Rangareddy district.
6. Due to deficit rainfall of 30 % during the year 2014-15 as compared to previous year, the fall in water levels in the range of 0-2 m covers maximum area (38% of state), represented by 41% of wells.
7. Water level fluctuations during May-2015 WRT decadal mean of May-2005-2014, shows a fall in water levels in 76% of the area and maximum fall of 33.36 m is observed in Adilabad district.

STATUS OF GROUND WATER LEVEL SCENARIO, DURING PRE-MONSOON SEASON-2015 (MAY)

(TELANGANA STATE)

STATUS OF GROUND WATER LEVEL SCENARIO IN TELANGANA STATE, DURING PRE-MONSOON SEASON -MAY 2015

1. INTRODUCTION

Depth to Water level data was collected from monitoring wells known as Ground water monitoring wells in Telangana during May, 2015. The number of operational wells after the monitoring in January, 2015 are 736 (360 dug wells and 376 piezometers). Ground water monitoring wells abandoned during May, 2015 are 9 (5 dug wells and 4 piezometers) whereas 2 Ground water monitoring wells (1 DW +1 Pz) were established during the period. Thus the number of operational wells after present monitoring stands at 729 (356 dug wells and 373 piezometers).

During May 2015, a total number of 104 Ground water monitoring wells (92 dug wells & 12 Piezometers) are dry. The maximum number of dry wells (20 & 18 no's) is from Nalgonda and Adilabad districts due to less rainfall received during June 2014 - May 2015. Total 53 wells (10 dug wells and 43 piezometers) could not be monitored due to various reasons like inaccessibility, damaged roads, installation of pumps, jamming of piezometers cap, roots entered etc. District wise status of Ground Water monitoring wells is presented in **Annexure-I.**

Based on the rainfall data and water level data collected from the Ground water monitoring wells during May, 2015 and the earlier periods, the following seven maps are prepared on 1:5 million scales.

ANNEXURE-I

DISTRICT WISE STATUS OF GROUND WATER MONITORING WELLS- MAY, 2015, TELANGANA STATE

S. No.	District	No of Stations to be monitored			No of Stations where WL data Recorded			No of Stations Monitored as Dry			No of Stations not Monitored due to Various Reasons			No of Stations Abandoned			No of Stations Established			No of Stations as on 31/05/2015		
		DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total	DW	Pz	Total
1	Adilabad	51	25	76	35	20	55	14	4	18	2	1	3	0	0	0	0	0	0	51	25	76
2	Hyderabad	8	21	29	7	13	20	0	0	0	0	7	7	1	1	2	0	1	1	7	21	28
3	Karimnagar	29	54	83	19	54	73	7	0	7	3	0	3	0	0	0	0	0	0	29	54	83
4	Khammam	55	13	68	49	11	60	6	0	6	0	2	2	0	0	0	0	0	0	55	13	68
5	Mahbubnagar	22	28	50	14	24	38	6	0	6	0	4	4	2	0	2	0	0	0	20	28	48
6	Medak	24	29	53	11	25	36	12	1	13	1	3	4	0	0	0	0	0	0	24	29	53
7	Nalgonda	50	64	114	35	48	83	13	7	20	2	6	8	0	3	3	0	0	0	50	61	111
8	Nizamabad	28	30	58	20	23	43	7	0	7	1	7	8	0	0	0	0	0	0	28	30	58
9	Ranga Reddy	48	60	108	34	49	83	13	0	13	0	11	11	1	0	1	1	0	1	48	60	108
10	Warangal	45	52	97	32	50	82	11	0	11	1	2	3	1	0	1	0	0	0	44	52	96
	Total	**360**	**376**	**736**	**256**	**317**	**573**	**89**	**12**	**101**	**10**	**43**	**53**	**5**	**4**	**9**	**1**	**1**	**1**	**356**	**373**	**729**

2. RAINFALL

The rainfall data collected from India Meteorological Department and compiled from Weekly Weather reports has been used to analyze the rainfall for the period June 2004 to May 2015. District-wise rainfall data for the period June-13-May-14, Jun'14-May'15, decadal mean (Jun-May) of 2004-2014 and normal of June-May and the departure of Jun'14-May'15 rainfall with all the rest of the periods is given **Table 1** and various thematic maps are given in **Fig. 1, Fig. 2 and Fig. 3.**

Table-1: salient Features of Rainfall and its Variability in Telangana State.

		RAINFALL(mm)				Departure of JUNE'14-May'15 rainfall from		
S. No.	**District**	**June-14 -May 15**	**June-13 -May 14**	**Decadal Mean (2005-14)**	**Normal**	**June-13 -May 14**	**Decadal Mean (June-May)**	**Normal June-May**
1	Adilabad	893	1689	1053	1120	-47.1%	-15.2%	-20.3%
2	Hyderabad	584	1090	859	851	-46.4%	-32.0%	-31.4%
3	Karimnagar	729	1487	1065	980	-51.0%	-31.5%	-25.6%
4	Khammam	808	1522	1280	1095	-46.9%	-36.9%	-26.2%
5	Mahbubnagar	573	987	696	731	-41.9%	-17.7%	-21.6%
6	Medak	498	1145	828	922	-56.5%	-39.9%	-46.0%
7	Nalgonda	521	1140	712	761	-54.3%	-26.8%	-31.5%
8	Nizamabad	637	1425	952	1092	-55.3%	-33.1%	-41.7%
9	Rangareddy	612	1024	818	842	-40.2%	-25.2%	-27.3%
10	Warangal	711	1467	1060	987	-51.5%	-32.9%	-28.0%
	STATE MEAN	**657**	**1298**	**932**	**938**	**-49.4%**	**-29.6%**	**-30.0%**
Source: India Meteorological Department, GOI								

2.1 Rainfall Departure (June 14-May 15) with Normal Rainfall of same Period (Fig.1):

This map gives departure of June 14-May15 rainfall with normal rainfall of the same period. It is prepared to correlate with depth to water level map of May 2015. During the period June 14-May15, the state has received 30 % less rainfall than normal and is observed throughout the state. It ranges from -46% in Medak district to -20% in Adilabad district.

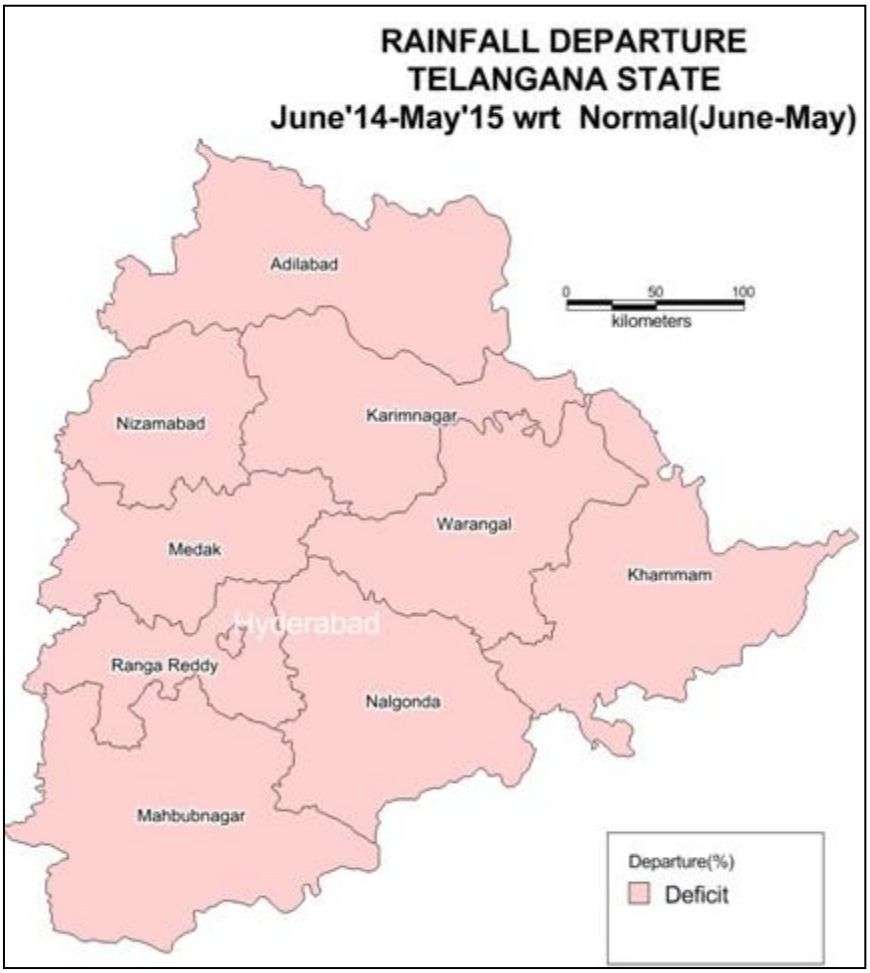


Figure-1: Rainfall Departure (June-14-May-15, WRT Normals of same Period).

2.2 Rainfall Departure June 14 to May-15 With respect to June 13 to May-14 (Fig.2):

This map gives departure of Jun'14-May'15 rainfall with Jun'13-May'14 rainfall. It is prepared to correlate with water level fluctuation map of May 2015 with May 2014. **Table 1** indicates that state has received 657 mm of rainfall during the period Jun'14 to May'15, which is 49 % less than the rainfall received during the same period last year and 30% less than the decadal mean(2005-2014) and normal rainfall. The state received about 1298 mm of rainfall during the same period last year. The departure in percentage ranges from -57% in Medak district to -40% in Rangareddy district.

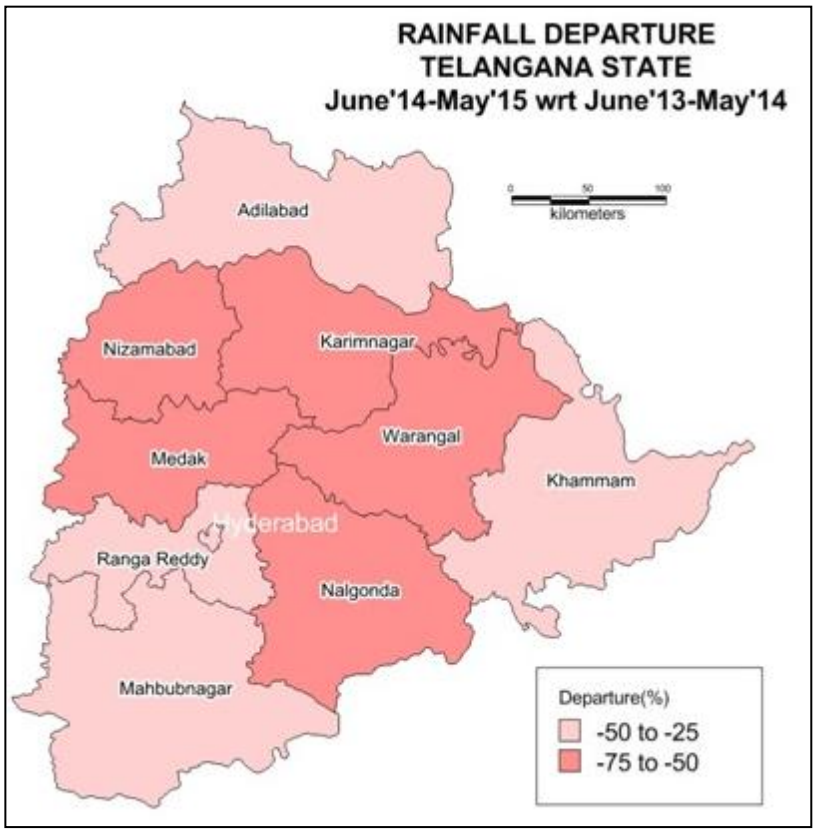


Figure-2: Rainfall Departure (June14-May-15 WRT June 13-May-14).

2.3 Rainfall Departure, June 14-May15 with Decadal Mean June-May (2005-2014) (Fig 3): This map gives departure of Jun'14-May'15 rainfall with decadal mean rainfall (June-May). It is prepared to correlate with water level fluctuation map of May 2015 with Decadal mean (May 2005-14). **Table 1** indicates that the decadal mean rainfall (Jun-May) of the state is 932 mm. The departure in percentage ranges from -40% in Medak district to -15% in Adilabad district.

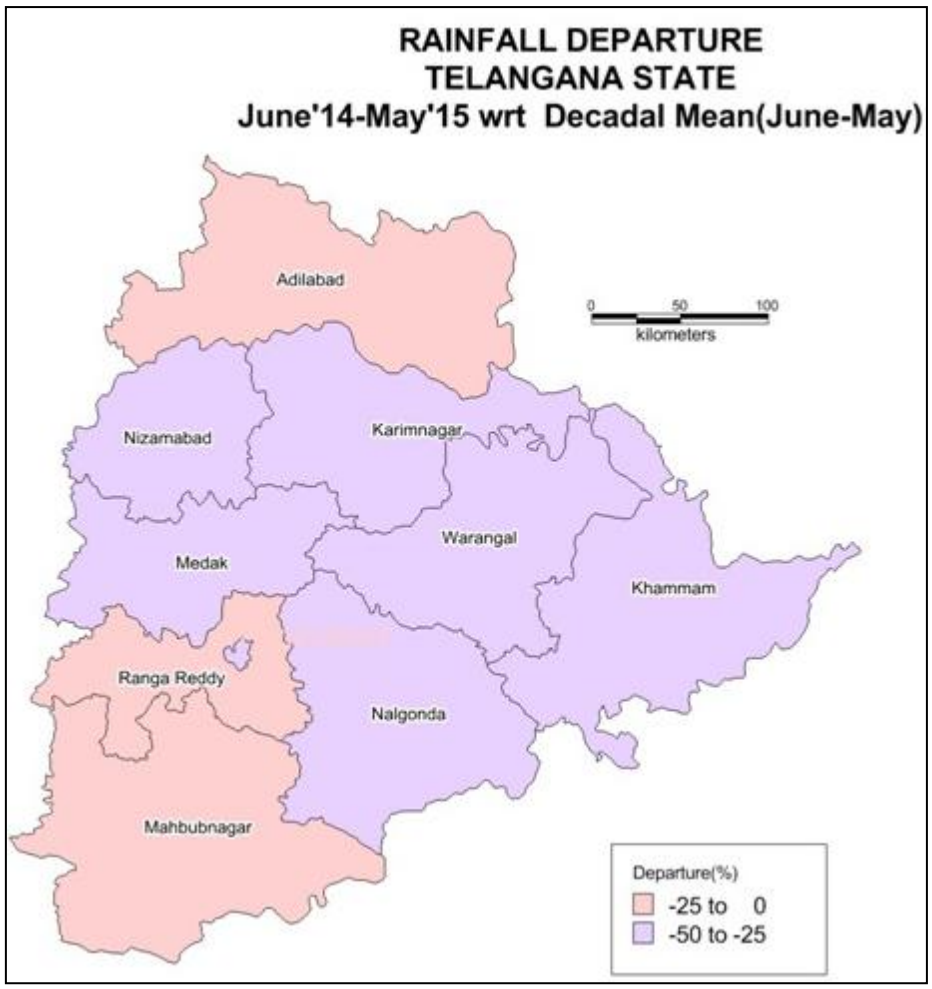
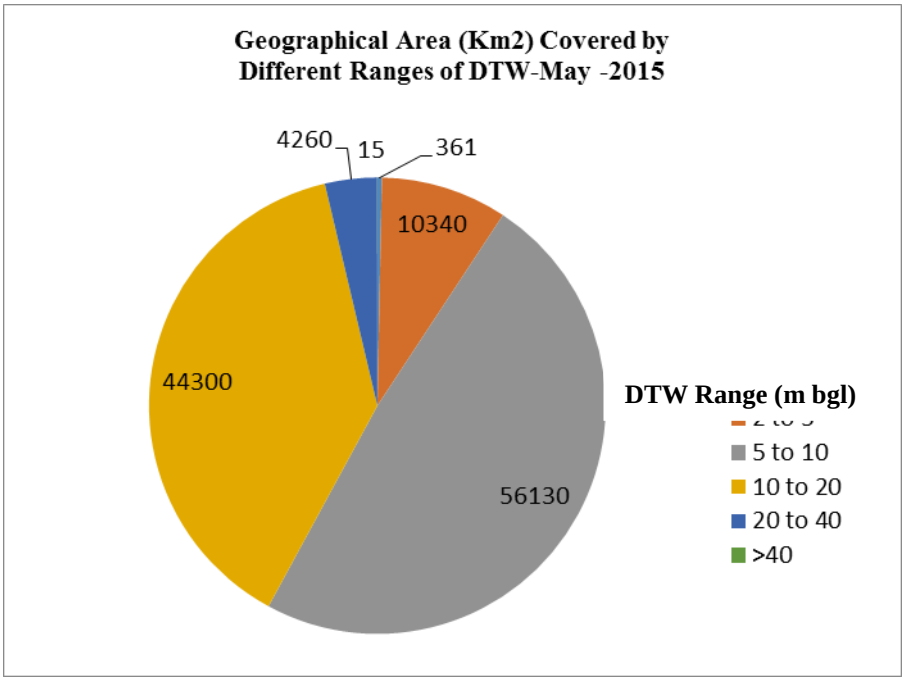


Figure-3: Rainfall Departure (June-14-May-15, WRT to Decadal Mean, June-May, 2005-2014).

3. DEPTH TO WATER LEVEL DURING PRE-MONSOON SEASON (MAY-2015)

The depth to water levels are summarized below and presented in **Fig.4.** The area wise distribution is presented as pie diagram and percent distribution of wells as bar diagram.

1. An analysis of depth to water level data of 564 wells **(Annexure-II**) shows, water levels in the range of 0.33 (Rangareddy district) to 44.78 mbgl (Rangareddy district).
2. Shallow water level in the range of 0 to 2 m bgl covers an area of about 361 Km^2 (0.3% of state area) and mostly observed in Khammam and Adilabad district.
3. Water levels in the range of 2 to 5 m occupies about 10340 Km^2 area (~9% of the total geographical area of the state), occupying mostly eastern part of the State.
4. During May, majority of the water levels are in the range of 5 to 10 m bgl occupying about 56, 130 Km^2 area (48.3%) and represented by 41.7 % wells.
5. Water levels between 10-20 m bgl covers about 44,300 Km^2 (38.1%) representing 35.1% wells.
6. Deep water levels in the range of 20-40 m bgl and > 40 m bgl covers about 3.7% and <0.1% of the total geographical area respectively, representing 5% and 0.5% of the total wells respectively, covering mostly Hyderbad, Rangareddy and Medak district.



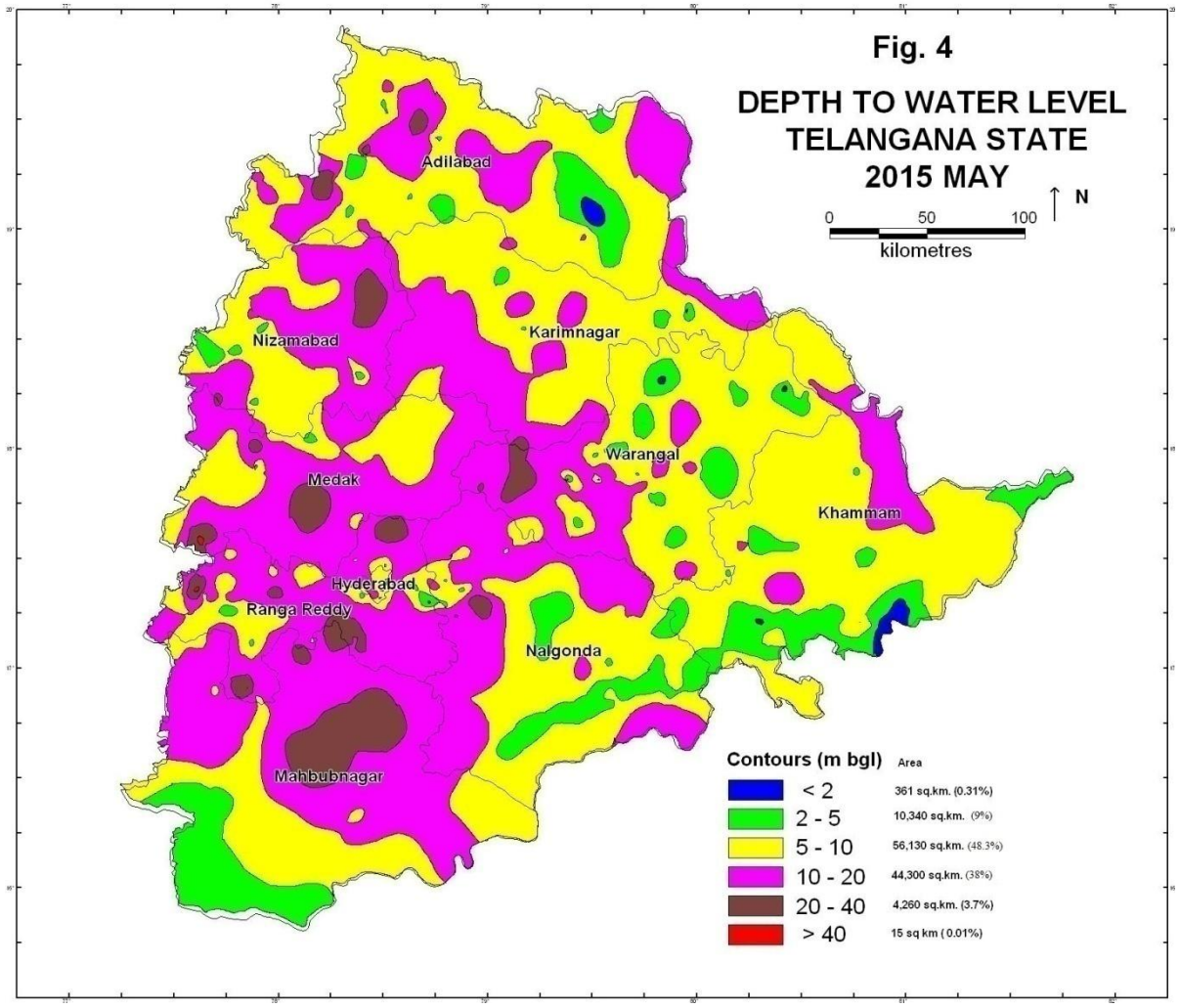
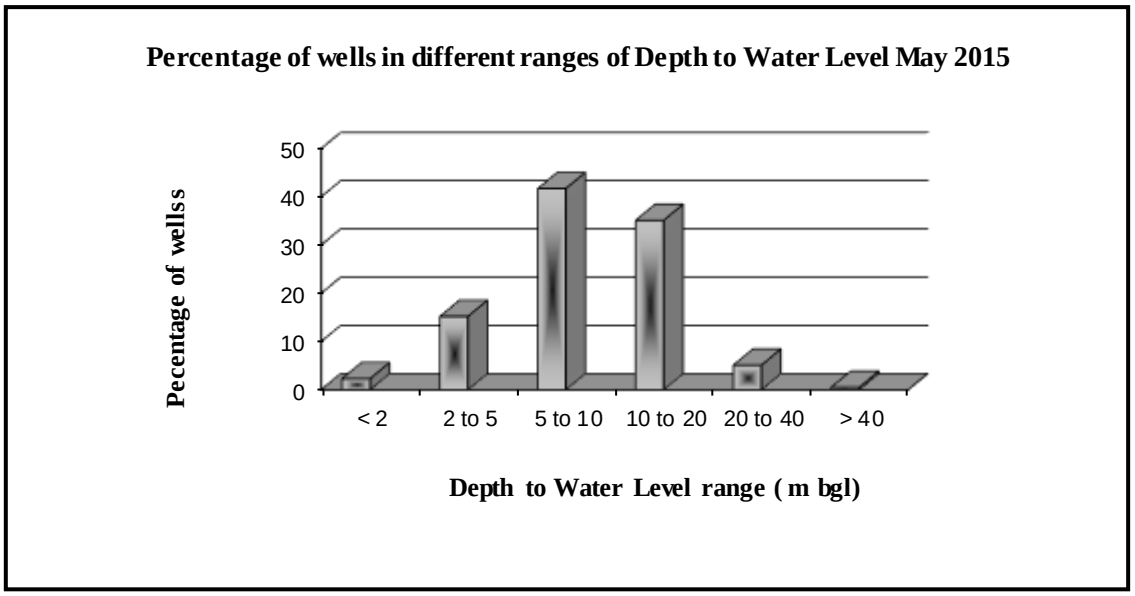


Fig. 4
DEPTH TO WATER LEVEL
TELANGANA STATE
2015 MAY
N
0
50
100
kilometres
Adilabad
Nizamabad
Karimnagar
Warangal
Medak
Khammam
Hyderabad
Ranga Reddy
Nalgonda
Mahbubnagar
Contours (m bgl)
Area
< 2
361 sq.km. (0.31%)
2 - 5
10,340 sq.km. (9%)
5 - 10
56,130 sq.km. (48.3%)
10 - 20
44,300 sq.km. (38%)
20 - 40
4,260 sq.km. (3.7%)
> 40
15 sq km (0.01%)


Percentage of wells in different ranges of Depth to Water Level May 2015
Pecentage of wellss
50
40
30
20
10
0
< 2
2 to 5
5 to 10
10 to 20
20 to 40
> 40
Depth to Water Level range (m bgl)

ANNEXURE-II

SUMMERISED RESULTS OF DEPTH TO WATER LEVEL (m bgl)

Sl. No.	District Name	No. of wells analyzed	Depth to water Table (m bgl)		No of Wells/% of wells showing depth to water level (m bgl) in the range of											
			Min	Max	0 - 2	%	2-5	%	5-10	%	10-20	%	20-40	%	>40	%
1	Adilabad	66	0.52	39.5	1	1.52	11	16.67	38	57.58	13	19.7	3	4.55	0	0
2	Hyderabad	10	3.12	18.91	0	0	4	40	3	30	3	30	0	0	0	0
3	Karimnagar	63	1.25	25.52	1	1.59	3	4.76	34	53.97	24	38.1	1	1.59	0	0
4	Khammam	59	0.74	16.65	5	8.47	13	22.03	29	46.15	12	20.34	0	0	0	0
5	Mahbubnagar	34	2.47	39.65	0	0	4	11.76	11	32.35	11	32.35	8	23.53	0	0
6	Medak	36	2.4	46.1	0	0	3	8.33	13	36.11	16	44.44	3	8.33	1	2.78
7	Nalgonda	91	2.57	37.37	0	0	24	26.37	37	40.66	28	30.77	2	2.2	0	0
8	Nizamabad	45	2.06	27.37	0	0	5	11.11	20	44.44	17	37.78	3	6.67	0	0
9	Ranga Reddy	78	0.33	44.78	2	2.5	4	5	24	30	40	50	6	7.5	2	2.5
10	Warangal	82	1.27	27.65	4	4.88	15	18.29	26	31.71	34	41.46	3	3.66	0	0
	Total	**564**	**0.33**	**46.1**	**13**	**2.3**	**86**	**15.2**	**235**	**41.7**	**198**	**35.1**	**29**	**5.1**	**3**	**0.5**

4. WATER LEVEL FLUCUATION DURING MAY 2015 with RESPECT to MAY 2014

Water level fluctuation data of May 2015 with respect to May 2014 is presented in **Annexure-III and Fig.5** An analysis of 512 wells shows that water level rise is recorded in 12% wells (62) covering an area of about 10.5% of the total geographical area. About 89% of the area have shown a fall in water level representing 85.93% wells (440), while in the rest, 1.95 % wells (10) no fluctuation is recorded. Fall in water levels is mainly due to less rainfall (-49%) than the last year. Area wise water level fluctuations are shown as pie diagram and percentage of wells as bar diagram.

Water level rise of more than 4 m is recorded maximum in Rangareddy and Nalgonda district (2 % wells) while water level fall of more than 4 m is recorded in Nizamabad, Nalgonda and Medak district (23.7 %) wells.

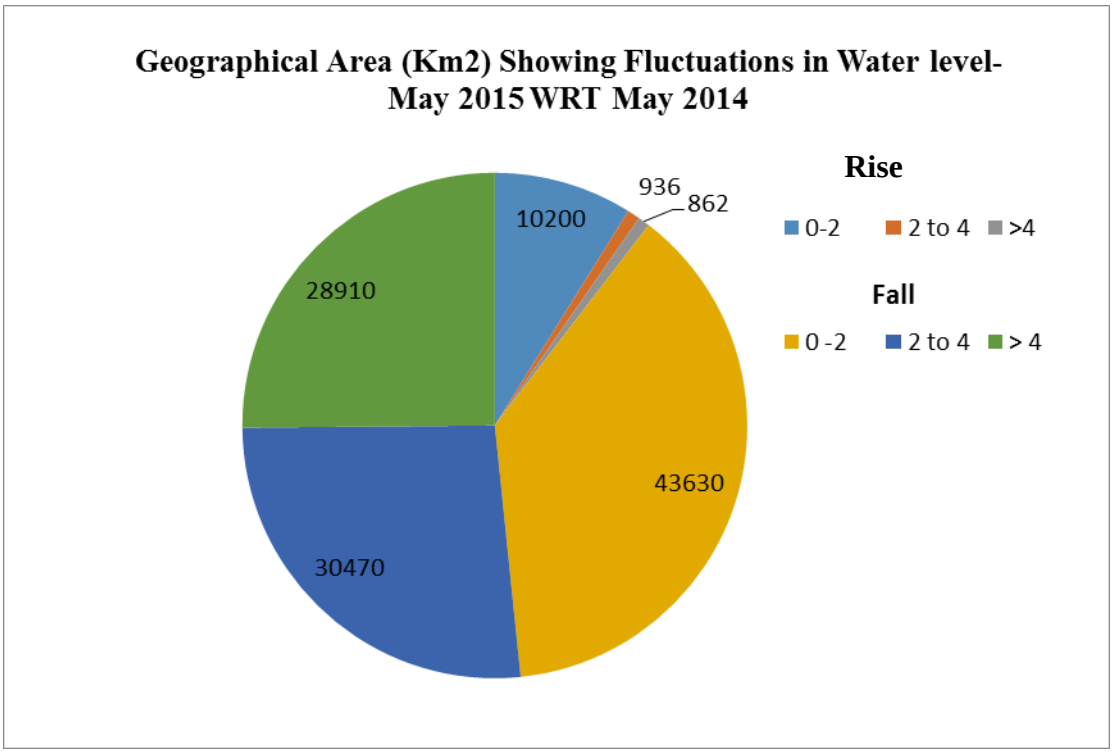
4.1 RISE IN WATER LEVELS:

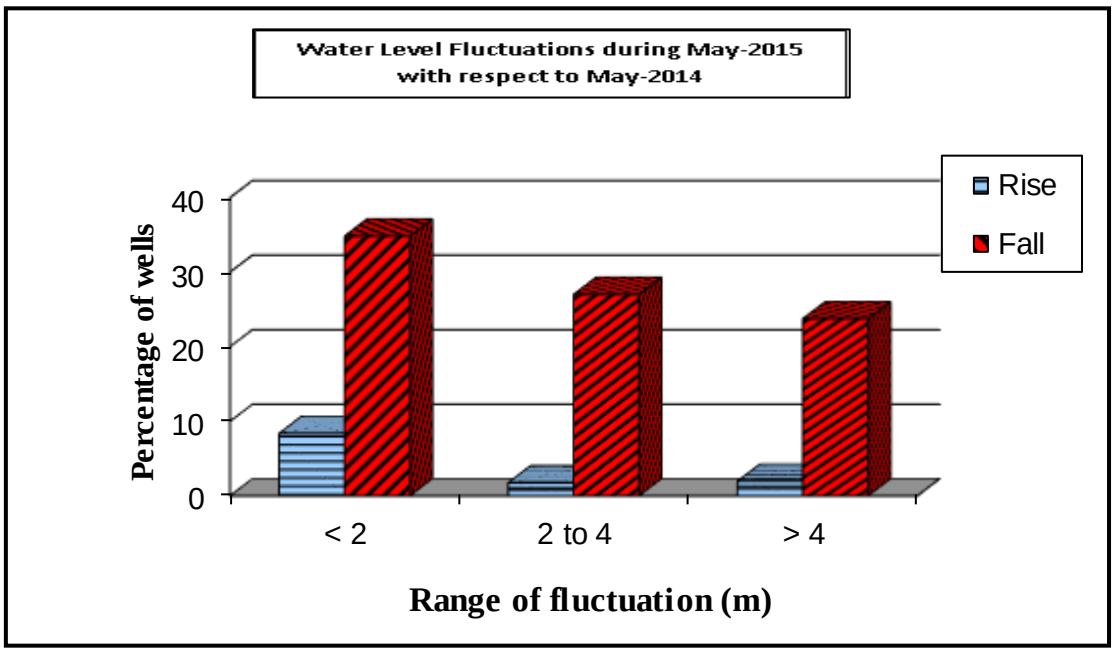
1. During May 2015, the minimum rise in water level of 0.01 m in Warangal district and maximum of 19.23 m in Adilabad district is observed.
2. Medak district have shown a very negligible rise in water levels as compared to other district (Min 0.2 and Max 0.4 m).
3. Water level rise of <2 m is recorded in 8.36% wells covering about 9 % of total geographical area, falling in northern part of Kammam, Adilabad, eastern part of Warangal, western part of Mahabubnagar district and in patches in all the districts of the state.
4. 2 to 4 m and > 4 m rise in water levels is observed in 1.75 % and 2% of wells, covering about 0.8% and 0.7% geographical area respectively.

4.2 FALL IN WATER LEVELS:

1. During the period an appreciable fall in water levels is observed with minimum 0.02 m (Khammam) and maximum 36.82 m (Rangareddy district) covering about 1,03010 Km^2 area (89%).
2. Fall in water levels of less than 2 m is observed in all districts of Telangana state covering an area about 43,630 km^2 (38%). This range is observed in 40.7% of wells.

3. Water level fall between 2 to 4 m is noticed in all districts of Telangana state covering an area about 30,470 km^2 (26%). This range is observed in 31.6% of wells.
4. More than 4 m water level fall is observed in all districts of Telangana State except Khammam districts covering an area about 28,910 km^2 (25%). This range is observed in 27.7% of wells.





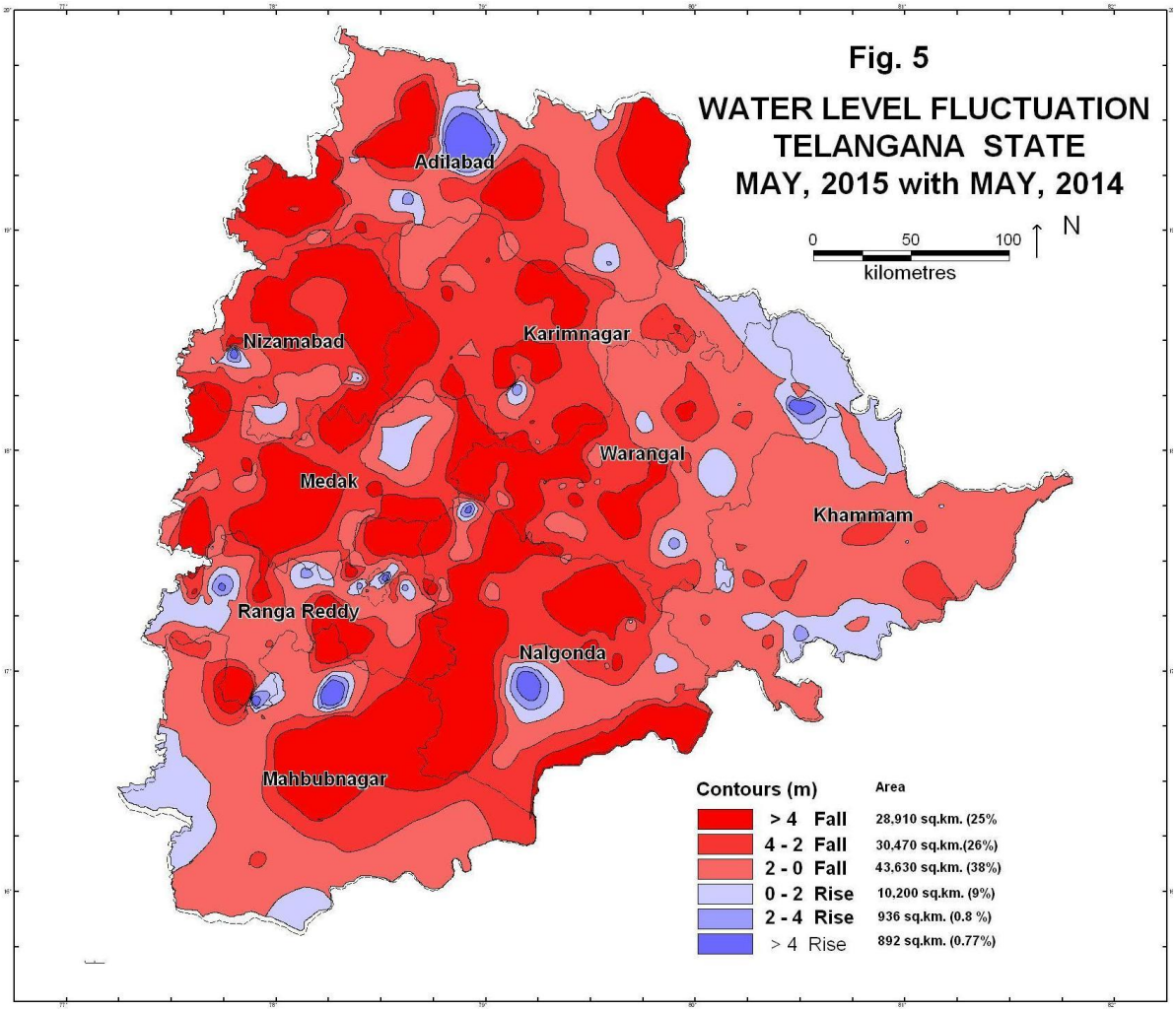


Fig. 5
WATER LEVEL FLUCTUATION
TELANGANA STATE
MAY, 2015 with MAY, 2014
0
50
100
kilometres
N
Adilabad
Nizamabad
Karimnagar
Warangal
Medak
Khammam
Ranga Reddy
Nalgonda
Mahbubnagar
Contours (m)
Area
> 4 Fall
28,910 sq.km. (25%
4 - 2 Fall
30,470 sq.km.(26%)
2 - 0 Fall
43,630 sq.km. (38%)
0 - 2 Rise
10,200 sq.km. (9%)
2 - 4 Rise
936 sq.km. (0.8 %)
> 4 Rise
892 sq.km. (0.77%)

ANNEXURE-III

DISTRICT WISE WATER LEVEL FLUCTUATION AND FREQUENCY OF DISTRIBUTION (MAY 2015 WRT MAY 2014), TS.

Sl.No.	District Name	No. of wells analyzed	Range of Fluctuation (m)				No. of wells/Percentage Showing Fluctuation												Total No. of Wells	
			Rise		Fall		Rise						Fall						Rise	Fall
			Min	Max	Min	Max	0 to 2	%	2 to 4	%	> 4	%	0 to 2	%	2 to 4	%	> 4	%		
1	Adilabad	61	0.28	19.23	0.12	35.75	3	49.2	2	3.28	1	1.64	30	49.18	14	23	11	18.03	6	55
2	Hyderabad	10	0.16	6.9	0.11	2.28	1	9.09	1	9.09	1	9.09	6	54.55	1	9.09	1	9.09	3	8
3	Karimnagar	63	3.61	3.61	0.07	9.22	0	0	1	1.59	0	0	20	31.75	25	39.7	16	25.4	1	61
4	Khammam	56	0.03	2.89	0.02	3.89	13	23.1	1	1.79	0	0	28	50	13	23.2	0	0	14	41
5	Mahbubnagar	33	1	9.54	0.19	19.63	2	6.06	0	0	1	3.03	13	39.39	8	24.2	6	18.18	3	27
6	Medak	36	0.2	0.41	0.05	23.5	2	5.56	0	0	0	0	10	27.78	10	27.8	11	30.56	2	31
7	Nalgonda	63	0.3	6.86	0.05	13.22	4	6.35	0	0	2	3.17	21	33.33	16	25.4	20	31.75	6	57
8	Nizamabad	44	0.13	6.49	0.05	9.33	4	9.09	1	2.27	1	2.27	4	9.09	14	31.8	17	38.64	6	35
9	Ranga Reddy	68	0.17	7.21	0.15	36.82	8	11.43	2	2.86	3	4.29	23	32.86	14	20	20	28.57	13	57
10	Warangal	77	0.01	8.16	0.24	17.45	6	7.79	1	1.3	1	1.3	24	31.17	24	31.2	20	25.97	8	68
	Total	**511**	**0.01**	**19.23**	**0.02**	**36.82**	**43**	**8.4**	**9**	**1.76**	**10**	**1.96**	**179**	**35**	**139**	**27.2**	**119**	**23.3**	**62**	**437**

5. WATER LEVEL FLUCTUATION-DECADAL MEAN OF MAY (2005-2014) WITH MAY 2015

Water level fluctuation of May, 2015 with reference to Decadal means of May, (2005-2014) is presented in **Annexure-IV and Fig.6.** An analysis of 522 wells data shows a rise in water levels in 139 wells (26.6%) and fall in 379 wells (72.6%) covering an area of 25,555 km^2 (22%) and 89,560 km^2 (76%) respectively. This fall in water levels with respect to decal mean is mainly due to less rainfall (-30%) during the same period.

Perusal of the map shows a general fall in water levels. Water level rise of more than 4 m is recorded in Mahabubnagar, Nalgonda, Warangal and Rangareddy districts, while water level fall of more than 4 m is recorded in most of the districts except Khammam.

5.1 DECADAL RISE IN WATER LEVELS:

1. During May 2015, the minimum rise in water level of 0.02 m in Medak district and maximum of 10.2 m in Mahabubnagar district is observed.
2. Medak district have shown a very negligible rise in water levels as compared to other district (Min 0.02 and Max 1.55 m).
3. Water level rise of <2 m is recorded in 19.4 % wells covering about 18 % of total geographical area (21510 Km^2) and it is mainly observed in Khammam, Mahabubnagar, Adilabad, Rangareddy and Nalgonda Districts.
4. 2 to 4 m and > 4 m rise in water levels is observed in 4.6 % and 2.5% of wells, covering about 3% and 1% geographical area respectively.

5.2 DECADAL FALL IN WATER LEVELS:

1. During the period an appreciable fall in water levels is observed with minimum 0.02 m (Medak) and maximum 33.36 m (Adilabad district) covering about 89,560 Km^2 area (76%).
2. Fall in water levels of less than 2 m is observed in all districts of Telangana state covering an area about 52,760 km^2 (45%). This range is observed in 37.1% of wells.
3. Water level fall between 2 to 4 m is noticed in all districts of Telangana state covering an area about 23,630 km^2 (20%). This range is observed in 20.2% of wells.
4. More than 4 m water level fall is observed in all districts of Telangana State except Khammam districts covering an area about 13,170 km^2 (11%). This range is observed in 15.4% of wells.

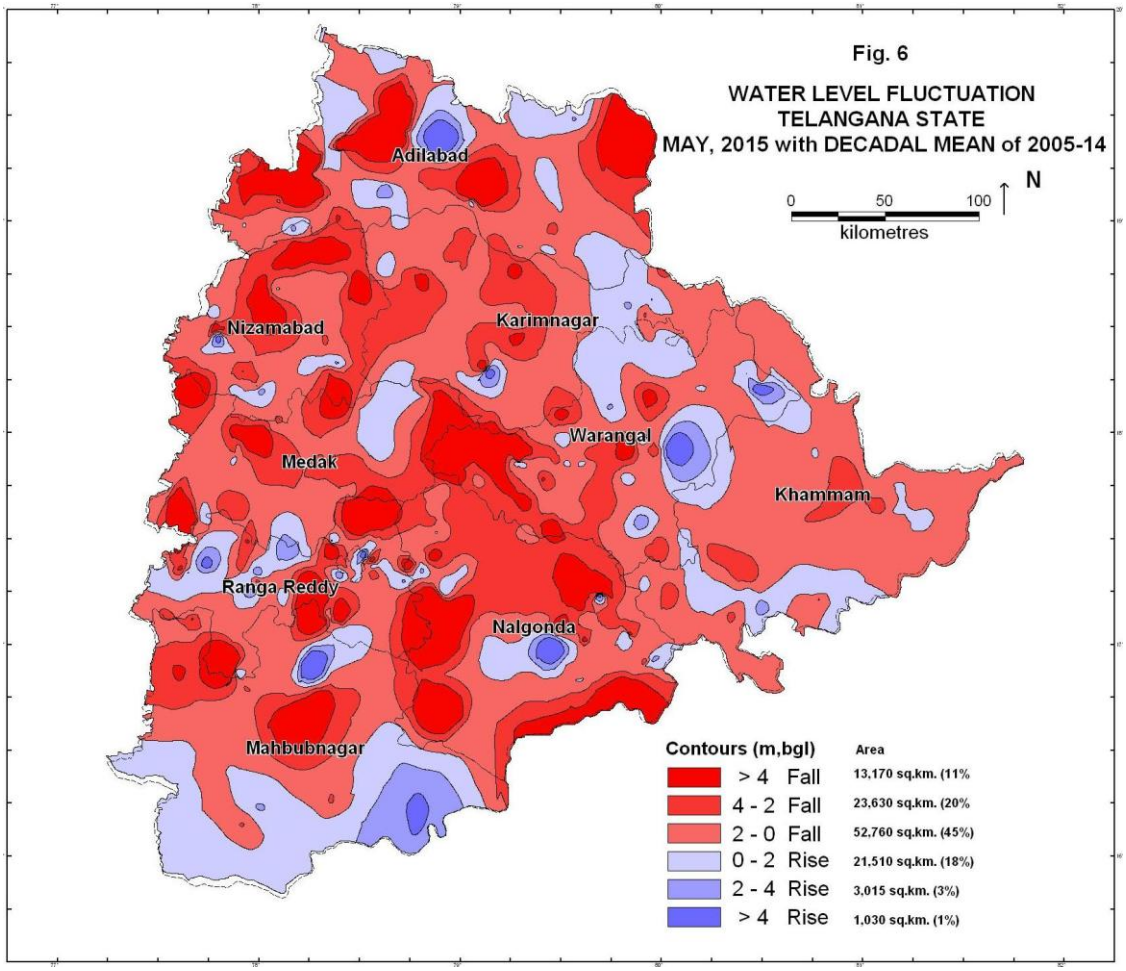
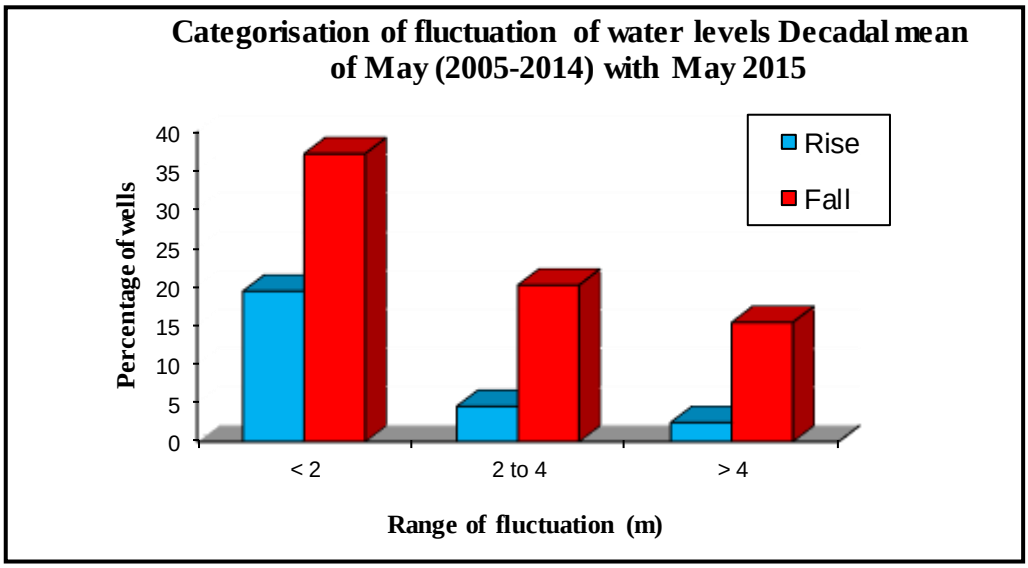
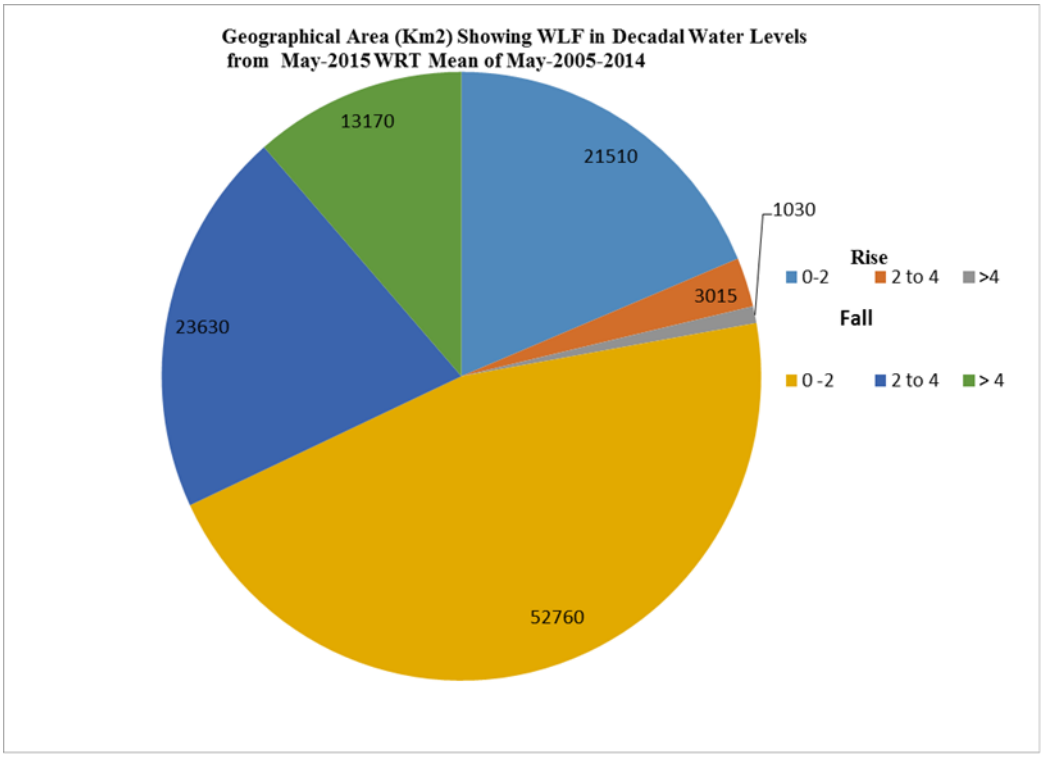


Fig. 6
WATER LEVEL FLUCTUATION
TELANGANA STATE
MAY, 2015 with DECADAL MEAN of 2005-14
N
0
50
100
kilometres
Adilabad
Nizamabad
Karimnagar
Warangal
Medak
Khammam
Ranga Reddy
Nalgonda
Mahbubnagar
Contours (m,bgl)
Area
> 4 Fall
13,170 sq.km. (11%
4 - 2 Fall
23,630 sq.km. (20%
2 - 0 Fall
52,760 sq.km. (45%)
0 - 2 Rise
21,510 sq.km. (18%)
2 - 4 Rise
3,015 sq.km. (3%)
> 4 Rise
1,030 sq.km. (1%)


Categorisation of fluctuation of water levels Decadal mean of May (2005-2014) with May 2015
Percentage of wells
40
35
30
25
20
15
10
5
0
Rise
Fall
< 2
2 to 4
> 4
Range of fluctuation (m)


Geographical Area (Km2) Showing WLF in Decadal Water Levels from May-2015 WRT Mean of May-2005-2014
13170
21510
1030
3015
23630
52760
Rise
0-2
2 to 4
>4
Fall
0 -2
2 to 4
> 4

ANNEXURE-IV

District Wise Water Level Fluctuation From Mean of 10 Years ((May 2005-May 2014) with May 2015, Telangana State.

District Name	No of Wells analyzed	Range of Fluctuation (m)				No. of wells/Percentage Showing Fluctuation												Total No. of Wells	
		Rise		Fall		Rise						Fall						Rise	Fall
		Min	Max	Min	Max	0 to 2	%	2 to 4	%	> 4	%	0 to 2	%	2 to 4	%	> 4	%		
Adilabad	62	0.05	8.51	0.04	33.36	18	29.03	4	6.45	1	1.61	22	35.48	9	14.5	8	12.9	23	39
Hyderabad	10	0.56	6.88	0.94	3.08	4	36.36	0	0	1	9.09	2	18.18	3	27.3	0	9.09	5	5
Karimnagar	63	0.19	5.39	0.11	5.5	9	14.29	2	3.17	1	1.59	29	46.03	17	27	5	7.94	12	51
Khammam	56	0.06	2.89	0.05	3.63	15	26.79	1	1.79	0	0	29	51.79	11	19.6	0	0	16	40
Mahbubnagar	34	0.86	10.21	0.12	17.24	4	11.76	1	2.94	3	8.82	13	38.24	8	23.5	5	14.71	8	26
Medak	36	0.02	1.55	0.02	23.1	6	16.67	0	0	0	0	12	33.33	9	25	8	22.22	6	29
Nalgonda	70	0.08	8.83	0.02	13.22	9	12.86	2	2.86	2	2.86	25	35.71	16	22.9	16	22.86	13	57
Nizamabad	44	0.13	3.37	0.04	9.82	7	15.91	3	6.82	0	0	13	29.55	8	18.2	11	25	10	32
Ranga Reddy	68	0.08	5.12	0.03	36.39	17	24.29	8	11.4	2	2.86	18	25.71	14	20	8	14.29	27	40
Warangal	79	0.16	6.69	0.03	12.26	13	16.46	3	3.8	3	3.8	32	40.51	11	13.9	17	21.52	19	60
Total	**522**	**0.02**	**10.21**	**0.02**	**36.39**	**102**	**19.4**	**24**	**4.6**	**13**	**2.5**	**195**	**37.1**	**106**	**20.2**	**78**	**14.94**	**139**	**379**