भारत सरकार
जल संसाधन, नदी विकास और गंगा संरक्षण मंत्रालय
केंद्रीय भूमि जल बोर्ड

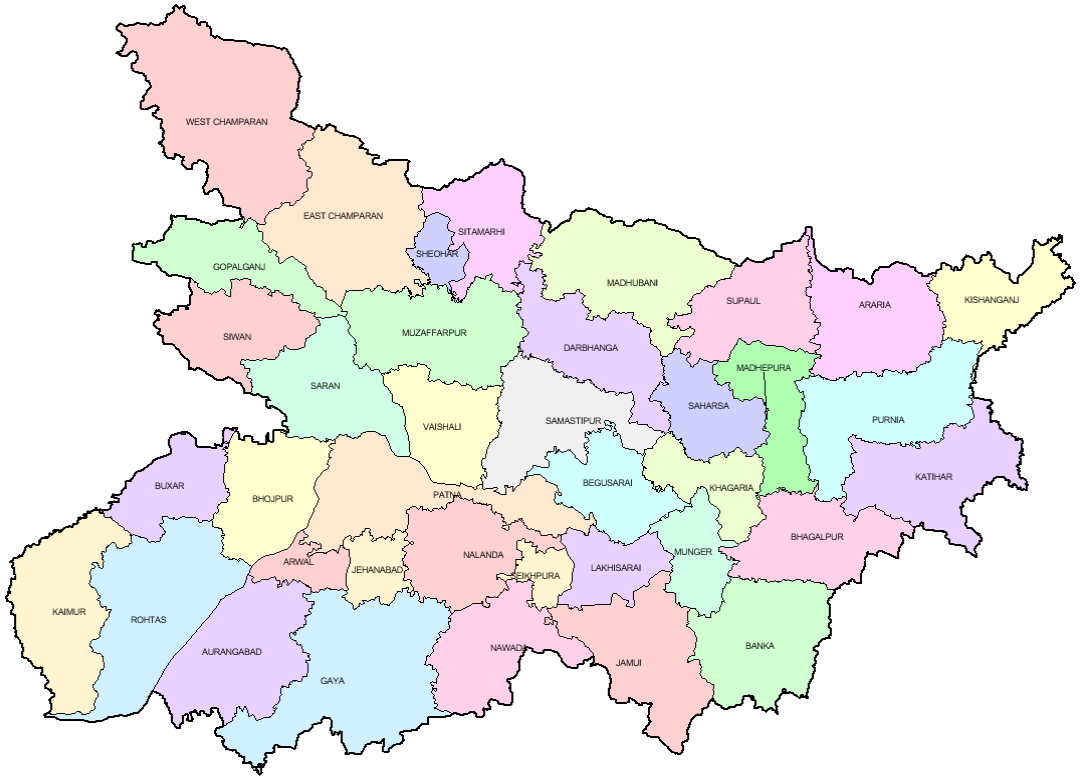
GOVERNMENT OF INDIA
MINISTRY OF WATER RESOURCES RD & GR
CENTRAL GROUND WATER BOARD

वार्षिक भूजल पुस्तिका, बिहार

Ground Water Year Book

(2018 - 2019)

(2018-2019)



मध्य पूर्वी क्षेत्र, पटना
नवंबर 2019

MID-EASTERN REGION, PATNA
November 2019

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GROUND WATER YEAR BOOK, BIHAR
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ABSTRACT

Monitoring of ground water levels from 729 Hydrograph Network Stations (HNS) were carried out in the year 2018-2019 with an objective to assess ground water regime of phreatic aquifer. The water level monitoring was carried out in the months of May'18, August'18, November'18, and January'19. The ground water samples from the HNS were collected in the month of May'18 for chemical analysis. The water level in the HNS represented phreatic aquifer.

The observed water level data had been grouped into four categories viz. 0-2 m, 2-5 m, 5-10 m and >10 m. Thematic maps depicting ground water levels measured in different periods had been prepared. The water levels had been further analysed for study of its change with respect to measurement of pre-monsoon period of the same year, previous year water level data of the same period, and decadal mean water level data of the same period. The fluctuation had been grouped under rise and fall categories. In each category there are three groups viz. 0-2 m, 2-4 m and >4 m. Thematic maps had been prepared for each category of fluctuation.

During pre-monsoon 2018 the ground water levels were found to vary between 0.53 and 15.80 m bgl. The depth to water level rests in range of 2-5 m bgl is 39% of HNS, which spatially covers covering northern part of NBP and as patches of SBP, and depth to water level rests in range of 5-10 m bgl is 53% NHS wells which spatially covers southern part of North Bihar Plains (NBP) and maximum part of South Bihar Plains (SBP). During post-monsoon 2018, water level rested in the range of 2 – 5 m bgl in 58% of the HNS which covers major part (68% area) of the state. The fluctuation of water level between pre and post-monsoon 2018 indicated rise in water level in 90% of the HNS. Annual change of water level of May 2018 with respect to May 2017 indicated rise in water level in 37% of the HNS, and during November 2018 with respect to November 2017 indicated rise in 35% of the HNS. The change in water level of May 2018 with respect to the decadal mean of May (May 2008 to May 2017) indicated fall in 57% of the HNS and during November 2018 with respect to the decadal mean of November (November 2008 to November 2017) indicated fall in 64% of HNS.

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1. INTRODUCTION

Bihar state lies between 83º 20' and 88º 00' E Longitudes and 24º 15' and 27º 23' N Latitudes. It shares international border with Nepal in the north and is bounded in the east, west and south by West Bengal, Uttar Pradesh and Jharkhand states respectively. The state covers geographical area of 94,163 Sq.km and has its capital at Patna ***(Fig 1).***

Administratively the state is divided into 38 districts and 534 community development blocks. The population of the state is 10.41 crores (2011 census). Population density is 881persons/Sq.km. The urban population is 11,758,016 and rural population is 92,341,436. There are 150 small and large towns in the state. The distribution of urban population is highly skewed as only three towns namely Gaya, Bhagalpur, and Muzaffarpur are having population of more than 3 lakhs, besides urban population of Patna urban agglomeration which is having 1,683,200.

2. HYDROGEOLOGY

The generalized stratigraphic succession of the state is presented in Table 1. The hydrogeological map of Bihar is depicted in ***Fig 2.***

Table 1. *Generalized geological succession of Bihar.*

Age	*Formation*	*Broad Lithology*
Quaternary	Alluvial Deposits	Sand, clay, silt and occasional gravel
Tertiary	Siwaliks	Sandstone, conglomerate, clay stone, gravel
L-Cambrian	Vindhyan Super Group	Sandstone, limestone.
Proterozoic	Chotanagpur Granite Gneiss	Granite, granitic-gneiss, schist, phyllites, dolomites, basic rocks, amphibolites.
Archean	Bihar Mica belt	Gneiss, Pegmatites etc.,

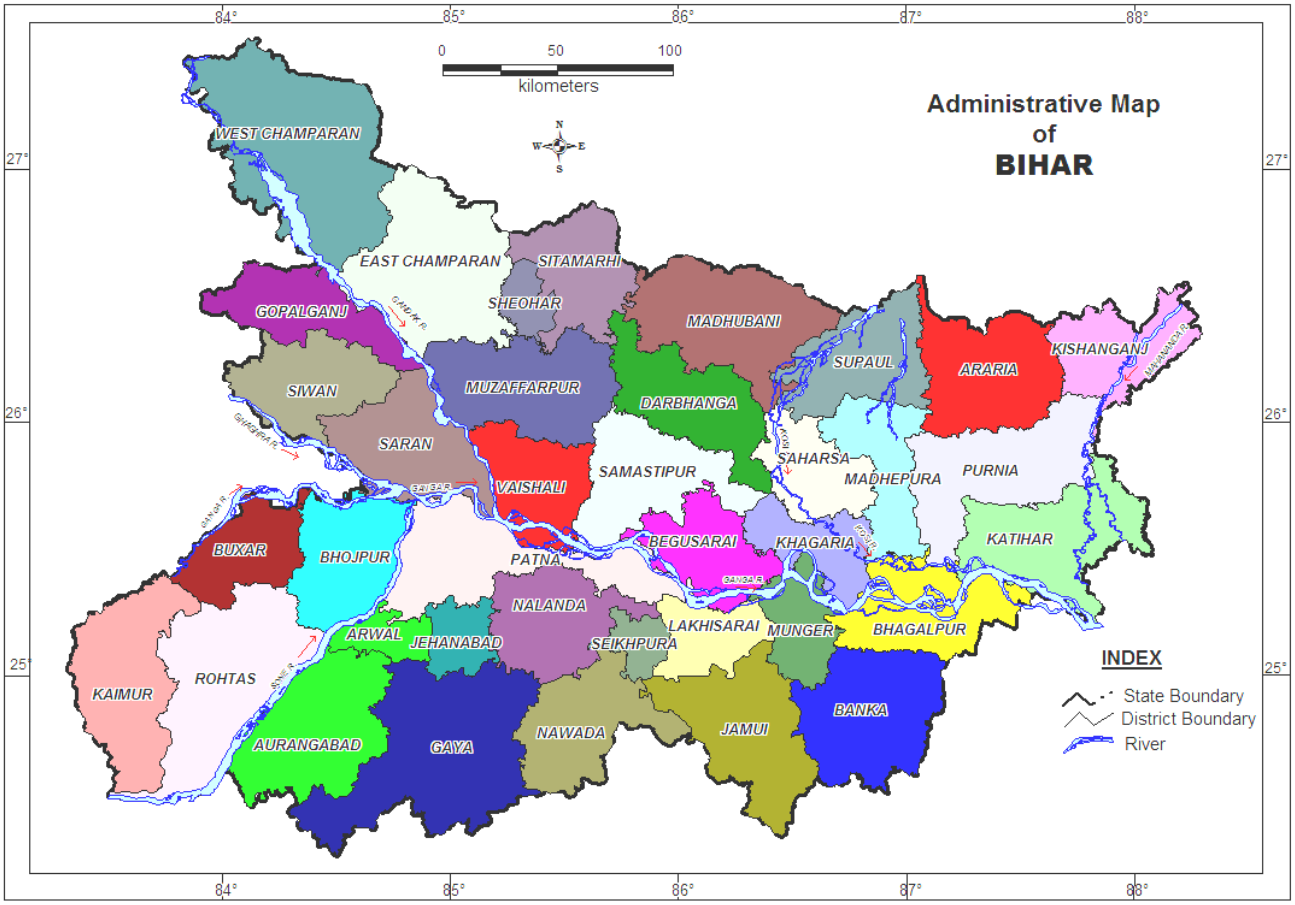

Fig. 1 *Administrative Map of Bihar state*

Pre-cambrians

The rocks belonging to Proterozoic and Archean age are granite, granitic-gneiss, quartzite, phyllites, slates, and metabasics. Rocks of Chhotanagpur Granite Gneissic Complex (CGGC) suit occur in the form of small strip in the districts bordering Jharkhand state. Meta-basic rocks intrude the Chhotanagpur Granite Gneiss Complex suit of rocks. Mica bearing pegmatite of Bihar Mica Belt has been found in Gaya, Nawada and Munger districts. In parts of Munger, Gaya and Nawada districts the meta-sedimentary rocks (viz. phyllite, schist and quartzite) of Pre-cambrian age are also found.

The occurrence and movement of ground water is controlled by the thickness and nature of weathered mantle and saprolite zone (a transition zone between weathered residuum and fresh basement), besides fractures lying underneath the weathered residuum. Thickness of the weathered zone usually ranges from 5 to 20 m. Thickness of weathered zone is more in schist and other meta-sedimentary rocks in comparison to the granite-gneiss. The weathered product of granite and granite-gneiss is marked by presence of coarse granular materials composed of quartz and feldspar, whereas those of schist and phyllite by clayey materials.

Ground water occurs under unconfined condition within the weathered mantle and saprolite zone. In the secondary porosities imparted by joints, cracks and fractures, ground water occurs under confined to semi-confined conditions.

Vindhyans

Rocks of Vindhyan Super-group are confined in the west and north of the river Sone and forms eastern end of the Kaimur Plateau. It occurs in the parts of Rohtas, Kaimur and Aurangabad districts. The width of the Vindhyan rocks becomes less than 3 km near Sasaram in Rohtas district. Rocks found under this super-group are mainly sandstone, limestone, quartzite and schist. These rocks behave as consolidated formation and have remained unaffected by any large-scale tectonic disturbances, except faulting at a few places in the geological past. Vindhyan sandstones are compact and have low primary porosity. Ground water in this occurs within the weathered residuum and in the secondary porosity below them. Ground water occurs under unconfined condition in the weathered mantle. The thickness of the weathered residuum varies from 5 to 10 m.

Siwaliks

The Siwaliks of Upper Tertiary age occur as small patches in northwestern corner of the state in West Champaran district bordering Nepal. It consists of sandstone, conglomerate, red clay and spongy limestone and forms structural hills with a number of faults crisscrossing them. Ground water occurs under confined conditions in sandstones disposed at depth.

Quaternary alluvium

Quaternary sediments of Recent to Sub-Recent age cover about 89 percent of the geographical area of the state. They occupy entire north Bihar plain, and a vast stretch of land between south of the river Ganga and the Chhotanagpur Plateau. Deep exploratory drilling by Central Ground Water Board has confirmed thickness of sedimentary deposits in north Bihar plain as more than three hundred meter. In the south of the river Ganga, the alluvial thickness gradually decreases to as low as 50 m or even less, towards the area bordering the Jharkhand state. The sedimentary deposit consists of alternate sequences of sand and clay layers representing multi-cyclic nature of sedimentation. The Quaternary alluvial deposit spread over south and north of the river Ganga is a part of Mid-Ganga Plain. The Terai belt, which is demarcated by auto-flow wells, occurs as a narrow strip in the bordering areas in Madhubani, Darbhanga, and West

Champaran districts. It is an extension of Terai belt of Nepal which coalesces with alluvial plain. Ground water occurs under unconfined conditions in the phreatic aquifer, which is generally disposed within 70 m below ground. Aquifers situated at deeper levels have ground water levels under confined condition.

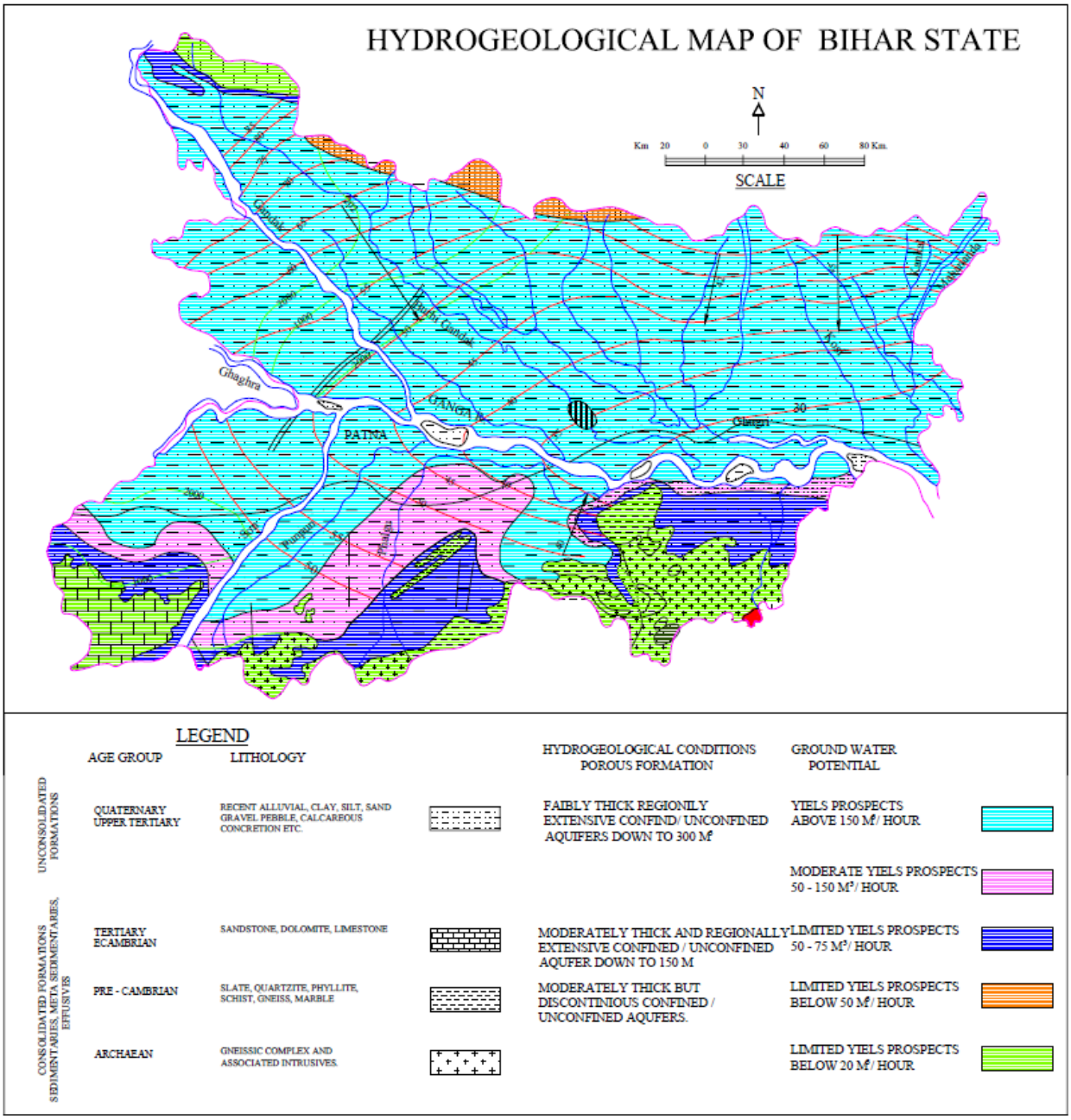

Fig. 2 *Hydrogeological Map of Bihar state*

3. GROUND WATER SCENARIO

A total of 736 Hydrograph Network Stations (HNS) which are dug wells tapping phreatic aquifer has been monitored as a part of ground water regime monitoring in the state of Bihar. Majority of the wells represent phreatic alluvial aquifer. The district wise location and distribution of the HNS are given in **Fig 3** and **Table 2** respectively.

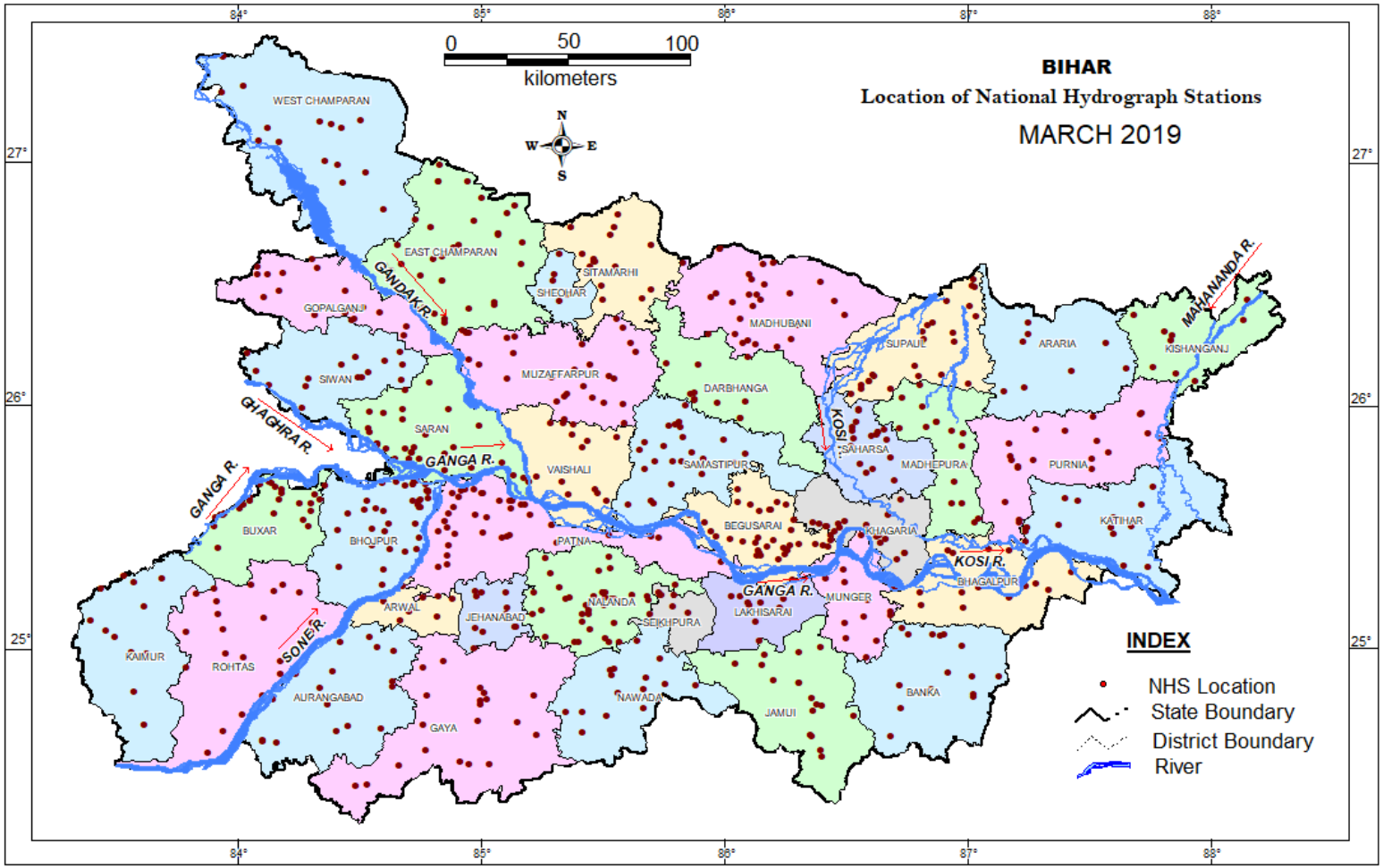

Fig. 3 *Location of Hydrograph Network Stations in Bihar state, 2019*

Table 2 *District wise distribution of the HNS as on 31.3.19*

Status of GW Monitoring Stations-March 2019

SN	District	DW	TW
1	Araia	8	
2	Aurangabad	17	
3	Banka	15	
4	Begusarai	36	
5	Bhagalpur	16	3
6	Bhojpur	37	
7	Buxar	25	
8	Darbhanga	12	
9	Gaya	21	
10	Gopalganj	20	
11	Jamui	18	
12	Jehanabad & Arwal	19	
13	Kaimur/Bhabhua	12	
14	Katihar	16	
15	Khagaria	19	
16	Kishanganj	9	
17	Lakhisarai	9	
18	Madhepura	17	
19	Madhubani	27	
20	Munger	11	
21	Muzaffarpur	27	
22	Nalanda	36	
23	Nawada	16	
24	W Champaran	15	
25	Patna	38	29
26	E Chamaparan	34	
27	Purnia	20	
28	Rohtas	21	
29	Saharsa	18	
30	Samastipur	24	
31	Saran	30	
32	Sheikhpura	7	
33	Sheohar	5	
34	Sitamarhi	16	
35	Siwan	16	
36	Supaul	25	
37	Vaishali	17	
Total		**729**	**32**

The numbers of HNS monitored in the state as per the following monitoring schedules:

Table 3 *HNS monitoring schedule*

Sl. N.	Month	Date	Period
1	May	20 – 30	Pre-monsoon
2	August	20 – 30	Mid-monsoon
3	November	1 – 10	Post-monsoon
4	January	1 – 10	Recession

The Number of HNS monitored during the various monitoring period is given in **Table-4.** The water level data of HNS are presented in the Annexure I. The data were analysed for each set of measurement and the thematic presentation of depth to water level and its fluctuations have been prepared in the range of 0 – 2 m, 2 – 5 m, 5 – 10 m and more than 10 m using GEMS software. Bihar state has been broadly divided into North Bihar Plain (NBP) consisting of areas falling to the north of the river Ganga and South Bihar Plain (SBP) consisting of areas falling to the south of the river Ganga and bordering Jharkhand state.

Table 4 *Number of HNS monitored/analysed during different months*

State	May'18	August'18	November'18	January'19
Bihar	690	682	673	705

3.1 DEPTH TO WATER LEVEL

3.1.1 May 2018

During Pre- Monsoon period (May 2018), 660 HNS were analysed. The Minimum depth to water level is 0.53 m bgl has been observed at, Madhubani district, and maximum is 15.8 m bgl at Jamui district. The depth to water level rests in range of 5 – 10 m bgl in 55% of the area of Bihar State, which spatially covers southern part of North Bihar Plains (NBP) and maximum part of South Bihar Plains (SBP). The depth to water level rests in the range of 2-5 m bgl in about 42% of the area covering northern part of NBP and as patches of SBP. In ~ 3% of area, water level > 10 m bgl has been recorded, which distributed as isolated patches mainly in Kaimur, Rohtas, Jamui, Bhagalpur, Aurangabad, Kishanganj, Buxar, Nalanda and Siwan district. In only 12 Hydrograph Network Station (HNS) which falls in Saharsa, Supaul, Madhubani, Kishanganj, Patna, and Darbhanga district, the depth to water level < 2 m bgl has been recorded **(Fig. 4; Table 5).**

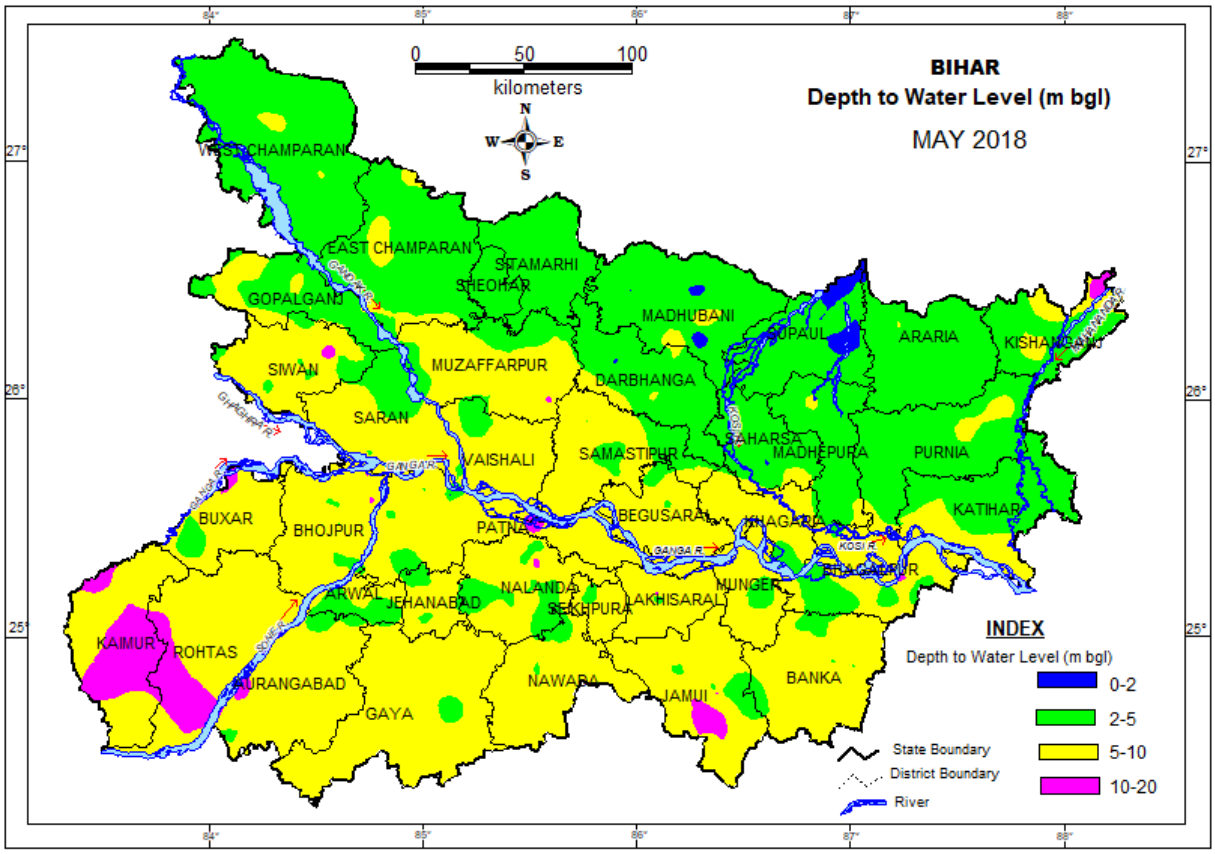

Fig. 4*: Depth to water level in May 2018*

Table 5 District wise well frequency for different ranges of depth to water level of HNS in **May. 2018** in Bihar state

SN	District	No. of Wells analysed	Depth to water level (m bgl)		0-2 m		2-5 m		5-10 m		10-20 m	
			Min.	Max.	No.	%	No.	%	No.	%	No.	%
1	Araria	9	2.10	5.53	0	0	8	89	1	11	0	0
2	Aurangabad	17	3.23	14.00	0	0	2	12	12	71	3	18
3	Banka	13	3.98	9.00	0	0	5	38	8	62	0	0
4	Begusarai	33	3.62	9.19	0	0	2	6	31	94	0	0
5	Bhagalpur	12	2.74	12.50	0	0	4	33	6	50	2	17
6	Bhojpur	32	4.38	10.88	0	0	4	13	25	78	3	9
7	Buxar	24	3.60	11.45	0	0	2	8	18	75	4	17
8	Darbhanga	9	1.87	5.19	1	11	7	78	1	11	0	0
9	Gaya	21	3.69	9.55	0	0	1	5	20	95	0	0
10	Gopalganj	22	3.02	6.67	0	0	15	68	7	32	0	0
11	Jamui	17	3.14	15.80	0	0	4	24	7	41	6	35
12	Jehanabad	19	3.07	7.50	0	0	9	47	10	53	0	0
13	Kaimur	10	5.50	13.20	0	0	0	0	5	50	5	50
14	Katihar	15	3.82	7.16	0	0	10	67	5	33	0	0
15	Khagaria	16	2.41	8.40	0	0	1	6	15	94	0	0
16	Kishanganj	8	2.00	10.40	1	13	5	63	1	13	1	13
17	Lakhisarai	8	2.21	11.65	0	0	1	13	6	75	1	13
18	Madhepura	15	3.10	5.85	0	0	12	80	3	20	0	0
19	Madhubani	21	0.53	6.64	3	14	15	71	3	14	0	0
20	Munger	7	3.87	7.47	0	0	1	14	6	86	0	0
21	Muzaffarpur	26	2.43	10.40	0	0	6	23	19	73	1	4
22	Nalanda	34	2.46	11.76	0	0	16	47	15	44	3	9
23	Nawada	15	2.85	9.50	0	0	3	20	12	80	0	0
24	W champaran	15	2.23	5.50	0	0	13	87	2	13	0	0
25	Patna	28	1.68	11.47	1	4	4	14	20	71	3	11
26	E champaran	32	2.35	6.27	0	0	24	75	8	25	0	0
27	Purnia	18	2.86	5.79	0	0	16	89	2	11	0	0
28	Rohtas	20	4.86	12.40	0	0	1	5	15	75	4	20
29	Saharsa	14	1.66	5.17	1	7	12	86	1	7	0	0
30	Samastipur	18	3.38	7.94	0	0	5	28	13	72	0	0
31	Saran	28	2.19	9.55	0	0	6	21	22	79	0	0
32	Seikhpura	7	3.47	9.66	0	0	2	29	5	71	0	0
33	Sheohar	1	3.69	3.69	0	0	1	100	0	0	0	0
34	Sitamarhi	16	2.34	4.99	0	0	16	100	0	0	0	0
35	Siwan	20	3.95	12.00	0	0	7	35	12	60	1	5
36	Supaul	24	0.75	4.92	5	21	19	79	0	0	0	0
37	Vaishali	16	3.78	8.48	0	0	1	6	15	94	0	0
	Total	660	0.53	15.80	12	2	260	39	351	53	37	6

3.1.2 August 2018

During mid-monsoon (August 2018), total 677 HNS were monitored. The depth to water level has been found to vary between 0.1 m bgl (Aurangabad district) and 12.65 m bgl (Aurangabad disrtict). The depth to water level varies in the range of 0 – 2 m bgl covers in about 22% area due to monsoon rainfall. It spatially covers the major part and bordering area of E & W Champaran, Sitamarhi, Madhubani, Supaul, and Kishanganj district, small parts of Rohtas, Darbhanga, Kaimur, Aurangabad, Gaya, Nawada, Banka, Munger, Patna, Jamui and Bhagalpur districts and as patches in many other part of the State.

Range of depth to water level 2-5 m bgl covers major part (62%) of the state including southern part of NBP and maximum part of SBP except some small patch like area. Parts of Saran, Siwan, Muzaffarpur, Vaishali, Samastipur, Buxar, Kaimur, Rohtas, Aurangabad, Jehanabad, Nalanda, Nawada, Sheikhpura, and other part as patches, the depth to water level rests in the range of 5 to 10 m bgl which forms about 16% of the area of the State. Only 5 wells located in Siwan, Kaimur, Jamui, Aurangabad and Bhagalpur district have shown water level more than 10 m bgl. **(Fig. 5; Table 6)**

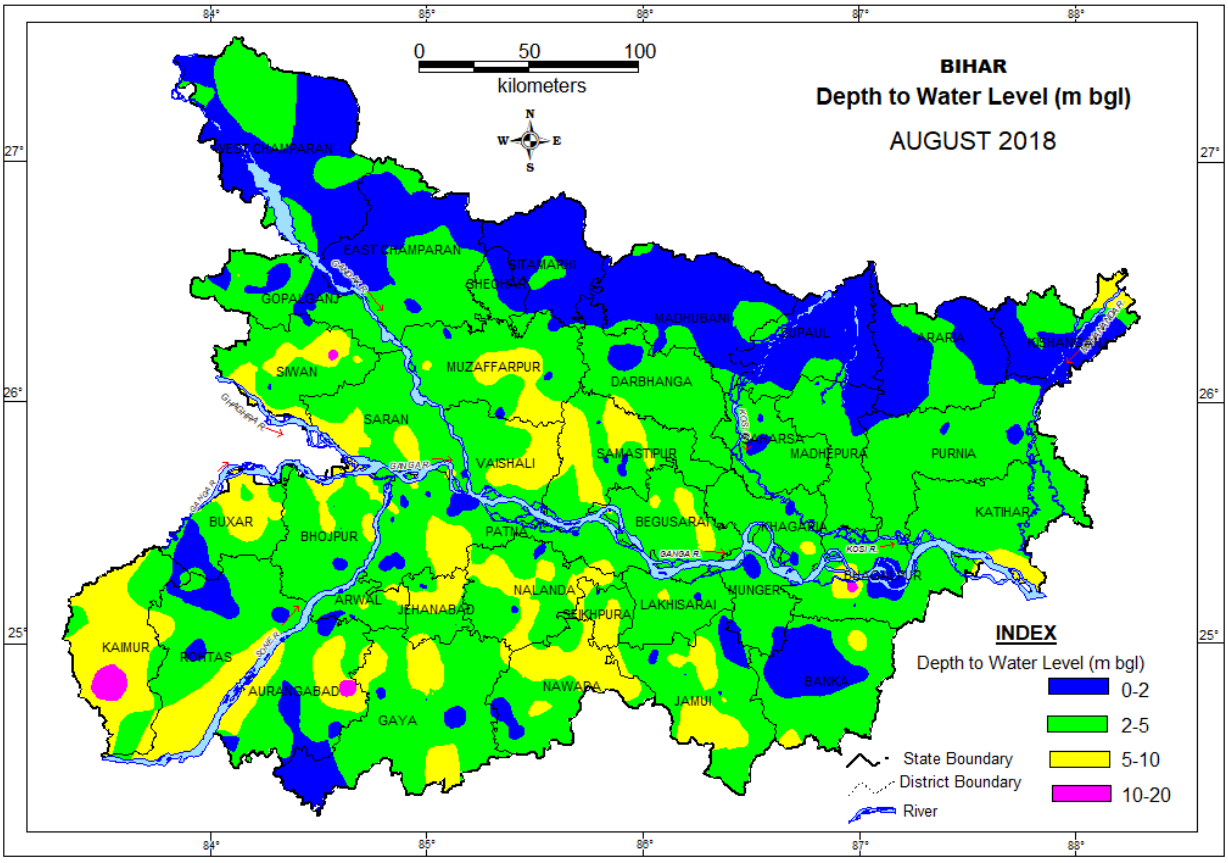

Fig. 5*: Depth to water level in August 2018*

Table 5 District wise well frequency for different ranges of depth to water level of HNS in **August. 2018** in Bihar state												
SN	**District**	**No. of Wells analysed**	**Depth to water level (m bgl)**		**0-2 m**		**2-5 m**		**5-10 m**		**10-20 m**	
			Min.	**Max.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
1	Araria	7	0.61	2.65	5	71	2	29	0	0	0	0
2	Aurangabad	16	0.1	14	6	38	6	38	3	19	1	6
3	Banka	14	0.89	6.09	6	43	6	43	2	14	0	0
4	Begusarai	35	2.14	7.3	0	0	26	74	9	26	0	0
5	Bhagalpur	10	1.17	12.15	3	30	6	60	0	0	1	10
6	Bhojpur	35	1.35	6.92	3	9	18	51	14	40	0	0
7	Buxar	25	0.36	7.8	2	8	13	52	10	40	0	0
8	Darbhanga	8	1.42	4.88	1	13	7	88	0	0	0	0
9	Gaya	21	0.32	9.08	5	24	10	48	6	29	0	0
10	Gopalganj	22	0.42	5.22	8	36	13	59	1	5	0	0
11	Jamui	17	0.43	11.92	4	24	7	41	5	29	1	6
12	Jehanabad	19	1.56	7.74	4	21	9	47	6	32	0	0
13	Kaimur	11	3.95	12.3	0	0	2	18	8	73	1	9
14	Katihar	15	1.94	5.67	1	7	13	87	1	7	0	0
15	Khagaria	18	1.14	5.88	2	11	14	78	2	11	0	0
16	Kishanganj	8	0.68	7.89	5	63	2	25	1	13	0	0
17	Lakhisarai	7	1.88	7.91	1	14	5	71	1	14	0	0
18	Madhepura	17	1.63	3.52	2	12	15	88	0	0	0	0
19	Madhubani	23	0.18	4.59	17	74	6	26	0	0	0	0
20	Munger	8	1.53	3.57	2	25	6	75	0	0	0	0
21	Muzaffarpur	24	0.16	7.39	3	13	13	54	8	33	0	0
22	Nalanda	34	1.04	9.9	2	6	18	53	14	41	0	0
23	Nawada	14	0.58	8.64	2	14	6	43	6	43	0	0
24	W champaran	14	0.84	4.32	11	79	3	21	0	0	0	0
25	Patna	31	0.4	8.46	10	32	17	55	4	13	0	0
26	E champaran	32	0.25	4.2	19	59	13	41	0	0	0	0
27	Purnia	18	1.22	4.75	2	11	16	89	0	0	0	0
28	Rohtas	20	0.54	8.57	6	30	7	35	7	35	0	0
29	Saharsa	18	1.47	4.4	3	17	15	83	0	0	0	0
30	Samastipur	19	0.4	7.51	4	21	6	32	9	47	0	0
31	Saran	30	0.2	8.07	1	3	14	47	15	50	0	0
32	Seikhpura	7	1.33	7.48	1	14	2	29	4	57	0	0
33	Sheohar	2	0.56	2.22	1	50	1	50	0	0	0	0
34	Sitamarhi	16	0.51	2.6	13	81	3	19	0	0	0	0
35	Siwan	20	1.51	12	1	5	12	60	6	30	1	5
36	Supaul	25	0.52	2.57	18	72	7	28	0	0	0	0
37	Vaishali	17	0.9	6.58	1	6	11	65	5	29	0	0
	Total	**677**	**0.1**	**14**	**175**	**26**	**350**	**52**	**147**	**22**	**5**	**1**

3.1.3 November 2018

Total 672 HNS wells were analysed during post-monsoon period (November 2018). The minimum and the maximum depth to water levels have been recorded as 0.64 m bgl (Madhbani district) and 13.5 m bgl (Jamui district) respectively. In major area of the State (68%) water level rests in range of 2 – 5 m bgl which covers almost entire Northern part and major part of Southern part of Bihar State. The depth to water level in the range of 5-10 m bgl occurs in about 27 % of the area, which occurs in part of Kaimur, Rohtas, Gaya, Jmaui, Sheikhpua, Nalanda, Patna, Samastipur, Vaishali, and Muzaffarpur districts and many other places as small patches. The water level in the range of 0 – 2 m bgl has been observed in only 11% of HNS wells, spatially covers as small patches at many locations (Sitamarhi, Madhubani, Araria, Kishanganj, Bhagalpur, Banka, Aurangabad, Rohtas, Buxar and W Champaran district, and many small parts of the state) There are 19 HNS stations in Rohtas, Jamui, Bhagalpur there where level has been observed more than 10 m bgl **(Fig. 6; Table 7).**

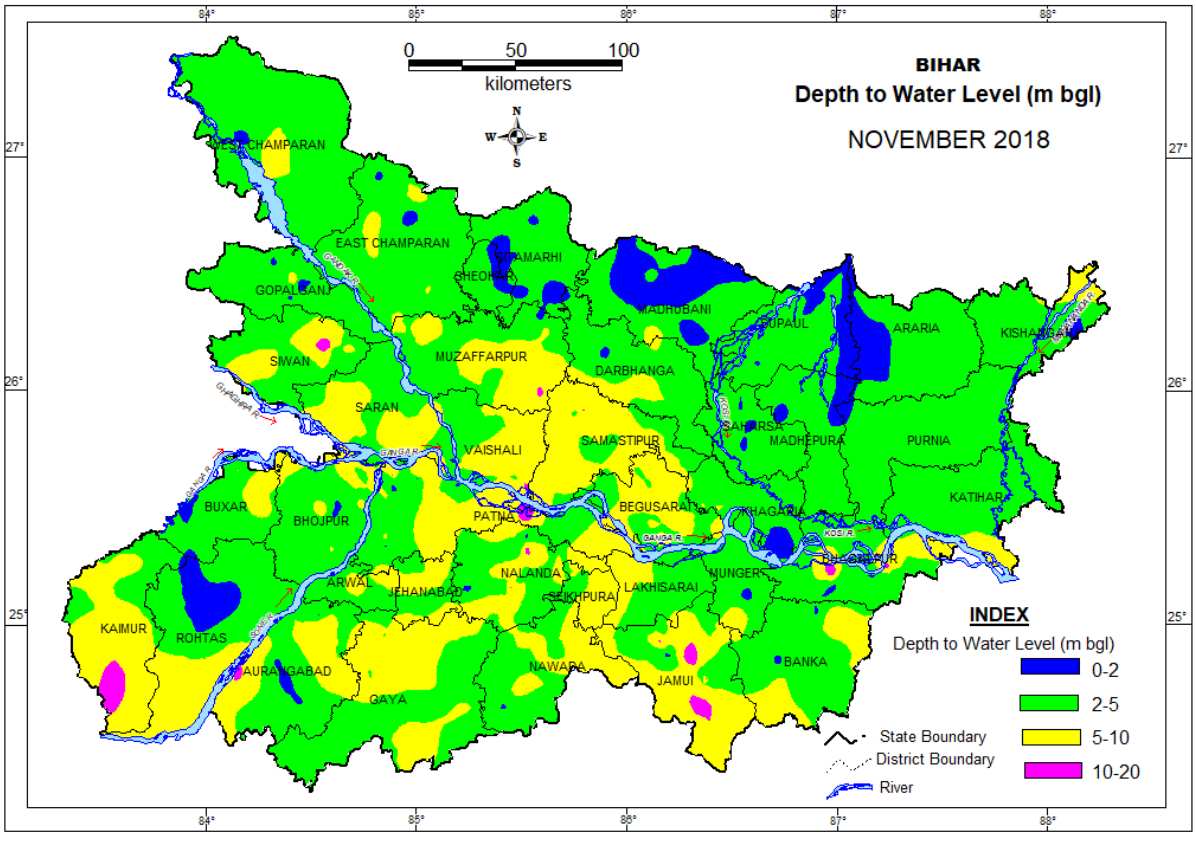

Fig. 6*: Depth to water level in November 2018*

Table 7 District wise well frequency for different ranges of depth to water level of HNS in **Nov. 2018** in Bihar state												
SN	**District**	**No. of Wells analysed**	**Depth to water level (m bgl)**		**0-2 m**		**2-5 m**		**5-10 m**		**10-20 m**	
			Min.	**Max.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
1	Araria	7	1.68	3.3	2	29	5	71	0	0	0	0
2	Aurangabad	16	1.43	10.86	4	25	6	38	4	25	2	13
3	Banka	14	1.59	7.72	2	14	8	57	4	29	0	0
4	Begusarai	28	2.68	9.3	0	0	13	46	15	54	0	0
5	Bhagalpur	13	1.56	12.26	2	15	7	54	2	15	2	15
6	Bhojpur	37	1.55	6.91	2	5	19	51	16	43	0	0
7	Buxar	25	1	6.55	2	8	15	60	8	32	0	0
8	Darbhanga	8	1.72	5.28	1	13	5	63	2	25	0	0
9	Gaya	21	2.23	9.33	0	0	9	43	12	57	0	0
10	Gopalganj	22	1.09	6.38	3	14	18	82	1	5	0	0
11	Jamui	18	1.57	13.5	1	6	9	50	3	17	5	28
12	Arwal & Jehanabad	18	2.15	9.21	0	0	11	61	7	39	0	0
13	Kaimur	10	2.7	10.26	0	0	4	40	5	50	1	10
14	Katihar	15	2.52	5.84	0	0	14	93	1	7	0	0
15	Khagaria	17	1.29	5.41	1	6	14	82	2	12	0	0
16	Kishanganj	8	1.76	8.6	1	13	6	75	1	13	0	0
17	Lakhisarai	8	2.06	9.11	0	0	6	75	2	25	0	0
18	Madhepura	17	1.04	5.32	2	12	14	82	1	6	0	0
19	Madhubani	22	0.64	5.85	12	55	9	41	1	5	0	0
20	Munger	10	1.33	7.85	1	10	8	80	1	10	0	0
21	Muzaffarpur	26	1.1	10.4	1	4	12	46	12	46	1	4
22	Nalanda	36	1.27	11.28	2	6	19	53	12	33	3	8
23	Nawada	16	1.88	8.49	2	13	7	44	7	44	0	0
24	W Champaran	15	1.07	8.8	1	7	13	87	1	7	0	0
25	Patna	29	1.62	11.47	6	21	11	38	10	34	2	7
26	E Champaran	32	1.01	7.09	2	6	25	78	5	16	0	0
27	Purnia	17	2.24	4.53	0	0	17	100	0	0	0	0
28	Rohtas	20	1.25	9.45	6	30	10	50	4	20	0	0
29	Saharsa	18	1.61	4.71	3	17	15	83	0	0	0	0
30	Samastipur	18	2.8	10.7	0	0	3	17	14	78	1	6
31	Saran	28	0.75	8.96	1	4	11	39	16	57	0	0
32	Seikhpura	7	2.22	8.91	0	0	4	57	3	43	0	0
33	Sheohar	2	1.84	2.39	1	50	1	50	0	0	0	0
34	Sitamarhi	16	1.25	3.62	7	44	9	56	0	0	0	0
35	Siwan	19	3.14	12	0	0	12	63	6	32	1	5
36	Supaul	22	1.18	4.76	9	41	13	59	0	0	0	0
37	Vaishali	17	2.69	10.53	0	0	6	35	10	59	1	6
	Total	672	0.64	13.5	77	11	388	58	188	28	19	3

3.1.0 January 2019

During the recession period (Jan. 2019), 657 HNS were analysed. The minimum depth to water level of 0.3 m below ground level (bgl) has been observed in Samastipur district, and maximum water level of 15.8 m bgl has been observed in the Jamui district. The depth to water level rests in range of 2 – 5 m bgl in maximum part (56% area) of Bihar State. The depth to water level rests in the range of 5 – 10 m bgl in 43% of the area covering adjoining area and major part of Lakhisarai, Muzaffarpur, Saran, Vaishali, Begusarai, Aurangabad, Rohtas, Kaimur, Gaya, Nawada, Jamui, Sheikhpura, Buxer and many locations as patches. Only in 17 wells located in Aurangabad, Bhagalpur, Gaya, Jamui, Muzaffarpur, Nalanda, Patna, and Siwan district depth to water level >10m bgl has been observed. **(Fig.7; Table 8).**

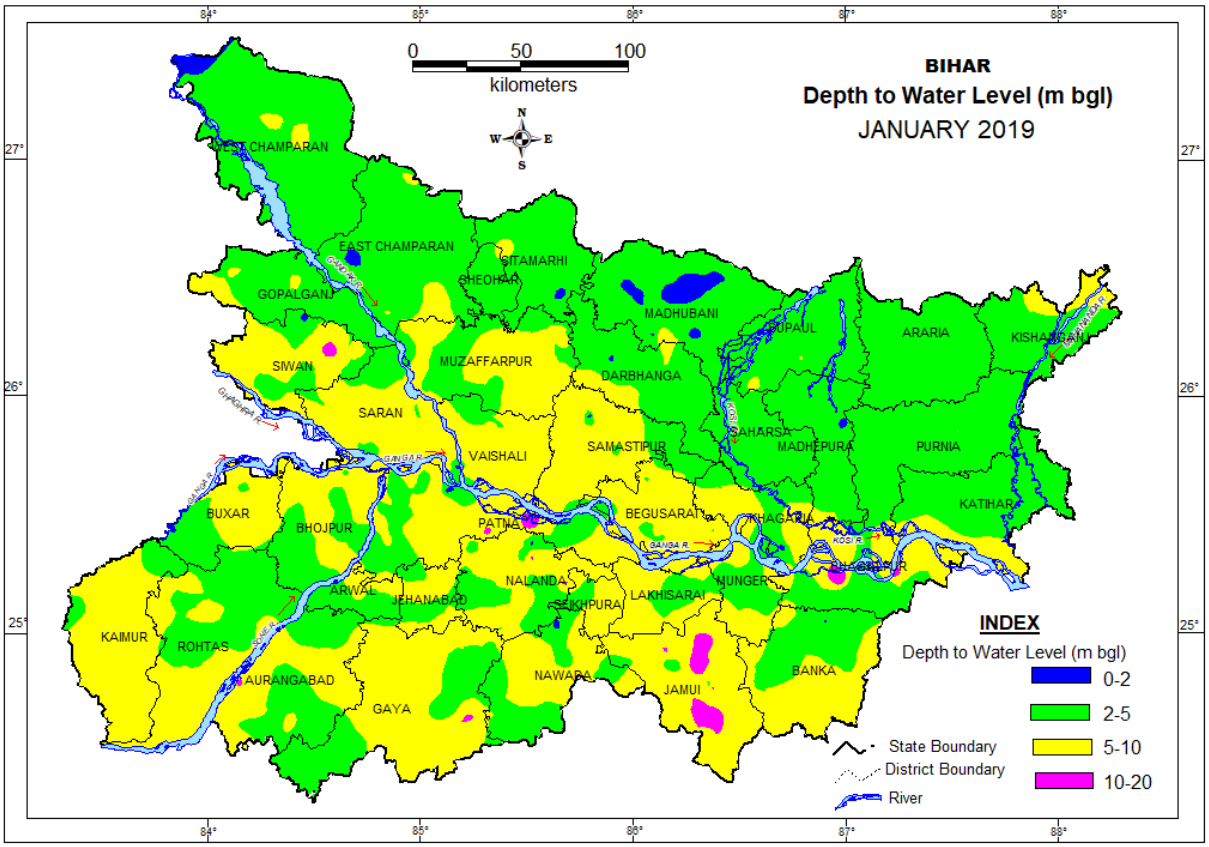

Fig. 7*: Depth to water level in January 2019*

Table 8 District wise well frequency for different ranges of depth to water level of HNS in **Jan. 2019** in Bihar state

SN	District	No. of Wells analysed	Depth to water level (m bgl)		0-2 m		2-5 m		5-10 m		10-20 m	
			Min.	Max.	No.	%	No.	%	No.	%	No.	%
1	Araria	7	2.25	4.5	0	0	7	100	0	0	0	0
2	Aurangabad	15	2.22	10.4	0	0	8	53	5	33	2	13
3	Banka	13	1.9	8.15	1	8	6	46	6	46	0	0
4	Begusarai	33	3.14	9.9	0	0	7	21	26	79	0	0
5	Bhagalpur	10	2.19	13.4	0	0	5	50	3	30	2	20
6	Bhojpur	36	3.12	9.8	0	0	11	31	25	69	0	0
7	Buxar	25	2.1	9.24	0	0	8	32	17	68	0	0
8	Darbhanga	8	1.84	5.73	1	13	5	63	2	25	0	0
9	Gaya	21	2	10.85	1	5	4	19	15	71	1	5
10	Gopalganj	21	1.38	6.38	1	5	17	81	3	14	0	0
11	Jamui	16	3.79	15.8	0	0	2	13	7	44	7	44
12	Jehanabad	18	2.77	8.53	0	0	8	44	10	56	0	0
13	Kaimur	8	3.85	9.42	0	0	1	13	7	88	0	0
14	Katihar	14	3.08	6.36	0	0	10	71	4	29	0	0
15	Khagaria	19	1.44	8.1	1	5	6	32	12	63	0	0
16	Kishanganj	7	2.06	9.71	0	0	6	86	1	14	0	0
17	Lakhisarai	8	2.19	9.02	0	0	5	63	3	38	0	0
18	Madhepura	17	1.64	5.32	1	6	15	88	1	6	0	0
19	Madhubani	24	0.65	6.58	7	29	16	67	1	4	0	0
20	Munger	8	3.5	9.74	0	0	4	50	4	50	0	0
21	Muzaffarpur	25	1.9	8	1	4	7	28	17	68	0	0
22	Nalanda	33	1.26	11.62	1	3	16	48	14	42	2	6
23	Nawada	15	1.7	9.1	2	13	4	27	9	60	0	0
24	W champaran	14	0.56	7.13	1	7	11	79	2	14	0	0
25	Patna	31	1.18	11.47	2	6	15	48	12	39	2	6
26	E champaran	26	1	5.46	1	4	22	85	3	12	0	0
27	Purnia	17	2.73	5.04	0	0	16	94	1	6	0	0
28	Rohtas	20	2.32	8.02	0	0	10	50	10	50	0	0
29	Saharsa	16	1.84	5.2	1	6	14	88	1	6	0	0
30	Samastipur	18	0.3	9	1	6	2	11	15	83	0	0
31	Saran	30	0.87	8.96	1	3	7	23	22	73	0	0
32	Seikhpura	7	2.45	9.08	0	0	3	43	4	57	0	0
33	Sheohar	2	2.32	3.73	0	0	2	100	0	0	0	0
34	Sitamarhi	16	1.61	6.1	1	6	14	88	1	6	0	0
35	Siwan	17	3.02	12	0	0	6	35	10	59	1	6
36	Supaul	24	2.26	9.02	0	0	22	92	2	8	0	0
37	Vaishali	18	3.19	9.5	0	0	3	17	15	83	0	0
	Total	657	0.3	15.8	25	4	325	49	290	44	17	3

3.2 SEASONAL FLUCTUATION

3.2.1 May 2018 to August 2018

Water level fluctuation between May 2018 and August 2018 has been analysed for 633 HNS to study the seasonal fluctuation of depth to water level, and its categorization in different depth zones. The analysis indicates rise in the water level in 608 (96%) HNS whereas the fall is observed only in 25 (4%) HNS. Majority of HNS (43%) have shown the rise of water level in the range of 0 to 2 m constituting 44% area of the State including maximum part of NBP and in some parts of SBP. Major parts of E Champaran, Muzaffarpur, Darbhanga, Araria, Purnia, Katihar, Kishnganj, Saharsa and Madhepura district in NBP and Nalanda, Nawada, Gaya, Jehanabda and Arwal district in SBP and many other small parts of the state, have shown rise in water level upto 2m. Rise of water level from 2 to 4 m has been recorded in 36% (231 wells) NHS wells, covering major parts of Buxar, Bhojpur, Aurangabad, Gaya, Jamui and E Champaran districts and some other parts as small patches. Only 16% of HNS have shown rise in water level of more than 4m. In major part of Kaimur, Rohtas, Banka, and Lakhisarai district rise of water level more than 4m has been recorded.

Few wells located in Muzaffarpur, Saran, Supaul, Saharsa, Nalanda, Vaishali and Jehanabad district have shown fall in water level <2m. Only 1 wells located in Saharsa district shows fall in water level in the range of 2-4 m due to some local problem. **(Fig.8; Table 9).**

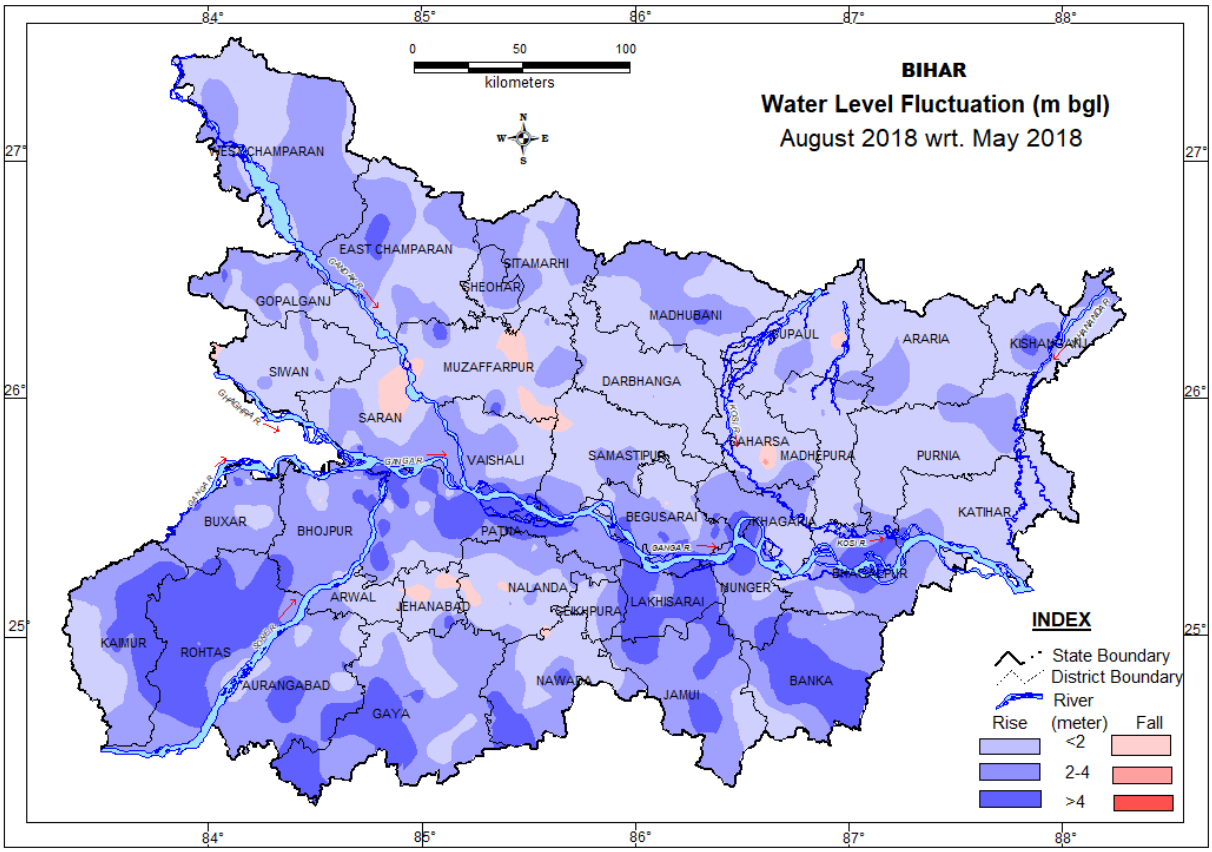

Fig. 7 *Water level Fluctuation between May 2018 and August 2018*

Table – 9 District wise categorization of fluctuation and their frequency of water levels of HNS of **Aug. 2018 w.r.t. May 2018**																				
SN	**District**	**No. of HNS**	**Range of fluctuation (m)**				**No. of Wells / Percentage showing fluctuation**												**Total**	
			Rise		**Fall**		**Rise**						**Fall**							
			Min.	**Max.**	**Min.**	**Max.**	**<2m**	**%**	**2-4m**	**%**	**>4m**	**%**	**<2m**	**%**	**2-4m**	**%**	**>4m**	**%**	**Rise**	**Fall**
1	Araria	7	0.55	2.27	-	-	5	71	2	29	0	0	0	0	0	0	0	0	7	0
2	Aurangabad	16	1.05	6.22	-	-	3	19	9	56	4	25	0	0	0	0	0	0	16	0
3	Banka	13	0.85	6.94	-	-	2	15	6	46	5	38	0	0	0	0	0	0	13	0
4	Begusarai	32	0.19	5.87	0.48	0.48	11	34	12	38	8	25	1	3	0	0	0	0	31	1
5	Bhagalpur	8	0.87	10.03	-	-	3	38	3	38	2	25	0	0	0	0	0	0	8	0
6	Bhojpur	32	0.25	7.08	0.34	0.34	5	16	21	66	5	16	1	3	0	0	0	0	31	1
7	Buxar	24	1.35	5.25	-	-	3	13	19	79	2	8	0	0	0	0	0	0	24	0
8	Darbhanga	8	0.12	2.11	-	-	6	75	2	25	0	0	0	0	0	0	0	0	8	0
9	Gaya	21	0.38	6.31	-	-	7	33	7	33	7	33	0	0	0	0	0	0	21	0
10	Gopalganj	21	0.18	4.84	-	-	10	48	10	48	1	5	0	0	0	0	0	0	21	0
11	Jamui	17	0.67	8.43	-	-	2	12	11	65	4	24	0	0	0	0	0	0	17	0
12	Jehanabad	19	0.4	4.83	0.03	1.32	11	58	3	16	1	5	4	21	0	0	0	0	15	4
13	Kaimur	10	0.92	5.9	-	-	2	20	5	50	3	30	0	0	0	0	0	0	10	0
14	Katihar	15	0.1	4.87	-	-	11	73	3	20	1	7	0	0	0	0	0	0	15	0
15	Khagaria	15	0.56	5.82	-	-	4	27	5	33	6	40	0	0	0	0	0	0	15	0
16	Kishanganj	8	1.32	6.59	-	-	6	75	1	13	1	13	0	0	0	0	0	0	8	0
17	Lakhisarai	7	2.77	6.81	0.09	0.09	0	0	2	29	4	57	1	14	0	0	0	0	6	1
18	Madhepura	15	0.13	2.41	-	-	12	80	3	20	0	0	0	0	0	0	0	0	15	0
19	Madhubani	20	0.27	5.33	-	-	10	50	9	45	1	5	0	0	0	0	0	0	20	0
20	Munger	7	1.53	5.94	-	-	1	14	3	43	3	43	0	0	0	0	0	0	7	0
21	Muzaffarpur	24	0.17	5.66	0.04	0.87	12	50	4	17	1	4	7	29	0	0	0	0	17	7
22	Nalanda	31	0.01	5.93	0.11	0.46	21	68	6	19	1	3	3	10	0	0	0	0	28	3
23	Nawada	14	0.04	5.27	0.25	0.25	7	50	3	21	3	21	1	7	0	0	0	0	13	1
24	W. Champaran	13	0.65	3.39	-	-	4	31	9	69	0	0	0	0	0	0	0	0	13	0
25	Patna	27	0.05	10	-	-	6	22	7	26	14	52	0	0	0	0	0	0	27	0
26	E. Champaran	31	0.39	5.18	-	-	12	39	17	55	2	6	0	0	0	0	0	0	31	0
27	Purnia	17	0.43	3.02	-	-	13	76	4	24	0	0	0	0	0	0	0	0	17	0
28	Rohtas	20	0.98	9.73	-	-	2	10	4	20	14	70	0	0	0	0	0	0	20	0
29	Saharsa	14	0.24	2.59	2.69	2.69	11	79	1	7	1	7	0	0	1	7	0	0	13	1
30	Samastipur	17	0.1	3.7	-	-	12	71	5	29	0	0	0	0	0	0	0	0	17	0
31	Saran	27	0.1	5.36	1.3	1.3	12	44	13	48	1	4	1	4	0	0	0	0	26	1
32	Seikhpura	7	0.26	4.62	1.1	1.1	3	43	2	29	1	14	1	14	0	0	0	0	6	1
33	Sheohar	1	3.13	3.13	-	-	0	0	1	100	0	0	0	0	0	0	0	0	1	0
34	Sitamarhi	16	1	3.69	-	-	6	38	10	63	0	0	0	0	0	0	0	0	16	0
35	Siwan	19	0.25	5.62	0.18	0.51	12	63	2	11	3	16	2	11	0	0	0	0	17	2
36	Supaul	24	0.37	2.56	0.12	0.67	19	79	3	13	0	0	2	8	0	0	0	0	22	2
37	Vaishali	16	0.04	6.86	-	-	8	50	4	25	4	25	0	0	0	0	0	0	16	0
	Total	633	0.01	10.03	0.03	2.69	274	43	231	36	103	16	24	4	1	0	0	0	608	25

3.2.2 May 2018 to November 2018

Water level fluctuations between May 2018 and November 2018 has been analysed for 625 HNS. The rise of water level observed in 563 (90%) HNS ranged from 0.01 (Muzaffarpur) to 9.75 m (Buxar) whereas, only 62 (10%) HNS have shown fall in water level ranged from 0.01 (Madhubani) to 5.68 m (Begusarai). The majority of HNS (357 well, 57%) have shown rise in the range of 0-2 m, whereas the 143 and 63 NHS have shown rise in water level in the range of 2-4 m and >4m respectively.

About 94 % area of the State has shown rise in water level. The 0-2 m segment covering 65% area of the state has spread in the major part of NBP and in SBP, major part of Nalanda, Nawada, Gaya, Arwal and Jehanabad district and many other localised area of the State. About 23% area covering major part of SBP and parts of Vaishali, Begusarai, Khagaria, Bhagalpur and Katihar district in NBP has shown water level rise in the range of 2-4 m. The areas covering part of Banka, Bhagalpur, Munger, Lakhisarai, Nawada, Aurangabad, Rohtas, and Kaimur district are shown water level rise in the range of more than 4 m. The fall is recorded as dissiminated patches at many locations (small patches in Darbhanga, Saran, Supaul, Samastipur, Muzaffarpur, E Champaran, Nawada, Sheikhpura, Jamui, Banka and Nalanda district) in the State. **(Fig 9, Table 10).**

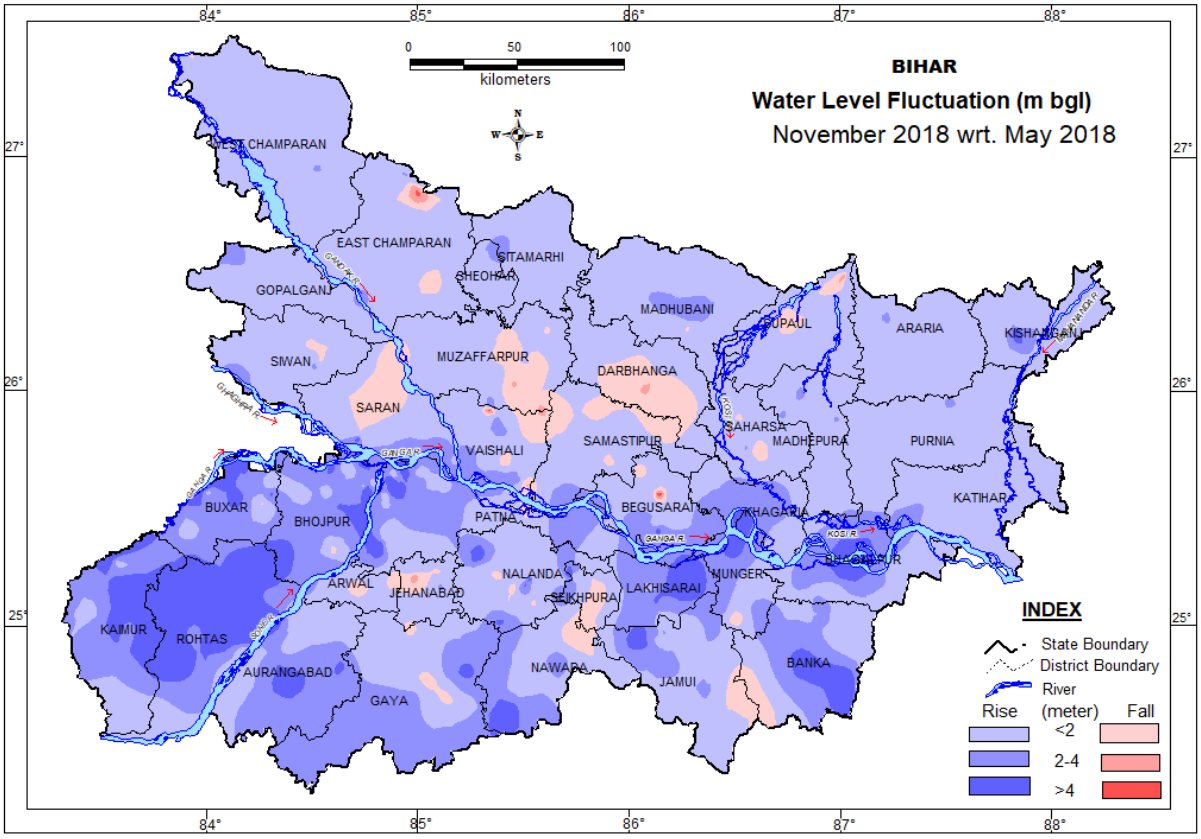

Fig. 9*: Fluctuation in ground water level between May 2018 and Nov. 2018.*

Table – 10 District wise categorization of fluctuation and their frequency of water levels of HNS of **Nov. 2018 w.r.t. May 2018**

District	No. of HNS	Range of fluctuation (m)				No. of Wells / Percentage showing fluctuation												Total	
		Rise		Fall		Rise						Fall							
		Min.	Max.	Min.	Max.	<2m	%	2-4m	%	>4m	%	<2m	%	2-4m	%	>4m	%	Rise	Fall
Araria	6	0.91	3.19	0.11	0.11	4	67	1	17	0	0	1	17	0	0	0	0	5	1
Aurangabad	16	0.24	5.41	-	-	8	50	6	38	2	13	0	0	0	0	0	0	16	0
Banka	13	1.25	5.23	-	-	7	54	4	31	2	15	0	0	0	0	0	0	13	0
Begusarai	27	0.03	5.99	0.32	4.68	15	56	9	33	1	4	1	4	0	0	1	4	25	2
Bhagalpur	11	1.11	7.66	-	-	5	45	5	45	1	9	0	0	0	0	0	0	11	0
Bhojpur	32	0.29	6.28	0.55	0.55	6	19	16	50	9	28	1	3	0	0	0	0	31	1
Buxar	24	0.65	7.75	0.13	0.13	6	25	5	21	12	50	1	4	0	0	0	0	23	1
Darbhanga	8	0.15	1.03	0.01	0.44	4	50	0	0	0	0	4	50	0	0	0	0	4	4
Gaya	21	0.22	4.38	0.21	1.46	7	33	9	43	1	5	4	19	0	0	0	0	17	4
Gopalganj	21	0.03	2.53	-	-	18	86	3	14	0	0	0	0	0	0	0	0	21	0
Jamui	17	0.05	5.21	1.49	1.49	8	47	7	41	1	6	1	6	0	0	0	0	16	1
Jehanabad	18	0.38	2.40	0.15	2.81	12	67	2	11	0	0	3	17	1	6	0	0	14	4
Kaimur	9	1.17	8.50	-	-	2	22	4	44	3	33	0	0	0	0	0	0	9	0
Katihar	15	0.29	3.15	-	-	12	80	3	20	0	0	0	0	0	0	0	0	15	0
Khagaria	14	1.12	3.95	-	-	1	7	13	93	0	0	0	0	0	0	0	0	14	0
Kishanganj	8	0.24	5.76	-	-	7	88	0	0	1	13	0	0	0	0	0	0	8	0
Lakhisarai	7	2.54	6.63	0.05	0.05	0	0	3	43	3	43	1	14	0	0	0	0	6	1
Madhepura	15	0.67	2.25	0.96	0.96	11	73	3	20	0	0	1	7	0	0	0	0	14	1
Madhubani	19	0.34	3.99	0.01	0.22	15	79	2	11	0	0	2	11	0	0	0	0	17	2
Munger	7	1.03	5.03	0.94	0.94	2	29	2	29	2	29	1	14	0	0	0	0	6	1
Muzaffarpur	26	0.01	1.94	0.05	2.48	16	62	0	0	0	0	8	31	2	8	0	0	16	10
Nalanda	34	0.09	5.71	0.01	1.08	23	68	0	0	5	15	6	18	0	0	0	0	28	6
Nawada	15	0.25	4.97	1.20	1.20	10	67	3	20	1	7	1	7	0	0	0	0	14	1
W Champaran	14	0.18	2.10	0.04	0.04	12	86	1	7	0	0	1	7	0	0	0	0	13	1
Patna	25	0.07	7.64	-	-	10	40	11	44	4	16	0	0	0	0	0	0	25	0
E Champaran	32	0.13	2.31	0.66	4.74	27	84	3	9	0	0	1	3	0	0	1	3	30	2
Purnia	16	0.56	2.08	-	-	15	94	1	6	0	0	0	0	0	0	0	0	16	0
Rohtas	20	0.49	8.14	-	-	3	15	4	20	13	65	0	0	0	0	0	0	20	0
Saharsa	14	0.02	2.08	0.53	1.99	11	79	1	7	0	0	2	14	0	0	0	0	12	2
Samastipur	16	0.02	2.20	0.15	0.35	12	75	1	6	0	0	3	19	0	0	0	0	13	3
Saran	26	0.06	4.93	1.49	1.49	16	62	8	31	1	4	1	4	0	0	0	0	25	1
Seikhpura	7	0.13	7.42	0.09	0.82	3	43	1	14	1	14	2	29	0	0	0	0	5	2
Sheohar	1	1.85	1.85	-	-	1	100	0	0	0	0	0	0	0	0	0	0	1	0
Sitamarhi	16	0.13	2.69	-	-	15	94	1	6	0	0	0	0	0	0	0	0	16	0
Siwan	18	0.24	2.92	0.04	0.18	11	61	3	17	0	0	4	22	0	0	0	0	14	4
Supaul	21	0.26	1.63	0.09	3.48	18	86	0	0	0	0	2	10	1	5	0	0	18	3
Vaishali	16	0.43	3.59	0.84	4.80	4	25	8	50	0	0	2	13	1	6	1	6	12	4
Total	625	0.01	8.50	0.01	5.68	357	57	143	23	63	10	54	9	5	1	3	0	563	62

3.2.3 May 2018 to January 2019

Water level fluctuation between May 2018 and January 2019 has been analysed for 610 HNS which indicates rise in water level in about 78 % (476 wells) of the HNS. The rise in water level in the range of 0 – 2 m in 61 % of the HNS, 2 – 4 m in 12% of the HNS and >4 m only in 5% HNS. About 65% area has shown rise in water level up to 2 m covers major part of Araria, Purnia, Katihar, Kishanganj, E & W Champaran, Gopalganj, Madhepura, Saharsa, Khagaria, Siwan, Buxer, Gaya, Bhojpur, Nalanda, Nawada and Patna districts and some other parts of Bihar State. The range of 2 to 4 m rise has been observed in major parts of Kaimur, Rohtas district, part of Buxar, Bhojpur, Aurangabad, Gaya, Lakhisarai, Banka, and Bhagalpur district and many localised areas constitutes about 12% area of the State. Small parts of Rohtas, Kaimur, Aurangabad, Gaya, Nawada, Lakhisarai, Bhagalpur, Patna, Muzaffarapur, districts shows water level rise more than 4 m.

The fall in water level has been observed in 134 wells (22%), 19 % well shows fall less than 2 m and only 15 wells located in Saran, Patna, Begusarai, Munger, Jamui, Bhojpur, and Aurangabad shows fall in water level 2-4 m. The range of 0-2 m fall is observed as patchses in Araria, Supaul, Darbhanga, Muzaffarpur, E Champaran, Saran, Jamui, Banka, Patna and Jehanabad districts and other areas as small patches covering 17% of the area of the state. Only 15 well has shown fall of water level 2-4 m **(Fig. 10, Table 11).**

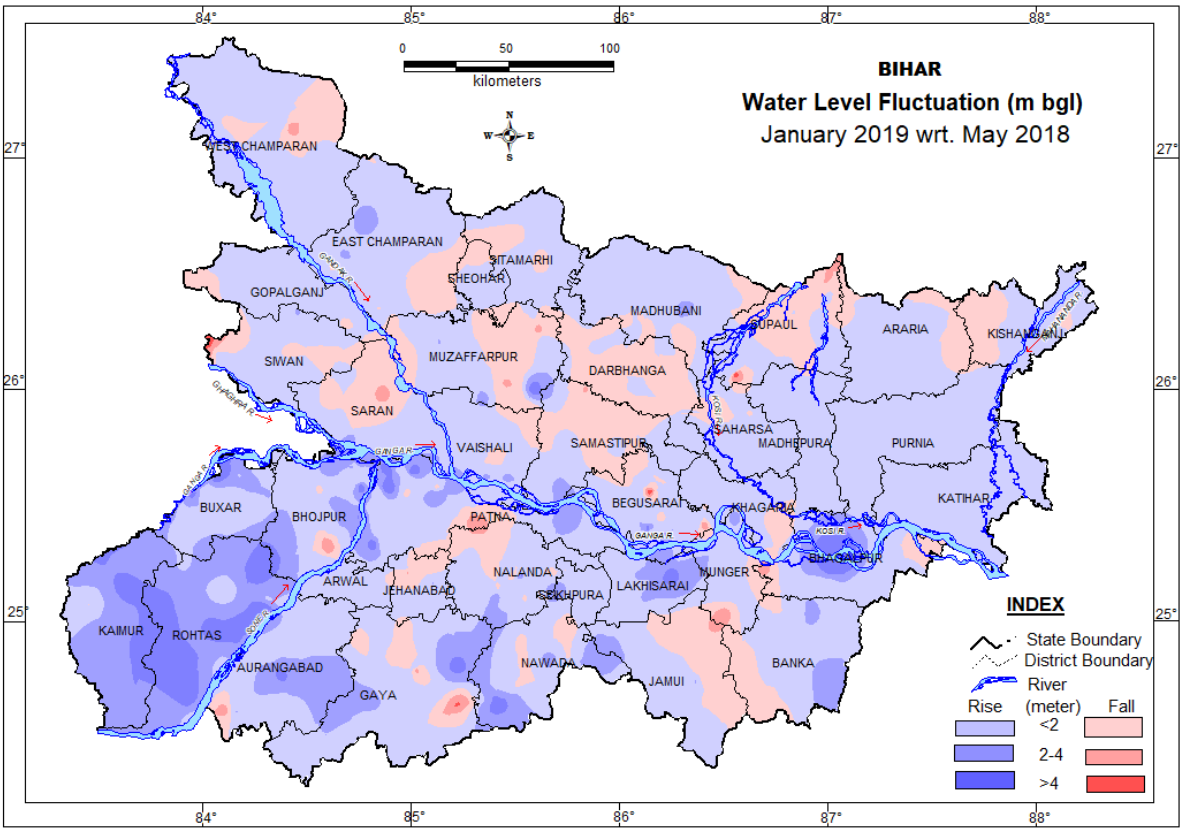

***Fig. 10**: Fluctuation in ground water level between May 2018 and Jan. 2019.*

Table – 11 District wise categorization of fluctuation and their frequency of water levels of HNS of **Jan. 2019 w.r.t. May 2018** for Bihar State

SN	District	No. of HNS	Range of fluctuation (m)				No. of Wells / Percentage showing fluctuation												Total	
			Rise		Fall		Rise						Fall							
			Min.	Max.	Min.	Max.	<2m	%	2-4m	%	>4m	%	<2m	%	2-4m	%	>4m	%	Rise	Fall
1	Araria	6	0.36	0.62	0.47	0.47	5	83	0	0	0	0	1	17	0	0	0	0	5	1
2	Aurangabad	15	0.02	4.62	3.17	3.17	10	67	3	20	1	7	0	0	1	7	0	0	14	1
3	Banka	12	0.31	3.64	0.05	1.11	5	42	3	25	0	0	4	33	0	0	0	0	8	4
4	Begusarai	30	0.25	5.53	0.03	5.68	20	67	2	7	1	3	5	17	1	3	1	3	23	7
5	Bhagalpur	9	0.35	5.33	0.53	2.72	6	67	0	0	1	11	1	11	1	11	0	0	7	2
6	Bhojpur	31	0.25	5.73	0.74	3.93	18	58	9	29	2	6	1	3	1	3	0	0	29	2
7	Buxar	24	0.02	5.36	-	-	12	50	8	33	4	17	0	0	0	0	0	0	24	0
8	Darbhanga	8	0.03	0.95	0.01	0.83	2	25	0	0	0	0	6	75	0	0	0	0	2	6
9	Gaya	21	0.06	4.61	0.4	4.39	14	67	1	5	1	5	3	14	1	5	1	5	16	5
10	Gopalganj	21	0.14	2.24	0.27	0.27	19	90	1	5	0	0	1	5	0	0	0	0	20	1
11	Jamui	16	0.1	2.17	0.21	2	6	38	2	13	0	0	8	50	0	0	0	0	8	8
12	Jehanabad	18	0.3	2.2	0.05	2.13	13	72	1	6	0	0	3	17	1	6	0	0	14	4
13	Kaimur	8	1.65	5.34	0.08	0.08	1	13	4	50	2	25	1	13	0	0	0	0	7	1
14	Katihar	14	0.06	1.97	-	-	14	100	0	0	0	0	0	0	0	0	0	0	14	0
15	Khagaria	16	0.31	1.7	0.88	1.37	14	88	0	0	0	0	2	13	0	0	0	0	14	2
16	Kishanganj	7	0.19	0.69	0.06	0.51	3	43	0	0	0	0	4	57	0	0	0	0	3	4
17	Lakhisarai	7	0.02	4.9	-	-	3	43	3	43	1	14	0	0	0	0	0	0	7	0
18	Madhepura	15	0.18	1.46	0.96	0.96	14	93	0	0	0	0	1	7	0	0	0	0	14	1
19	Madhubani	20	0.04	2.88	0.14	0.78	15	75	1	5	0	0	4	20	0	0	0	0	16	4
20	Munger	7	0.37	2.16	2.83	2.83	4	57	2	29	0	0	0	0	1	14	0	0	6	1
21	Muzaffarpur	25	0.21	5.34	0.24	2.76	10	40	1	4	1	4	11	44	2	8	0	0	12	13
22	Nalanda	32	0.06	5.08	0.08	1.11	19	59	4	13	1	3	8	25	0	0	0	0	24	8
23	Nawada	14	0.22	4.88	0.08	1.2	4	29	3	21	1	7	6	43	0	0	0	0	8	6
24	W. Champaran	13	0.31	1.71	0.07	3.62	9	69	0	0	0	0	3	23	1	8	0	0	9	4
25	Patna	27	0.21	5.35	0.5	3.45	13	48	7	26	4	15	2	7	1	4	0	0	24	3
26	E. Champaran	24	0.1	2.7	0.02	0.92	17	71	2	8	0	0	5	21	0	0	0	0	19	5
27	Purnia	16	0.13	0.97	-	-	16	100	0	0	0	0	0	0	0	0	0	0	16	0
28	Rohtas	20	0.9	5.73	-	-	4	20	9	45	7	35	0	0	0	0	0	0	20	0
29	Saharsa	12	0.14	1.44	0.12	1.02	9	75	0	0	0	0	3	25	0	0	0	0	9	3
30	Samastipur	16	0.01	2.4	0.05	2.23	6	38	1	6	0	0	8	50	1	6	0	0	7	9
31	Saran	27	0.02	3.7	0.25	2.47	20	74	4	15	0	0	2	7	1	4	0	0	24	3
32	Seikhpura	7	0.58	3.26	0.02	0.16	4	57	1	14	0	0	2	29	0	0	0	0	5	2
33	Sheohar	1	1.37	1.37	-	-	1	100	0	0	0	0	0	0	0	0	0	0	1	0
34	Sitamarhi	16	0.26	0.96	0.01	1.9	12	75	0	0	0	0	4	25	0	0	0	0	12	4
35	Siwan	16	0.33	1.92	0.39	4.69	11	69	0	0	0	0	4	25	0	0	1	6	11	5
36	Supaul	23	0.23	0.77	0.05	5.51	10	43	0	0	0	0	10	43	2	9	1	4	10	13
37	Vaishali	16	0.07	4.57	0.13	0.84	11	69	2	13	1	6	2	13	0	0	0	0	14	2
	Total	610	0.01	5.73	0.01	5.68	374	61	74	12	28	5	115	19	15	2	4	1	476	134

3.3.0 ANNUAL FLUCTUATION

3.3.1 May 2017 to May 2018

Fluctuation of ground water level between May 2017 and May 2018 of 604 HNS has been analysed which indicates rise in water level in 223 wells (37%) of the HNS and fall in water level in 381 No (63%) of HNS. Major part of the State has shown fall in water level. Fall to the tune of 0 – 2 m has covered maximum area (60%), which includes major parts of Darbhanga, E & W Champaran, Madhubani, Saharsa, Supaul, Madhepura, Samastipur and Siwan districts in NBP and Nalanda, Bhojpur, Rotas, Buxar, Kamur, Nawada and Patna districts in SBP and many other small parts of the state. Parts of Madhubani, saran, Aurangabad, Gaya and Jamui ditsricts and many other small parts of the state has shown water level fall between 2-4m. Very small part of Jamui, Aurangabad, Patna, Saran and Siwan districts has shown water level fall >4m.

Area where rise of water level is within 2 m spread over major part of Muzaffarpur, Vaishali, Araria, Kishanganj, Katihar, Bhagalpur, and Banka district and as patches at many places in the state constituting 34% area of the state. Water level rise in the range of 2-4 m observed in very small parts of Saran, Vaishali, Banka, Jamui, Munger, Gaya and Kaimur, district, and many other small patch like area in the state. Warer level rise >4m has been observed in only 8 NHS wells in Begusarai, Gaya, Jamui, Munger and Nalanda district. **(Fig. 11, Table 12).**

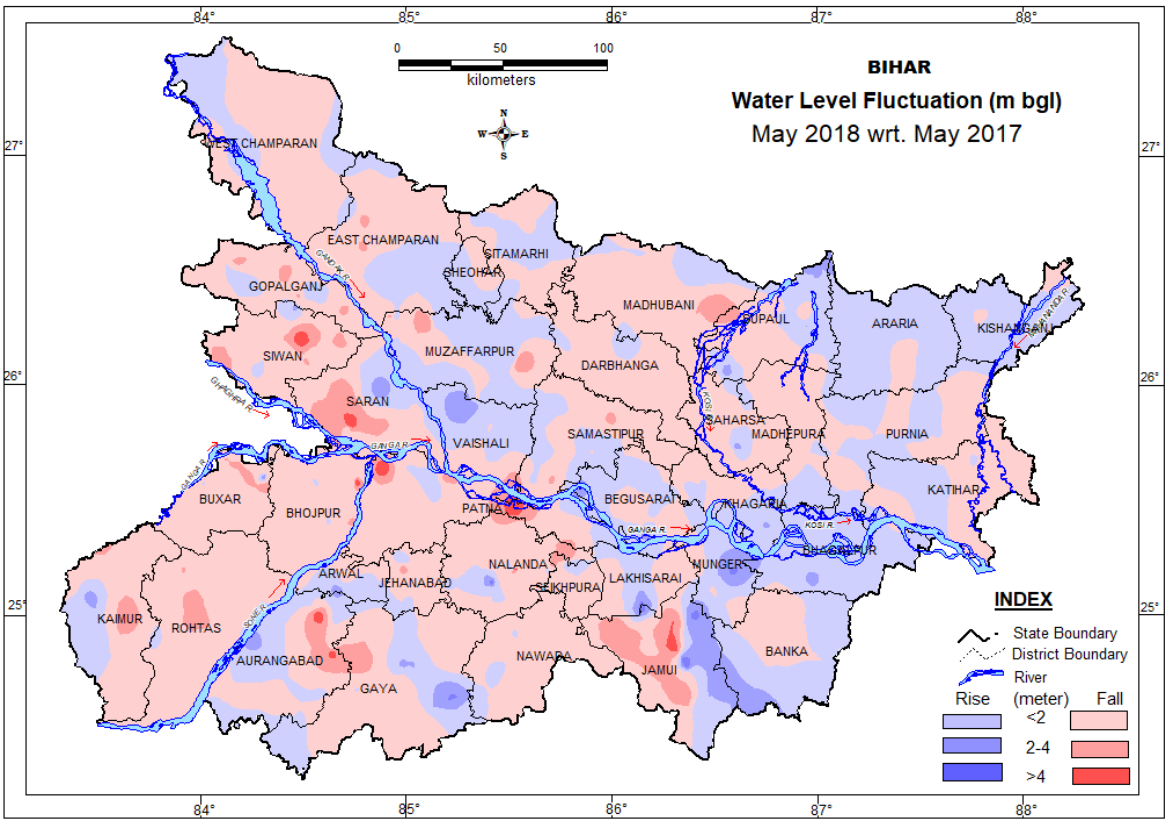

***Fig. 11**: Fluctuation in ground water level between May 2017 and May 2018.*

Table –12 District-wise categorization of frequency and fluctuation water levels of HNS of **May. 2018 w.r.t. May. 2017** for Bihar State

SN	District	No. of HNS	Range of fluctuation (m)				No. of Wells / Percentage showing fluctuation												Total	
			Rise		Fall		Rise						Fall							
			Min.	Max.	Min.	Max.	<2m	%	2-4m	%	>4m	%	<2m	%	2-4m	%	>4m	%	Rise	Fall
1	Araria	7	0.1	1.42	0.23	0.23	6	86	0	0	0	0	1	14	0	0	0	0	6	1
2	Aurangabad	17	0.02	3.28	0.16	5.36	11	65	1	6	0	0	3	18	0	0	2	12	12	5
3	Banka	13	0.22	2.68	0.18	1.01	4	31	1	8	0	0	8	62	0	0	0	0	5	8
4	Begusarai	23	0.07	4.02	0.01	1.66	9	39	2	9	1	4	11	48	0	0	0	0	12	11
5	Bhagalpur	12	0.22	2.67	-	-	9	75	3	25	0	0	0	0	0	0	0	0	12	0
6	Bhojpur	32	0.02	0.42	0.03	5.66	5	16	0	0	0	0	23	72	3	9	1	3	5	27
7	Buxar	23	0.02	3.4	0.1	3.07	1	4	1	4	0	0	16	70	5	22	0	0	2	21
8	Darbhanga	9	0.09	0.63	0.19	0.58	2	22	0	0	0	0	7	78	0	0	0	0	2	7
9	Gaya	19	0.1	4.39	0.66	2.26	5	26	1	5	2	11	10	53	1	5	0	0	8	11
10	Gopalganj	21	0.28	2.68	0.12	3.38	3	14	1	5	0	0	13	62	4	19	0	0	4	17
11	Jamui	15	0.03	4.27	0.76	5.3	3	20	1	7	3	20	4	27	2	13	2	13	7	8
12	Jehanabad	16	0.02	2.73	0.01	2.44	5	31	1	6	0	0	8	50	2	13	0	0	6	10
13	Kaimur	9	3.1	3.1	0.2	3.82	0	0	1	11	0	0	6	67	2	22	0	0	1	8
14	Katihar	14	0.01	1.09	0.53	1.46	9	64	0	0	0	0	5	36	0	0	0	0	9	5
15	Khagaria	11	0.04	2.17	0.13	1.05	5	45	1	9	0	0	5	45	0	0	0	0	6	5
16	Kishanganj	7	0.43	1.58	0.2	0.58	5	71	0	0	0	0	2	29	0	0	0	0	5	2
17	Lakhisarai	7	0.13	1.78	0.41	1.57	4	57	0	0	0	0	3	43	0	0	0	0	4	3
18	Madhepura	15	0.01	0.33	0.03	0.83	5	33	0	0	0	0	10	67	0	0	0	0	5	10
19	Madhubani	21	0.1	1.5	0.03	3.38	2	10	0	0	0	0	18	86	1	5	0	0	2	19
20	Munger	7	0.65	4.36	0.25	1.27	3	43	0	0	1	14	3	43	0	0	0	0	4	3
21	Muzaffarpur	25	0.09	2.01	0.05	4.04	15	60	1	4	0	0	6	24	2	8	1	4	16	9
22	Nalanda	32	0.03	4.01	0.05	5.42	10	31	0	0	1	3	19	59	1	3	1	3	11	21
23	Nawada	15	0.29	0.65	0.1	1.69	2	13	0	0	0	0	13	87	0	0	0	0	2	13
24	W.Champaran	14	0.12	0.65	0.13	1.7	5	36	0	0	0	0	9	64	0	0	0	0	5	9
25	Patna	17	0.1	1.4	0.18	4.7	3	18	0	0	0	0	11	65	1	6	2	12	3	14
26	E. Champaran	30	0.04	1.06	0.01	2.28	10	33	0	0	0	0	17	57	3	10	0	0	10	20
27	Purnia	17	0.11	0.81	0.4	2.05	10	59	0	0	0	0	6	35	1	6	0	0	10	7
28	Rohtas	19	0.01	0.2	0.24	2.55	3	16	0	0	0	0	12	63	4	21	0	0	3	16
29	Saharsa	14	0.1	2.69	0.16	1.09	2	14	1	7	0	0	11	79	0	0	0	0	3	11
30	Samastipur	18	0.05	0.92	0.03	2.4	9	50	0	0	0	0	7	39	2	11	0	0	9	9
31	Saran	26	0.06	2.98	0.31	5.4	2	8	1	4	0	0	15	58	6	23	2	8	3	23
32	Seikhpura	7	0.03	1.77	0.17	2.85	2	29	0	0	0	0	4	57	1	14	0	0	2	5
33	Sheohar	1	-	-	0.33	0.33	0	0	0	0	0	0	1	100	0	0	0	0	0	1
34	Sitamarhi	16	0.06	1.64	0.12	1.37	9	56	0	0	0	0	7	44	0	0	0	0	9	7
35	Siwan	17	0.65	0.65	0.01	4.69	1	6	0	0	0	0	10	59	5	29	1	6	1	16
36	Supaul	23	0.09	3.49	0.07	1.8	7	30	5	22	0	0	11	48	0	0	0	0	12	11
37	Vaishali	15	0.25	3.72	0.14	3.29	5	33	2	13	0	0	7	47	1	7	0	0	7	8
	Total	604	0.01	4.39	0.01	5.42	191	32	24	4	8	1	322	53	47	8	12	2	223	381

3.3.2 August 2017 to August 2018

Water level fluctuation between August 2017 and August 2018 has been anlysed for 613 HNS, which indicates that the rise of water level is in about 70% of the HNS and fall in about 30% of the HNS. Rise and fall within 2 m has been observed in major part of the state which covers major part of SBP and NBP constitute 65% of the total area. Fall of water level within the tune of 2-4 m observed in part of Saran, Muzaffarpur, Samastipur, Jamui, Nalanda, Nawada, Gaya, Jehanabad, Arangabad, Kaimr and Buxar and many other small patches in the state. Small part of Siwan, Kaimur, Aurangabad, Patna, Jehanabad, Nwada and Jamui district has shown water level fall >4m.

Part of NBP and SBP has shown fall in the tune of 0-2 m covered total 25% area.
The rise of water level in the range of 2 to 4 m has been observed in very small part of the state covering very small parts of Gaya, Naland, Banka, Munger, Bhagalpur and Muzaffarpur districts. Only 1 well in Gaya have shown rise in water level more than 4 m. **(Fig.12, Table 13).**

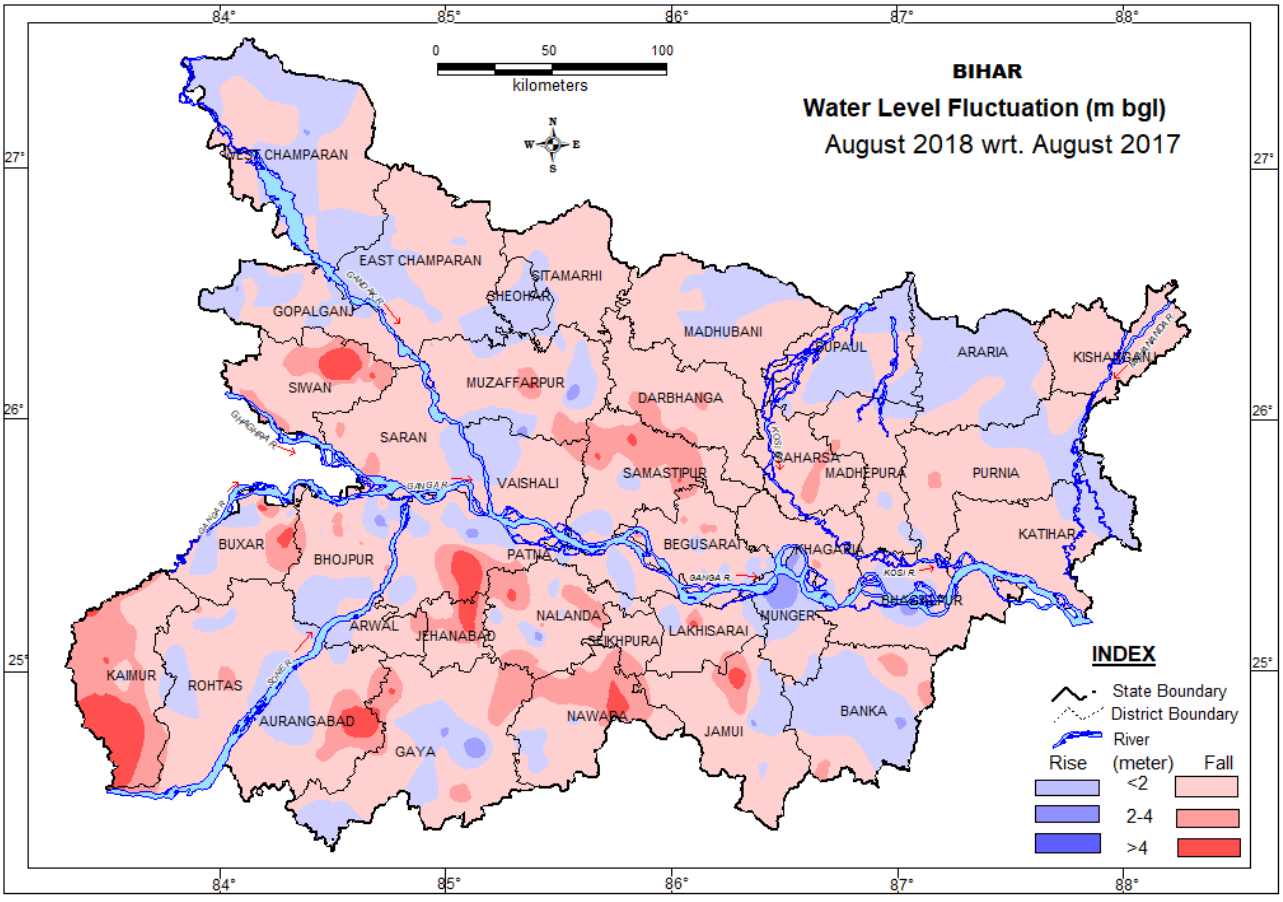

***Fig. 12**: Fluctuation in ground water level between Aug. 2017 and Aug. 2018*

Table –13 District-wise categorization of frequency and fluctuation water levels of HNS of **Aug. 2018 w.r.t. Aug. 2017** for Bihar State																				
SN	**District**	**No. of HNS**	**Range of fluctuation (m)**				**No. of Wells / Percentage showing fluctuation**												**Total**	
			Rise		**Fall**		**Rise**						**Fall**							
			Min.	**Max.**	**Min.**	**Max.**	**<2m**	**%**	**2-4m**	**%**	**>4m**	**%**	**<2m**	**%**	**2-4m**	**%**	**>4m**	**%**	**Rise**	**Fall**
1	Araria	6	0.1	0.93	0.16	0.2	4	67	0	0	0	0	2	33	0	0	0	0	4	2
2	Aurangabad	16	0.07	1.39	0.03	5.8	5	31	0	0	0	0	9	56	1	6	1	6	5	11
3	Banka	14	0.03	2.2	0.38	2.39	7	50	1	7	0	0	3	21	3	21	0	0	8	6
4	Begusarai	31	0.09	1.73	0.1	3.04	9	29	0	0	0	0	17	55	5	16	0	0	9	22
5	Bhagalpur	10	0.14	3.11	0.05	1.12	2	20	1	10	0	0	7	70	0	0	0	0	3	7
6	Bhojpur	33	0.12	2.88	0.09	3.71	9	27	3	9	0	0	16	48	5	15	0	0	12	21
7	Buxar	25	0.04	3.23	0.2	5.91	8	32	2	8	0	0	7	28	4	16	4	16	10	15
8	Darbhanga	8	-	-	0.5	3.56	0	0	0	0	0	0	5	63	3	38	0	0	0	8
9	Gaya	20	0.17	4.03	0.08	4.31	8	40	1	5	1	5	7	35	2	10	1	5	10	10
10	Gopalganj	22	0.17	2.26	0.04	1.95	8	36	1	5	0	0	13	59	0	0	0	0	9	13
11	Jamui	13	0.47	2.56	0.08	4.99	2	15	1	8	0	0	8	62	1	8	1	8	3	10
12	Jehanabad	19	0.05	0.05	0.15	5.74	1	5	0	0	0	0	12	63	4	21	2	11	1	18
13	Kaimur	10	1.32	1.32	1.19	5.5	1	10	0	0	0	0	1	10	5	50	3	30	1	9
14	Katihar	14	0.05	0.05	0.03	1.91	1	7	0	0	0	0	13	93	0	0	0	0	1	13
15	Khagaria	16	0.19	0.26	0.3	2.64	2	13	0	0	0	0	13	81	1	6	0	0	2	14
16	Kishanganj	5	-	-	0.03	0.95	0	0	0	0	0	0	5	100	0	0	0	0	0	5
17	Lakhisarai	6	0.59	0.59	0.26	5.96	1	17	0	0	0	0	4	67	0	0	1	17	1	5
18	Madhepura	14	0.03	0.61	0.29	2.37	4	29	0	0	0	0	9	64	1	7	0	0	4	10
19	Madhubani	21	0.04	1	0.06	1.98	8	38	0	0	0	0	13	62	0	0	0	0	8	13
20	Munger	5	0.16	3.75	0.16	0.97	1	20	2	40	0	0	2	40	0	0	0	0	3	2
21	Muzaffarpur	19	0.01	3.38	0.31	4.53	3	16	1	5	0	0	11	58	2	11	2	11	4	15
22	Nalanda	33	0.15	3.09	0.1	4.72	5	15	1	3	0	0	19	58	6	18	2	6	6	27
23	Nawada	14	0.25	0.63	1.21	5.82	4	29	0	0	0	0	5	36	3	21	2	14	4	10
24	W. Champaran	14	0.11	2.88	0.14	1.89	8	57	1	7	0	0	5	36	0	0	0	0	9	5
25	Patna	27	0.05	3.42	0.05	5.57	12	44	2	7	0	0	11	41	1	4	1	4	14	13
26	E. Champaran	21	0.01	2.16	0.39	2.04	11	52	1	5	0	0	8	38	1	5	0	0	12	9
27	Purnia	17	0.06	1.5	0.04	2.56	3	18	0	0	0	0	13	76	1	6	0	0	3	14
28	Rohtas	19	0.14	1.28	0.13	2.77	7	37	0	0	0	0	10	53	2	11	0	0	7	12
29	Saharsa	15	-	-	0.18	3.07	0	0	0	0	0	0	12	80	3	20	0	0	0	15
30	Samastipur	18	0.24	1.83	0.67	4.49	3	17	0	0	0	0	8	44	4	22	3	17	3	15
31	Saran	27	0.25	0.3	0.04	2.87	3	11	0	0	0	0	19	70	5	19	0	0	3	24
32	Seikhpura	5	0.29	0.29	0.76	1.47	1	20	0	0	0	0	4	80	0	0	0	0	1	4
33	Sheohar	2	0.64	1.3	-	-	2	100	0	0	0	0	0	0	0	0	0	0	2	0
34	Sitamarhi	16	0.03	0.45	0.01	1.05	3	19	0	0	0	0	13	81	0	0	0	0	3	13
35	Siwan	19	-	-	0.25	5.81	0	0	0	0	0	0	13	68	3	16	3	16	0	19
36	Supaul	22	0.02	1.53	0.03	0.96	15	68	0	0	0	0	7	32	0	0	0	0	15	7
37	Vaishali	17	2	3.41	0.07	2.08	1	6	1	6	0	0	14	82	1	6	0	0	2	15
	Total	613	0.01	4.03	0.01	5.96	162	26	19	3	1	0	338	55	67	11	26	4	182	431

3.3.3 November 2017 to November 2018

Water level fluctuation between November 2017 and November 2018 has been analysed for 605 HNS, which indicates that there is a fall of water level in about 65% of the HNS and rise in only 35% of the HNS. The fall of water level of 0-2 m range shows in 52% NHS wells covering 68% area covers maximum parts of Sitamarhi, Madhubani, Kishanganj, Katihar, Bhagalpur, Banka, Samastipur, Vaishali, Saran, Siwan, Gaya, Aurangabad and Kaimur districts and many other small patches in the state. The segment of 2 to 4m fall in small parts of Saran, Nalanda, Aurangabad, Kaimur, Gaya and Patna districts. >4 m rise has been observed only in Kaimur, Gaya, Aurangabad, Patna, Buxar and Nalanda district.

Total 31% area of the State shows rise in water level. Maximum parts Araria, Sheohar, Khagaria, Bhojpur, Rohtas, Buxar and some other small parts of state is covered by the range of 0-2m rise in water level. Only 20 NHS wells covering very small parts of Kaimur, Rohtas, Nalanda, and Munger district has shown the rise of water level 2- 4 m. The range of > 4 m rise has been observed in only 5 wells located in Rohtas and Buxar district. **(Fig.13, Table 14).**

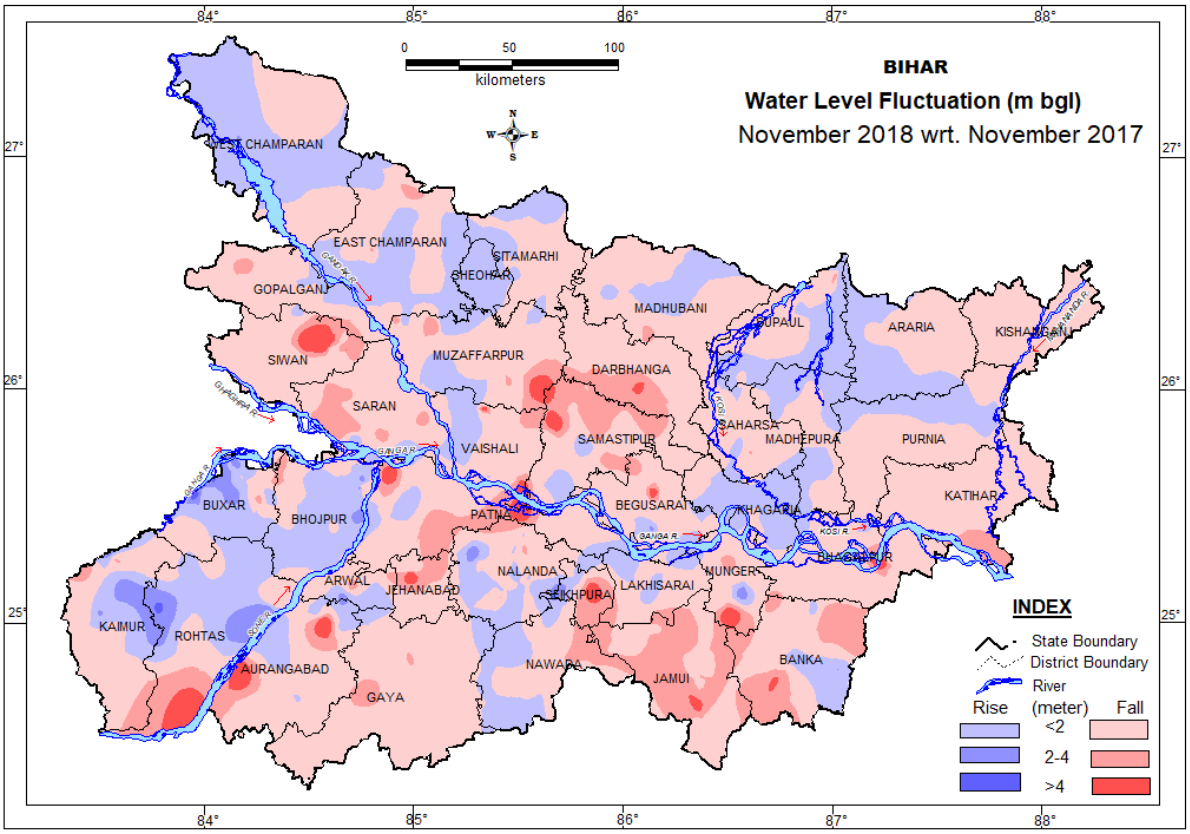

***Fig. 13**: Fluctuation in ground water level between Nov 2017 and Nov. 2018.*

Table –14 District-wise categorization of frequency and fluctuation water levels of HNS of **Nov. 2018 w.r.t. Nov. 2017** for Bihar State																				
SN	**District**	**No. of HNS**	**Range of fluctuation (m)**				**No. of Wells / Percentage showing fluctuation**												**Total**	
			Rise		**Fall**		**Rise**						**Fall**							
			Min.	**Max.**	**Min.**	**Max.**	**<2m**	**%**	**2-4m**	**%**	**>4m**	**%**	**<2m**	**%**	**2-4m**	**%**	**>4m**	**%**	**Rise**	**Fall**
1	Araria	7	0.05	1.11	0.02	0.71	3	43	0	0	0	0	4	57	0	0	0	0	3	4
2	Aurangabad	16	0.1	1.28	0.08	5.06	6	38	0	0	0	0	7	44	1	6	2	13	6	10
3	Banka	14	0.98	2.02	0.13	4.51	2	14	1	7	0	0	6	43	4	29	1	7	3	11
4	Begusarai	26	0.2	3.12	0.09	5.75	2	8	1	4	0	0	21	81	1	4	1	4	3	23
5	Bhagalpur	12	0.21	0.21	0.03	5.53	1	8	0	0	0	0	10	83	0	0	1	8	1	11
6	Bhojpur	34	0.03	3.88	0.1	2.61	21	62	4	12	0	0	7	21	2	6	0	0	25	9
7	Buxar	25	0.32	5.02	0.16	3.05	9	36	4	16	3	12	6	24	3	12	0	0	16	9
8	Darbhanga	7	-	-	0.04	2.81	0	0	0	0	0	0	4	57	3	43	0	0	0	7
9	Gaya	19	0.01	0.01	0.17	2.55	1	5	0	0	0	0	16	84	2	11	0	0	1	18
10	Gopalganj	22	0.09	0.85	0.17	2.75	4	18	0	0	0	0	16	73	2	9	0	0	4	18
11	Jamui	15	-	-	0.16	5.15	0	0	0	0	0	0	9	60	4	27	2	13	0	15
12	Jehanabad	16	0.03	2.82	0.03	6.02	2	13	1	6	0	0	9	56	3	19	1	6	3	13
13	Kaimur	10	2.31	3.21	0.07	2.75	0	0	3	30	0	0	5	50	2	20	0	0	3	7
14	Katihar	14	-	-	0.04	2.62	0	0	0	0	0	0	13	93	1	7	0	0	0	14
15	Khagaria	15	0.13	1.4	0.32	0.53	12	80	0	0	0	0	3	20	0	0	0	0	12	3
16	Kishanganj	7	-	-	0.17	1.42	0	0	0	0	0	0	7	100	0	0	0	0	0	7
17	Lakhisarai	8	0.38	1.41	0.34	1.59	4	50	0	0	0	0	4	50	0	0	0	0	4	4
18	Madhepura	12	0.31	0.78	0.08	1.9	6	50	0	0	0	0	6	50	0	0	0	0	6	6
19	Madhubani	20	0.04	1.35	0.03	2.44	5	25	0	0	0	0	14	70	1	5	0	0	5	15
20	Munger	9	0.83	3.77	0.26	6.21	1	11	1	11	0	0	5	56	1	11	1	11	2	7
21	Muzaffarpur	23	0.52	1.17	0.02	6.3	4	17	0	0	0	0	14	61	4	17	1	4	4	19
22	Nalanda	33	0.03	3.98	0.01	2.42	19	58	1	3	0	0	10	30	3	9	0	0	20	13
23	Nawada	14	0.08	0.8	0.05	2.34	6	43	0	0	0	0	6	43	2	14	0	0	6	8
24	W.Champaran	11	0.28	2.08	0.81	1.18	8	73	1	9	0	0	2	18	0	0	0	0	9	2
25	Patna	18	0.03	1.36	0.13	5.72	2	11	0	0	0	0	11	61	3	17	2	11	2	16
26	E.Champaran	29	0.19	1.54	0.06	3.11	16	55	0	0	0	0	11	38	2	7	0	0	16	13
27	Purnia	17	0.02	1.18	0.09	1.29	5	29	0	0	0	0	12	71	0	0	0	0	5	12
28	Rohtas	19	0.42	4.31	0.52	4.83	9	47	2	11	2	11	5	26	0	0	1	5	13	6
29	Saharsa	14	0.02	0.5	0.02	2.13	3	21	0	0	0	0	10	71	1	7	0	0	3	11
30	Samastipur	16	0.61	1.46	0.08	5.96	2	13	0	0	0	0	10	63	3	19	1	6	2	14
31	Saran	26	0.77	1.47	0.04	3.93	3	12	0	0	0	0	14	54	9	35	0	0	3	23
32	Seikhpura	6	0.08	3.3	0.05	5.12	2	33	1	17	0	0	2	33	0	0	1	17	3	3
33	Sheohar	1	0.28	0.28	-	-	1	100	0	0	0	0	0	0	0	0	0	0	1	0
34	Sitamarhi	16	0.14	1.28	0.11	1.43	6	38	0	0	0	0	10	63	0	0	0	0	6	10
35	Siwan	18	-	-	0.15	5.1	0	0	0	0	0	0	15	83	0	0	3	17	0	18
36	Supaul	19	0.14	0.61	0.25	3.37	15	79	0	0	0	0	3	16	1	5	0	0	15	4
37	Vaishali	17	0.06	1.11	0.08	6.1	4	24	0	0	0	0	10	59	1	6	2	12	4	13
	Total	605	0.01	5.02	0.01	6.3	184	30	20	3	5	1	317	52	59	10	20	3	209	396

3.3.4 January 2018 to January 2019

Water level fluctuation between January 2018 and January 2019 has been analysed for 616 HNS. The fall of water level ranged from 0.01 to 5.35 m has been observed in 407 wells (66%) whereas the rise in water level between 0.01 to 4.64 observed in 209 (34%) wells.

The fall to the tune of 0 to 2 m has been shown in 59% area of the State spread in almost entire State. The segment of 2 to 4 m fall has been observed in localised areas falls in Saran, Siwan, Muzaffarpur, Sitamarhi, Darbhanga, Samastipur, Jamui, Munger, Banka, Gaya, Patna and Jehanabad district and many other small parts of the State. Only 20 wells in has shown water level fall more than 4m.

The rise in the range of 0 – 2 m and 2 – 4 m has been observed in 27% and 3% of HNS respectively. The rise ranged from 0 to 2 m is observed in maximum part of Araria, Purnia, Kishanganj, Katihar, and some other small part as patches at many locations. The segment of 2 to 4 m rise has been calculated for only 21 wells covers the area as patches in part of Kaimur, Rohtas, Bhojpur, and Khagaria district. Only 07 well located in Rohtas, Samastipur, Buxar and Bhagalpur district have shown rise of water level more than 4 m. **(Fig. 14, Table 15).**

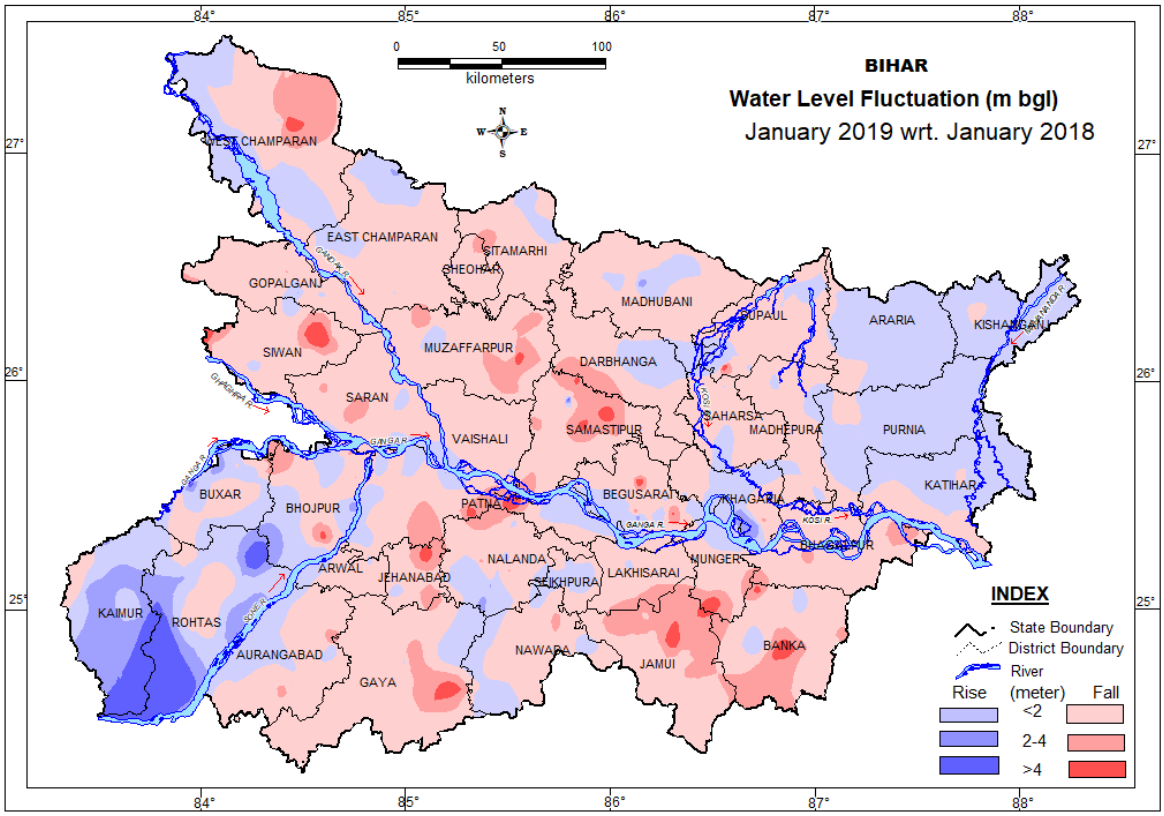

***Fig. 14**: Fluctuation in ground water level between Jan. 2019 and Jan. 2018.*

Table – 15 District-wise categorization of fluctuation and their frequency of water levels of HNS of **Jan 2019 w.r.t. Jan 2018** for Bihar State

SN	District	No. of HNS	Range of fluctuation (m)				No. of Wells / Percentage showing fluctuation												Total	
			Rise		Fall		Rise						Fall							
			Min.	Max.	Min.	Max.	<2m	%	2-4m	%	>4m	%	<2m	%	2-4m	%	>4m	%	Rise	Fall
1	Araria	6	0.35	1.42	0.08	0.08	5	83	0	0	0	0	1	17	0	0	0	0	5	1
2	Aurangabad	15	0.01	1.28	0.01	3.12	7	47	0	0	0	0	6	40	2	13	0	0	7	8
3	Banka	13	1.23	1.62	0.31	4.77	2	15	0	0	0	0	6	46	3	23	2	15	2	11
4	Begusarai	32	0.07	4.11	0.07	4.24	13	41	1	3	1	3	13	41	2	6	2	6	15	17
5	Bhagalpur	10	-	-	0.19	2.88	0	0	0	0	0	0	8	80	2	20	0	0	0	10
6	Bhojpur	36	0.08	3.14	0.05	4.71	10	28	1	3	0	0	20	56	3	8	2	6	11	25
7	Buxar	25	0.04	4.05	0.18	2.68	12	48	2	8	1	4	8	32	2	8	0	0	15	10
8	Darbhanga	8	1.84	1.84	0.29	2.52	1	13	0	0	0	0	5	63	2	25	0	0	1	7
9	Gaya	17	0.04	1.29	0.06	5.35	3	18	0	0	0	0	12	71	1	6	1	6	3	14
10	Gopalganj	21	0.02	2.18	0.02	2.13	4	19	1	5	0	0	15	71	1	5	0	0	5	16
11	Jamui	16	-	-	0.09	4.4	0	0	0	0	0	0	8	50	7	44	1	6	0	16
12	Jehanabad	16	0.15	0.23	0.16	4.66	3	19	0	0	0	0	11	69	1	6	1	6	3	13
13	Kaimur	8	0.69	3.07	0.71	1.4	1	13	4	50	0	0	3	38	0	0	0	0	5	3
14	Katihar	14	0.24	1.68	0.3	1.66	8	57	0	0	0	0	6	43	0	0	0	0	8	6
15	Khagaria	18	0.02	3.57	0.13	2.1	10	56	2	11	0	0	5	28	1	6	0	0	12	6
16	Kishanganj	7	0.19	1.24	0.65	0.65	6	86	0	0	0	0	1	14	0	0	0	0	6	1
17	Lakhisarai	8	0.92	0.92	0.06	1.61	1	13	0	0	0	0	7	88	0	0	0	0	1	7
18	Madhepura	17	0.12	0.7	0.05	2.09	3	18	0	0	0	0	13	76	1	6	0	0	3	14
19	Madhubani	23	0.08	2.88	0.1	2.73	5	22	1	4	0	0	16	70	1	4	0	0	6	17
20	Munger	7	0.39	0.7	0.74	4.74	2	29	0	0	0	0	4	57	0	0	1	14	2	5
21	Muzaffarpur	24	1.28	1.28	0.27	5.14	1	4	0	0	0	0	17	71	5	21	1	4	1	23
22	Nalanda	31	0.02	2.58	0.02	2.22	11	35	2	6	0	0	16	52	2	6	0	0	13	18
23	Nawada	14	0.43	1.58	0.11	2.32	4	29	0	0	0	0	9	64	1	7	0	0	4	10
24	W. Champaran	13	0.01	1.79	0.04	4.76	7	54	0	0	0	0	5	38	0	0	1	8	7	6
25	Patna	19	0.16	2.04	0.15	5.15	7	37	1	5	0	0	8	42	1	5	2	11	8	11
26	E. Champaran	24	0.04	2.2	0.03	1.83	8	33	1	4	0	0	15	63	0	0	0	0	9	15
27	Purnia	17	0.12	1.6	0.08	0.45	14	82	0	0	0	0	3	18	0	0	0	0	14	3
28	Rohtas	19	0.01	4.64	0.15	1.87	5	26	5	26	4	21	5	26	0	0	0	0	14	5
29	Saharsa	15	0.06	0.59	0.02	1.76	2	13	0	0	0	0	13	87	0	0	0	0	2	13
30	Samastipur	18	0.01	4.63	0.34	4.56	1	6	0	0	1	6	9	50	4	22	3	17	2	16
31	Saran	27	0.04	0.64	0.48	2.82	6	22	0	0	0	0	18	67	3	11	0	0	6	21
32	Seikhpura	6	0.24	0.93	1.13	3.01	4	67	0	0	0	0	1	17	1	17	0	0	4	2
33	Sheohar	2	-	-	0.13	1.62	0	0	0	0	0	0	2	100	0	0	0	0	0	2
34	Sitamarhi	16	0.07	0.41	0.1	3.22	2	13	0	0	0	0	13	81	1	6	0	0	2	14
35	Siwan	15	0.32	0.32	0.03	4.54	1	7	0	0	0	0	12	80	0	0	2	13	1	14
36	Supaul	22	0.02	1.37	0.08	4.63	9	41	0	0	0	0	12	55	0	0	1	5	9	13
37	Vaishali	17	0.29	1.51	0.04	1.58	3	18	0	0	0	0	14	82	0	0	0	0	3	14
	Total	616	0.01	4.64	0.01	5.35	181	29	21	3	7	1	340	55	47	8	20	3	209	407

3.4 DECADAL FLUCTUATION

3.4.1 Decadal Mean of May to May 2018

Fluctuation in water level of May 2018 with respect to decadal mean of May has been analysed for 629 HNS, which indicates fall in 57% and rise in the remaining 43% of the analysed HNS. The fall in the tune of 0 – 2 m is observed in the 49% of the HNS analysed, spatially covers the 50% area of the State and covers maximum part of SBP and major and adjoining part of E & W Champaran, Muzaffarpur, Gopalganj, Siwan, Srarn, Patna Saharsa and Patna district and as patches at many locations. In only 40 HNS has shown fall in the tune of 2-4 m covering very small patches of Saran, Siwan, Patna, Jamui, Kaimur, Rohts and Aurangabad districts. Only 13 wells located in Aurangabad, Buxar, Jehanabad, Madhubani, Patna, Samastipur, Saran and Siwan district has recorded water level fall more than 4m.

45% area of the State has shown rise in water level less than 2 m whereas the segment of 2 – 4 m observed in only 1% of total area (23 Nos. NHS). The rise of water level more than 4m has been recorded in only 2 wells located in Samastipur and Jamui district. **(Fig. 15, Table 16).**

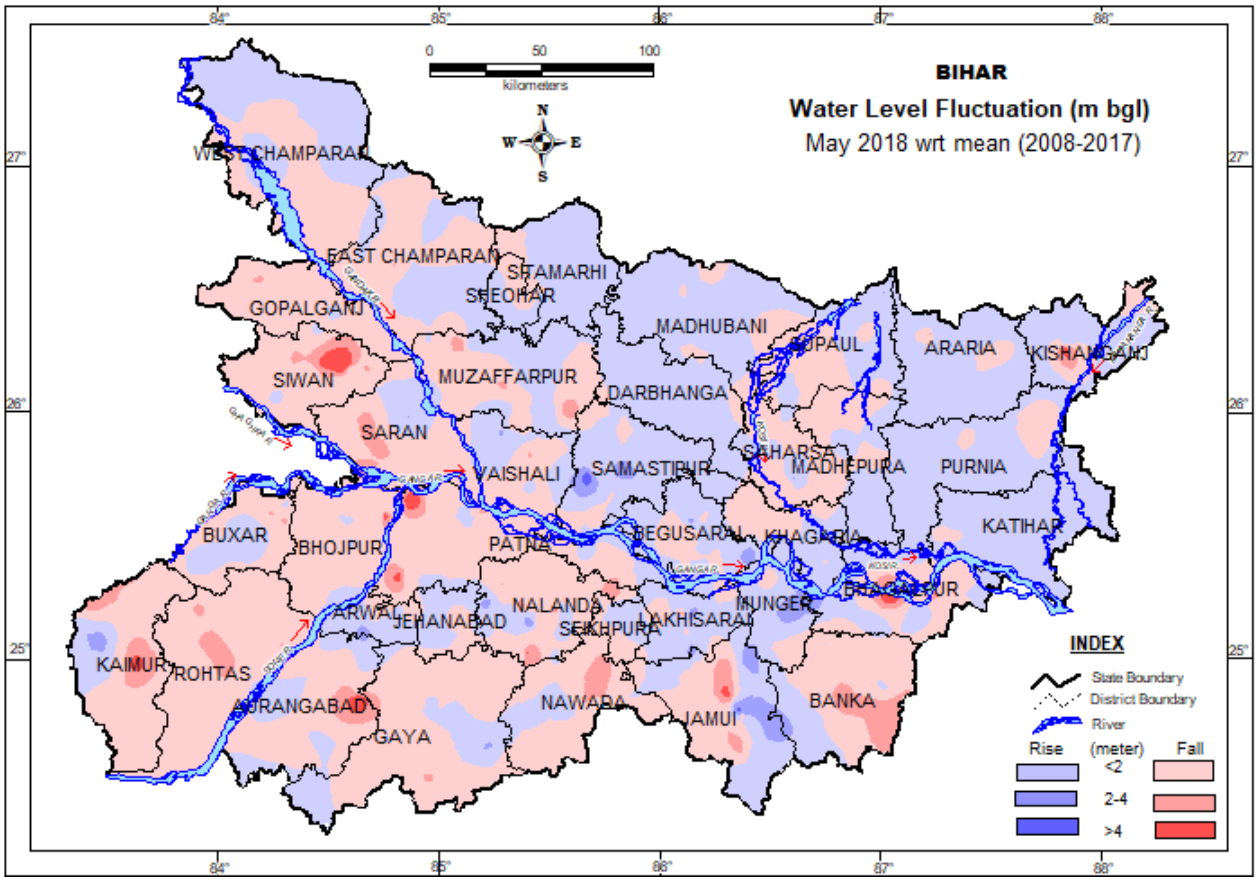

Fig. 15 *Fluctuation in water level between May (mean) and May 2018.*

Table – 16 District-wise categorization of fluctuation and their frequency of water levels of HNS of **May. 2018 w.r.t. May mean (2008-2017)** for Bihar State

SN	District	No. of HNS	Range of fluctuation (m)				No. of Wells / Percentage showing fluctuation												Total	
			Rise		Fall		Rise						Fall							
			Min.	Max.	Min.	Max.	<2m	%	2-4m	%	>4m	%	<2m	%	2-4m	%	>4m	%	Rise	Fall
1	Araria	9	0.03	1.65	0.39	2.1	7	78	0	0	0	0	1	11	1	11	0	0	7	2
2	Aurangabad	17	0.06	1.41	0.1	5.81	8	47	0	0	0	0	8	47	0	0	1	6	8	9
3	Banka	13	0.07	1.16	0.59	3.14	4	31	0	0	0	0	7	54	2	15	0	0	4	9
4	Begusarai	24	0.08	3.02	-	1.23	9	38	4	17	0	0	11	46	0	0	0	0	13	11
5	Bhagalpur	12	0.23	3.17	0.02	5.74	6	50	1	8	0	0	3	25	1	8	1	8	7	5
6	Bhojpur	32	0.17	0.29	0.05	5.34	4	13	0	0	0	0	26	81	1	3	1	3	4	28
7	Buxar	24	0.29	2.48	0.07	2.48	5	21	1	4	0	0	14	58	4	17	0	0	6	18
8	Darbhanga	9	0.02	1.28	-	-	9	100	0	0	0	0	0	0	0	0	0	0	9	0
9	Gaya	20	0.07	2.19	0.44	2.24	5	25	2	10	0	0	12	60	1	5	0	0	7	13
10	Gopalganj	21	0.21	0.65	0.11	2.32	2	10	0	0	0	0	18	86	1	5	0	0	2	19
11	Jamui	17	0.15	5.3	0.25	4.93	4	24	3	18	1	6	6	35	1	6	2	12	8	9
12	Jehanabad	18	0.07	2.73	0.02	2.11	10	56	1	6	0	0	6	33	1	6	0	0	11	7
13	Kaimur	10	1.77	3.1	0.16	4.79	1	10	1	10	0	0	5	50	2	20	1	10	2	8
14	Katihar	15	-	1.08	0.14	0.85	13	87	0	0	0	0	2	13	0	0	0	0	13	2
15	Khagaria	12	0.05	1.31	0.03	0.81	6	50	0	0	0	0	6	50	0	0	0	0	6	6
16	Kishanganj	8	0.01	1.09	0.36	5.06	6	75	0	0	0	0	1	13	0	0	1	13	6	2
17	Lakhisarai	8	0.15	2.66	0.29	3.66	3	38	1	13	0	0	3	38	1	13	0	0	4	4
18	Madhepura	15	0.06	0.82	0.25	0.83	9	60	0	0	0	0	6	40	0	0	0	0	9	6
19	Madhubani	21	0.23	1.37	0.03	0.98	15	71	0	0	0	0	6	29	0	0	0	0	15	6
20	Munger	7	-	3.08	0.74	1.68	3	43	2	29	0	0	2	29	0	0	0	0	5	2
21	Muzaffarpur	26	0.05	1.35	0.24	2.79	15	58	0	0	0	0	7	27	4	15	0	0	15	11
22	Nalanda	33	0.07	3.85	0.01	4.62	8	24	2	6	0	0	18	55	3	9	2	6	10	23
23	Nawada	15	0.05	1.56	0.27	2.81	5	33	0	0	0	0	8	53	2	13	0	0	5	10
24	W. Champaran	15	0.03	1.52	0.05	1.81	6	40	0	0	0	0	9	60	0	0	0	0	6	9
25	Patna	18	0.04	1.75	0.05	5.77	4	22	0	0	0	0	11	61	1	6	2	11	4	14
26	E. Champaran	31	0.15	0.69	0.06	2.11	12	39	0	0	0	0	18	58	1	3	0	0	12	19
27	Purnia	18	0.07	1.15	0.12	0.68	15	83	0	0	0	0	3	17	0	0	0	0	15	3
28	Rohtas	20	0.41	0.41	0.04	2.43	1	5	0	0	0	0	15	75	4	20	0	0	1	19
29	Saharsa	14	0.18	2.2	0.01	1.01	2	14	1	7	0	0	11	79	0	0	0	0	3	11
30	Samastipur	18	0.05	5.08	0.01	0.59	9	50	1	6	1	6	7	39	0	0	0	0	11	7
31	Saran	27	0.34	2.02	0.01	3.19	2	7	1	4	0	0	20	74	4	15	0	0	3	24
32	Seikhpura	7	0.03	1.06	0.5	1.6	4	57	0	0	0	0	3	43	0	0	0	0	4	3
33	Sheohar	1	-	-	0.2	0.2	0	0	0	0	0	0	1	100	0	0	0	0	0	1
34	Sitamarhi	16	-	1.41	0.09	0.09	15	94	0	0	0	0	1	6	0	0	0	0	15	1
35	Siwan	19	0.41	0.41	0.06	5.99	1	5	0	0	0	0	13	68	3	16	2	11	1	18
36	Supaul	23	0.16	2.21	0.03	0.93	13	57	1	4	0	0	9	39	0	0	0	0	14	9
37	Vaishali	16	0.25	2.12	0.08	2.35	4	25	1	6	0	0	9	56	2	13	0	0	5	11
	Total	629	0.01	5.30	0.01	5.99	245	39	23	4	2	0	306	49	40	6	13	2	270	359

3.4.2 Decadal Mean of August to August 2018

Fluctuation in water level of August 2018 with respect to decadal mean of August has been analysed for 667 HNS, which shows fall in water level in the 62% of HNS and rise in the remaining 38% of HNS. The fall in the range of 0 – 2 m has been observed in 52% of the HNS, spatially covers the major area (60%) of the state which mainly covers major part of the state. The range of 2 to 4 m fall has been recorded in Siwan, Muzaffrapur, Patna, Nalanda, Jehanabad, Aurangabad, Nawada and Kaimur district and as small patches at some other locations Only 19 wells located in Bhagalpur district has shown fall more than 4m.

About 31 % area of the State has shown rise of water level in the range of 0 to 2m spread mainly in major parts of Sitamarhi, Madhubani, Araria, E & W Champaran, Lakhisarai and Banka district and many other parts of state. The range of 2 – 4 m has been observed only in 18 wells. The rise of water level more than 4m has been recorded only in 2 well located in Samastipur and Jamui. **(Fig. 16, Table 17).**

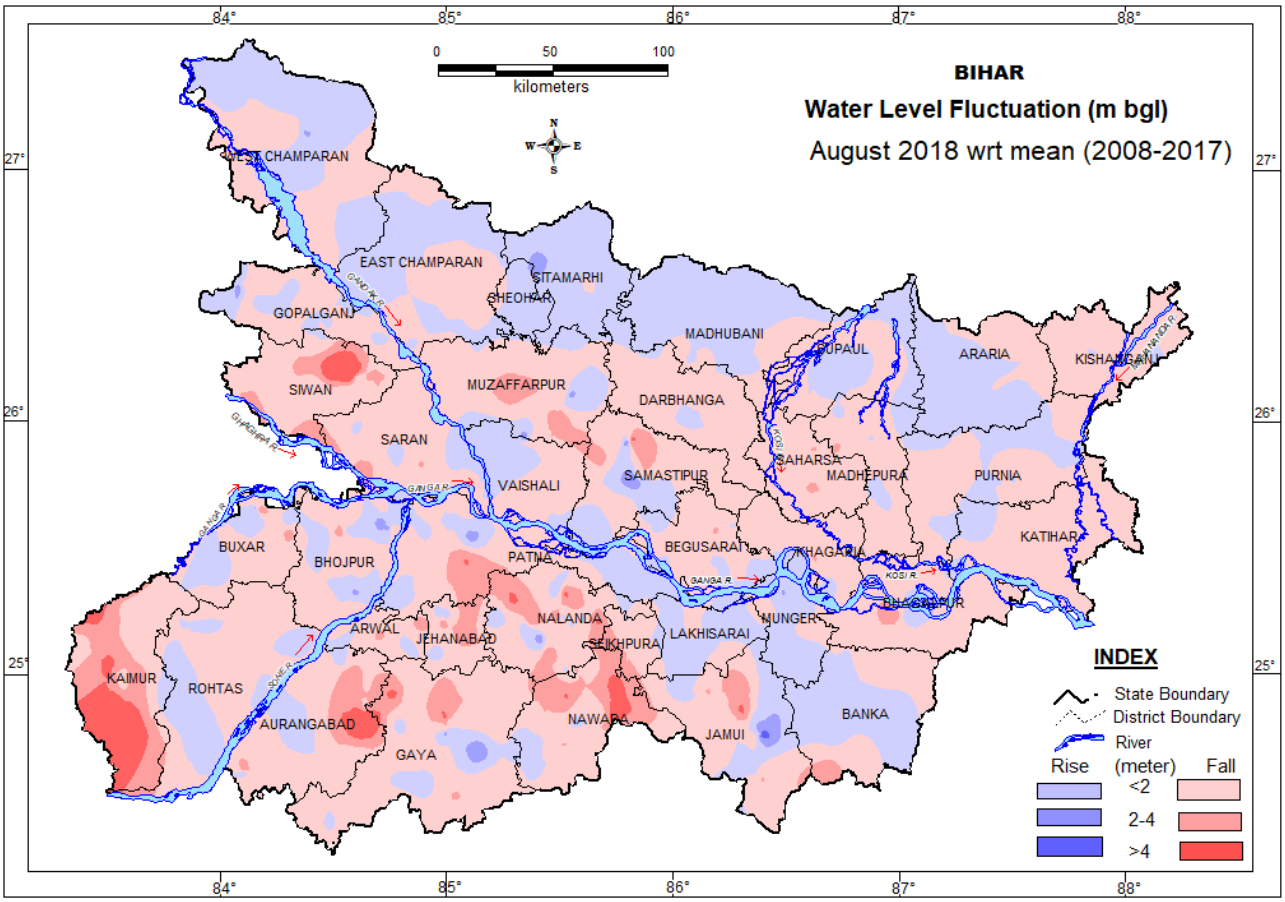

Fig. 16 *Fluctuation in water level between Aug. (mean) and Aug. 2018*

Table – 17 District-wise categorization of fluctuation and their frequency of water levels of HNS of **Aug. 2018 w.r.t. Aug. mean (2008-2017)** for Bihar

SN	District	No. of HNS	Range of fluctuation (m)				No. of Wells / Percentage showing fluctuation												Total	
			Rise		Fall		Rise						Fall							
			Min.	Max.	Min.	Max.	<2m	%	2-4m	%	>4m	%	<2m	%	2-4m	%	>4m	%	Rise	Fall
1	Araria	7	0.53	0.91	-	0.17	3	43	0	0	0	0	4	57	0	0	0	0	3	4
2	Aurangabad	16	0.15	0.84	0.22	9.75	5	31	0	0	0	0	8	50	2	13	1	6	5	11
3	Banka	14	0.22	1.42	0.04	2.35	7	50	0	0	0	0	6	43	1	7	0	0	7	7
4	Begusarai	33	0.01	1.07	0.13	2.61	11	33	0	0	0	0	20	61	2	6	0	0	11	22
5	Bhagalpur	10	1.35	1.35	0.11	3.56	1	10	0	0	0	0	8	80	1	10	0	0	1	9
6	Bhojpur	35	0.43	2.82	0.01	3.12	12	34	4	11	0	0	17	49	2	6	0	0	16	19
7	Buxar	25	0.02	2.31	0.08	3.15	11	44	1	4	0	0	11	44	2	8	0	0	12	13
8	Darbhanga	8	0.09	2.05	0.1	1.54	1	13	1	13	0	0	6	75	0	0	0	0	2	6
9	Gaya	21	0.03	3.4	0.07	4.51	4	19	2	10	0	0	12	57	1	5	2	10	6	15
10	Gopalganj	22	0.34	2.93	0.04	2.04	7	32	1	5	0	0	13	59	1	5	0	0	8	14
11	Jamui	17	0.22	5.09	0.03	4.41	6	35	0	0	1	6	6	35	3	18	1	6	7	10
12	Arwal & Jehanabad	19	0.08	0.76	0.33	3.36	6	32	0	0	0	0	7	37	6	32	0	0	6	13
13	Kaimur	10	-	-	-	6.39	0	0	0	0	0	0	4	40	3	30	3	30	0	10
14	Katihar	15	-	0.73	0.14	1.34	5	33	0	0	0	0	10	67	0	0	0	0	5	10
15	Khagaria	18	0.19	0.56	0.14	2.4	2	11	0	0	0	0	14	78	2	11	0	0	2	16
16	Kishanganj	8	0.21	0.21	0.01	1.13	1	13	0	0	0	0	7	88	0	0	0	0	1	7
17	Lakhisarai	7	0.15	1.13	1.1	2.09	5	71	0	0	0	0	1	14	1	14	0	0	5	2
18	Madhepura	16	0.2	0.58	0.05	2.23	4	25	0	0	0	0	11	69	1	6	0	0	4	12
19	Madhubani	23	0.02	1.88	0.26	1.18	19	83	0	0	0	0	4	17	0	0	0	0	19	4
20	Munger	7	0.48	2.11	0.26	0.38	4	57	1	14	0	0	2	29	0	0	0	0	5	2
21	Muzaffarpur	24	0.04	2.44	0.1	3.3	4	17	1	4	0	0	13	54	6	25	0	0	5	19
22	Nalanda	34	0.15	3	0.46	5.46	8	24	1	3	0	0	15	44	6	18	4	12	9	25
23	Nawada	14	0.13	1.21	0.13	5.63	4	29	0	0	0	0	3	21	4	29	3	21	4	10
24	W Champaran	14	0.14	2.88	0.01	0.72	6	43	1	7	0	0	7	50	0	0	0	0	7	7
25	Patna	28	0.05	3.42	0.05	4.17	9	32	2	7	0	0	16	57	0	0	1	4	11	17
26	E Champaran	32	0.18	1.45	0.02	1.89	18	56	0	0	0	0	14	44	0	0	0	0	18	14
27	Purnia	18	0.04	1.37	0.11	1.23	7	39	0	0	0	0	11	61	0	0	0	0	7	11
28	Rohtas	20	0.02	1.94	0.04	1.8	8	40	0	0	0	0	12	60	0	0	0	0	8	12
29	Saharsa	18	-	-	0.28	2.68	0	0	0	0	0	0	16	89	2	11	0	0	0	18
30	Samastipur	19	0.22	4.48	0.23	4.49	5	26	1	5	1	5	10	53	1	5	1	5	7	12
31	Saran	29	-	0.81	0.03	3.31	7	24	0	0	0	0	18	62	4	14	0	0	7	22
32	Seikhpura	7	0.37	0.37	0.28	2.99	1	14	0	0	0	0	4	57	2	29	0	0	1	6
33	Sheohar	2	0.67	1.97	-	-	2	100	0	0	0	0	0	0	0	0	0	0	2	0
34	Sitamarhi	16	0.24	2.94	0.43	0.43	14	88	1	6	0	0	1	6	0	0	0	0	15	1
35	Siwan	19	-	-	0.01	9.3	0	0	0	0	0	0	13	68	3	16	3	16	0	19
36	Supaul	25	0.03	1.2	0.01	1.05	11	44	0	0	0	0	14	56	0	0	0	0	11	14
37	Vaishali	17	0.48	2.76	0.05	1.15	4	24	1	6	0	0	12	71	0	0	0	0	5	12
	Total	667	0.01	5.09	0.01	9.75	222	33	18	3	2	0	350	52	56	8	19	3	242	425

3.4.3 Decadal Mean of November to November 2018

Fluctuation in water level of November 2018 with respect to decadal mean of November has been analysed for 653 HNS, which shows Rise in water level ranged from 0.01 (Kaimur and Purnia district) to 4.68 (Buxar district) m in 34% of the HNS and fall in the remaining 66 % of HNS. Maximum part (60% of total area) of the district shows water level fall in the range of 0 to2m. water level fall in the range of 2 – 4 m has been observed in 11% NHS which covers 10% area of the state including very small part of E & W Champaran, Muzaffarpur, Saran, Siwan, Vaishali, Samastipur, Darbhanga district in NBP and small parts of Kaimur, Rohtas, Aurangabad, Gaya, Sheikhpura, Nawada, Jamui, Banka and Patna district in SBP and some other patches. Fall >4m has been obsereved in only 3% NHS wells.

The rise in the range of 0-2 and 2-4 m has been shown by 32% and 4% of HNS respectively. The rise of water level ranged from 0 to 2 m covers 29% area of the State covers the major and adjoining part of E Champaran Madhubani, Araria, Purnia, Madhepura, Khagaria, Buxar, Bhojpur and Rohtas and as patches at many locations. Rise within 2 to 4 m observed in very small parts of Buxar, Rohtas and Munger distric. Only 1 well located in Buxar district has shown water level rise >4m. **(Fig. 17, Table 18.)**

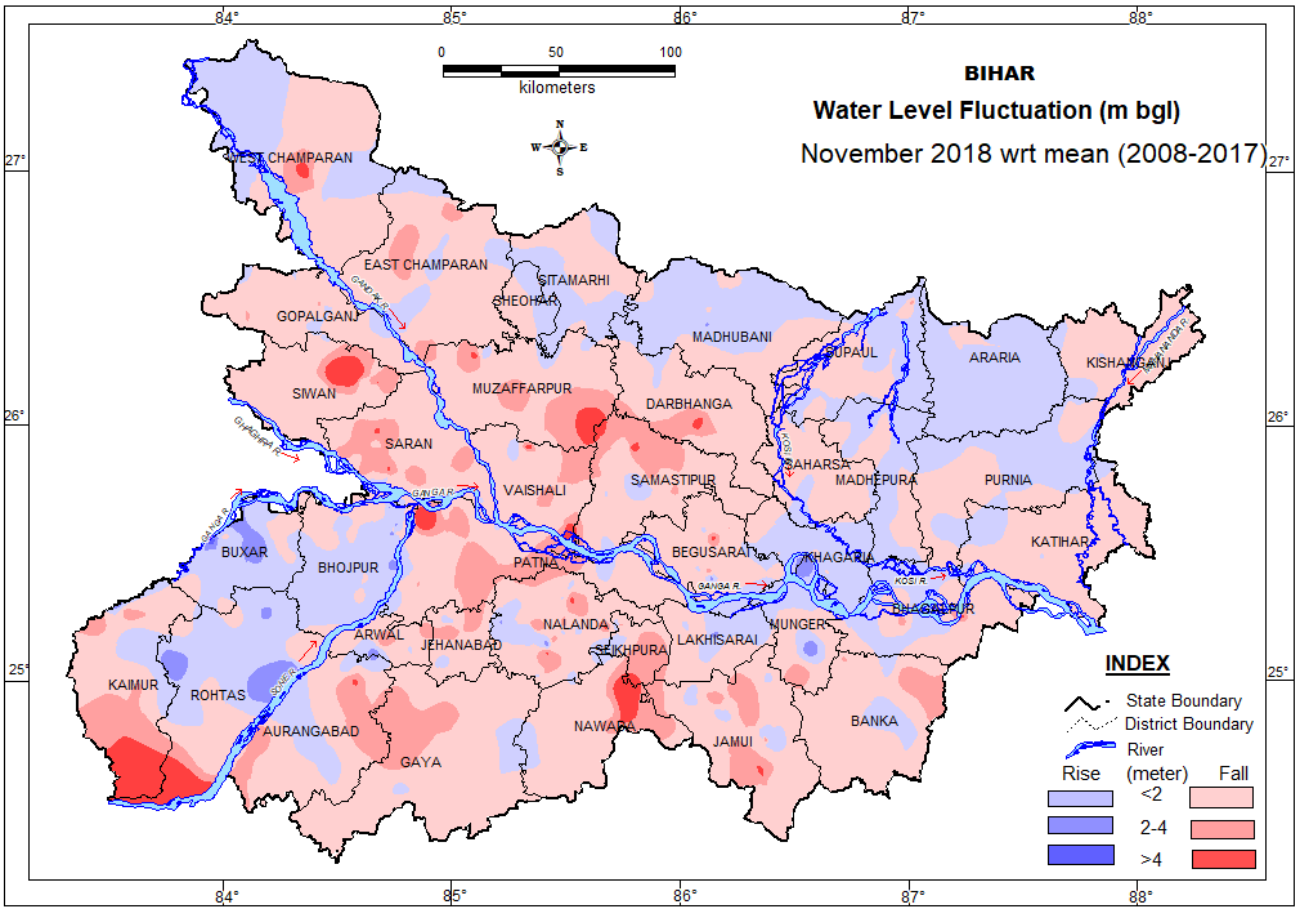

Fig. 17 *Fluctuation in water level between Nov. (mean) and Nov. 2018*

Table – 18 District-wise categorization of fluctuation and their frequency of water levels of HNS of **Nov. 2017 w.r.t. Nov. mean (2008-2017)** for Bihar State

SN	District	No. of HNS	Range of fluctuation (m)				No. of Wells / Percentage showing fluctuation												Total	
			Rise		Fall		Rise						Fall							
			Min.	Max.	Min.	Max.	<2m	%	2-4m	%	>4m	%	<2m	%	2-4m	%	>4m	%	Rise	Fall
1	Araria	7	0.1	0.9	0.09	0.14	5	71	0	0	0	0	2	29	0	0	0	0	5	2
2	Aurangabad	16	0.5	1.6	0.04	4.42	5	31	0	0	0	0	6	38	4	25	1	6	5	11
3	Banka	14	0.1	1.4	0.13	3.26	4	29	0	0	0	0	7	50	3	21	0	0	4	10
4	Begusarai	27	0.2	3.1	0.19	4.95	3	11	1	4	0	0	20	74	2	7	1	4	4	23
5	Bhagalpur	13	0.1	1.1	0.14	4.48	8	62	0	0	0	0	3	23	1	8	1	8	8	5
6	Bhojpur	37	0	2.9	0.08	2.09	22	59	4	11	0	0	10	27	1	3	0	0	26	11
7	Buxar	25	0.1	4.68	0.06	1.97	11	44	4	16	1	4	9	36	0	0	0	0	16	9
8	Darbhanga	8	0.1	0.2	0.95	2.21	2	25	0	0	0	0	5	63	1	13	0	0	2	6
9	Gaya	20	0	0.5	0.14	3.7	3	15	0	0	0	0	13	65	4	20	0	0	3	17
10	Gopalganj	22	0	0.7	0	2.21	5	23	0	0	0	0	15	68	2	9	0	0	5	17
11	Jamui	18	0.4	1.8	0.21	7.73	5	28	0	0	0	0	8	44	4	22	1	6	5	13
12	Arwal & Jehanabad	18	0.1	2.8	0.14	3.45	5	28	1	6	0	0	8	44	4	22	0	0	6	12
13	Kaimur	10	0	2.6	0.22	3.89	2	20	1	10	0	0	3	30	4	40	0	0	3	7
14	Katihar	15	0.1	0.6	0.03	0.95	3	20	0	0	0	0	12	80	0	0	0	0	3	12
15	Khagaria	16	0.1	1.1	0.08	0.24	12	75	0	0	0	0	4	25	0	0	0	0	12	4
16	Kishanganj	8	0	0.1	0.15	0.93	3	38	0	0	0	0	5	63	0	0	0	0	3	5
17	Lakhisarai	8	0.1	2.4	0.16	1.58	4	50	1	13	0	0	3	38	0	0	0	0	5	3
18	Madhepura	17	0	1.2	0.02	1.37	10	59	0	0	0	0	7	41	0	0	0	0	10	7
19	Madhubani	22	0.1	2.9	0.12	1.82	12	55	2	9	0	0	8	36	0	0	0	0	14	8
20	Munger	9	0	3.7	0.19	3.31	2	22	2	22	0	0	4	44	1	11	0	0	4	5
21	Muzaffarpur	24	0.2	0.6	0.21	6.52	3	13	0	0	0	0	12	50	7	29	2	8	3	21
22	Nalanda	35	0.1	3.1	0.01	5.52	8	23	2	6	0	0	17	49	5	14	3	9	10	25
23	Nawada	15	0.6	0.6	0.11	5.39	1	7	0	0	0	0	10	67	2	13	2	13	1	14
24	W Champaran	15	0.1	1.1	0.26	5.02	8	53	0	0	0	0	6	40	0	0	1	7	8	7
25	Patna	19	0	1.2	0.19	7.27	4	21	0	0	0	0	9	47	5	26	1	5	4	15
26	E Champaran	32	0.2	0.6	0.03	3.79	8	25	0	0	0	0	20	63	4	13	0	0	8	24
27	Purnia	17	0	0.7	0.05	1.04	8	47	0	0	0	0	9	53	0	0	0	0	8	9
28	Rohtas	20	0.6	3.7	0.49	6.02	9	45	4	20	0	0	6	30	0	0	1	5	13	7
29	Saharsa	18	0	0.6	0.14	1.68	2	11	0	0	0	0	16	89	0	0	0	0	2	16
30	Samastipur	18	0.1	2.3	0.19	5.86	1	6	1	6	0	0	9	50	6	33	1	6	2	16
31	Saran	28	0.1	0.7	0.22	4.44	3	11	0	0	0	0	18	64	5	18	2	7	3	25
32	Seikhpura	7	1.6	2.1	0.16	3.7	1	14	1	14	0	0	3	43	2	29	0	0	2	5
33	Sheohar	2	1.6	1.6	0.85	0.85	1	50	0	0	0	0	1	50	0	0	0	0	1	1
34	Sitamarhi	16	0.1	1.3	0.08	0.64	9	56	0	0	0	0	7	44	0	0	0	0	9	7
35	Siwan	18	-	-	0.08	7.4	0	0	0	0	0	0	14	78	1	6	3	17	0	18
36	Supaul	22	0	0.7	0.02	2.75	15	68	0	0	0	0	5	23	2	9	0	0	15	7
37	Vaishali	17	0.3	0.6	0.14	5.76	2	12	0	0	0	0	11	65	2	12	2	12	2	15
	Total	653	0.01	4.68	0.01	7.73	209	32	24	4	1	0	324	50	72	11	22	3	234	419

3.4.4 Decadal Mean of January to January 2019

Fluctuation in water level of January 2019 with respect to decadal mean of January has been analysed for 640 HNS. In 73% of the HNS, fall in water level is recorded and remaining 26% HNS rise in water level has been observed. The fall in the range of 0 – 2 m has been spread in 67% area covered almost entire part of the state except major part of Araria, Purnia, Bhojpur, Buxar, Rohtas and Kaimur district and some other patche like area of the state. The segment of 2-4m fall has been observed as patches in Muzaffarpur, Saran, Siwan, Samastipur, Darbhanga, Patna, Gaya, Aurangabad, Nalanda, Nawada, Bhagalpur and Khagaria district and some other places as small patches. Only 3% wells have shown fall of water level >4m.

About 22% area of the State has shown rise in the tune of 0 to 2 m including major part of Araria, Purnia, Bhojpur, Buxar, Rohtas and Kaimur district and some localised part of the state. The segment of 2 to 4 m rise has been observed as very small patches in Rohtas, Patna, Madhubani and Buxar district. Only 04 well located in Buxar, Rohtas and Samastipur distric has shown rise of water level more than 4 m.

(Fig. 18, Table 19).

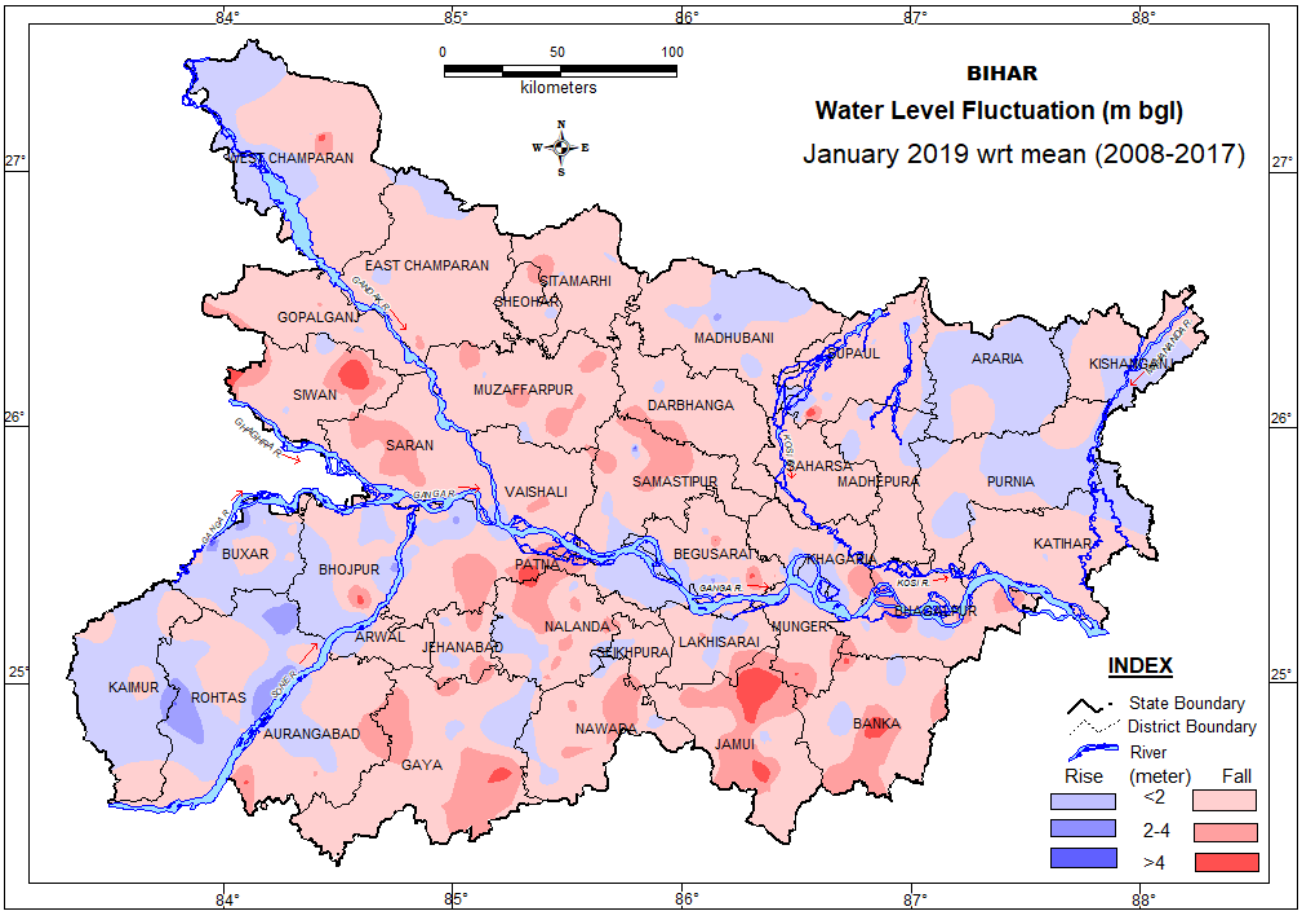

Fig. 18 *Fluctuation in water level between Jan. (mean) and Jan. 2019*

Table – 19 District-wise categorization of fluctuation and their frequency of water levels of HNS of **Jan. 2019 w.r.t. Jan. mean (2009-2018)** for Bihar State

SN	District	No. of HNS	Range of fluctuation (m)				No. of Wells / Percentage showing fluctuation												Total	
			Rise		Fall		Rise						Fall							
			Min.	Max.	Min.	Max.	<2m	%	2-4m	%	>4m	%	<2m	%	2-4m	%	>4m	%	Rise	Fall
1	Araria	7	0.16	0.7	0.97	0.97	6	86	0	0	0	0	1	14	0	0	0	0	6	1
2	Aurangabad	15	0.16	1.56	0.02	4.28	4	27	0	0	0	0	7	47	3	20	1	7	4	11
3	Banka	13	1.13	1.14	0.43	5.79	2	15	0	0	0	0	6	46	3	23	2	15	2	11
4	Begusarai	33	0.03	3.63	0.05	4.54	11	33	1	3	0	0	18	55	1	3	2	6	12	21
5	Bhagalpur	10	0.17	0.64	0.29	3.75	3	30	0	0	0	0	4	40	3	30	0	0	3	7
6	Bhojpur	36	0.07	2.88	0.01	4.71	10	28	1	3	0	0	24	67	0	0	1	3	11	25
7	Buxar	25	0.02	6.21	-	1.55	13	52	3	12	1	4	8	32	0	0	0	0	17	8
8	Darbhanga	8	0.19	0.19	0.88	2.21	1	13	0	0	0	0	6	75	1	13	0	0	1	7
9	Gaya	19	0.27	1.31	0.28	4.69	3	16	0	0	0	0	10	53	5	26	1	5	3	16
10	Gopalganj	21	0.13	1.23	0.04	2.21	2	10	0	0	0	0	18	86	1	5	0	0	2	19
11	Jamui	16	1.88	1.88	0.32	6.82	1	6	0	0	0	0	8	50	3	19	4	25	1	15
12	Jehanabad	18	0.05	0.49	0.11	3.22	5	28	0	0	0	0	11	61	2	11	0	0	5	13
13	Kaimur	8	0.21	1.51	1.58	2.32	6	75	0	0	0	0	1	13	1	13	0	0	6	2
14	Katihar	14	0.01	0.03	0.01	0.7	2	14	0	0	0	0	12	86	0	0	0	0	2	12
15	Khagaria	19	0.06	1.32	0.11	2.87	8	42	0	0	0	0	10	53	1	5	0	0	8	11
16	Kishanganj	7	0.12	0.32	0.25	1.56	4	57	0	0	0	0	3	43	0	0	0	0	4	3
17	Lakhisarai	8	0.52	1.05	0.37	2.71	3	38	0	0	0	0	4	50	1	13	0	0	3	5
18	Madhepura	17	0.35	0.88	0.03	1.35	3	18	0	0	0	0	14	82	0	0	0	0	3	14
19	Madhubani	24	0.03	2.58	0.07	2.12	11	46	1	4	0	0	11	46	1	4	0	0	12	12
20	Munger	7	1.89	1.89	0.34	4.06	1	14	0	0	0	0	5	71	0	0	1	14	1	6
21	Muzaffarpur	25	0.15	0.22	0.26	3.57	2	8	0	0	0	0	17	68	6	24	0	0	2	23
22	Nalanda	32	0.1	1.98	0.04	4.74	8	25	0	0	0	0	17	53	6	19	1	3	8	24
23	Nawada	14	0.28	0.55	0.56	4.01	4	29	0	0	0	0	6	43	3	21	1	7	4	10
24	W. Champaran	14	0.13	1.8	0.07	4.8	7	50	0	0	0	0	6	43	0	0	1	7	7	7
25	Patna	22	0.03	2.44	0.25	5.67	7	32	1	5	0	0	11	50	2	9	1	5	8	14
26	E. Champaran	25	0.04	1.07	0.18	2.29	4	16	0	0	0	0	19	76	2	8	0	0	4	21
27	Purnia	17	0.07	0.63	0.13	0.82	8	47	0	0	0	0	9	53	0	0	0	0	8	9
28	Rohtas	20	0.19	4.12	0.08	2	4	20	4	20	2	10	9	45	1	5	0	0	10	10
29	Saharsa	16	-	-	0.1	2.01	0	0	0	0	0	0	15	94	1	6	0	0	0	16
30	Samastipur	18	0.18	5.4	0.52	4.04	2	11	0	0	1	6	11	61	3	17	1	6	3	15
31	Saran	29	-	-	0.06	4.01	0	0	0	0	0	0	23	79	5	17	1	3	0	29
32	Seikhpura	7	0.08	1.32	0.54	2.65	2	29	0	0	0	0	3	43	2	29	0	0	2	5
33	Sheohar	2	0.15	0.15	1.19	1.19	1	50	0	0	0	0	1	50	0	0	0	0	1	1
34	Sitamarhi	16	0.04	0.16	0.1	3.24	3	19	0	0	0	0	12	75	1	6	0	0	3	13
35	Siwan	17	0.2	0.2	0.6	7.82	1	6	0	0	0	0	12	71	2	12	2	12	1	16
36	Supaul	24	0.09	0.58	0.05	6.51	6	25	0	0	0	0	16	67	1	4	1	4	6	18
37	Vaishali	17	0.17	2.06	0.07	2.2	2	12	1	6	0	0	12	71	2	12	0	0	3	14
	Total	640	0.01	6.21	0.01	7.82	160	25	12	2	4	1	380	59	63	10	21	3	176	464

4. HYDROCHEMISTRY

The ground water samples have been collected during May 2018. The chemical analysis is being carried out.

5. RAINFALL DATA ANALYSIS

The study of rainfall data indicates that in the year 2018 Bihar has received deficit rainfall during the monsoon period after a normal rainfall in the previous year and same is reflected in the unconfined aquifer. The district wise monthly rainfall for Bihar and percent departure has been given in Annexure-III. The rainfall between -20 % and 20% occurred in Banka, Bhabhua, Buxar, Gaya, Kishanganj, Madhubani and W. Champaran district.. Rest of the district has received less than 20% deficit in monsoon rainfall.

The depth to water level during Aug'18 revealed that 52% of observation wells showed **2-5** m water level and only 5 wells showed 10-20 m depth to water level. The comparison of decadal August and August '18 water levels has been carried out., Out of 667 wells analysed, 425 (64%) wells showed fall in water level and out of which 33% of wells showed fall in the range of <2m. Total 36% wells analysed have shown rise in water level. Hence, the phreatic aquifer is in the tune with the vagaries of normal monsoon.

Table –21: *Seasonal and annual rainfall statistics of Bihar* (Source IMD: Annual Climate Summary)

BIHAR	**Winter** (Jan.-Feb.)			**Pre-Monsoon** (Mar.- May)			**Monsoon** (Jun.-Sep.)			**Post-Monsoon** (Oct.-Dec.)			**Annual**		
Year	Actual (mm)	Normal	% Dep	Actual (mm)	Normal	% Dep	Actual (mm)	Normal	% Dep	Actual (mm)	Normal	% Dep	Actual (mm)	Normal	% Dep
2017	0.7	23	-97	124.3	77.5	60	936.8	1027.6	-9	50.2	77.5	-35	1112	1205.6	-8
2018	0.4	23	-98	67.4	77.5	-13	770.8	1027.6	-25	22.0	77.5	-25	860.6	1205.6	-29

6. TREND ANALYSIS DURING PRE AND POST MONSOON

Trend of the ground water level for the last ten year (2009-2018) have been analyzed. District wise percentage of well showing rise, fall and no significant trend during Pre- Monsoon and Post Monsoon season has been prepared and given in the Annexure – IV. From long term water level trend data it has been observed that more than 50% NHS wells have shown falling trend in 15 districts in premonsoon period and 21 districts in Postmonsoon period. No singnificant trend has been observed in Araria, Bhojpur, Darbhanga, Kishanganj, Madhepura, W Champaran, Supaul during Pre-monsoon period and in Araria, Darbhanga, Katihar, Kishanganj, Lakhisarai, Madhepura, Madhubani, Purnia, Sheohar, Sitamarhi and Supaul during Post-monsoon period.

Anneure-I

Depth to Water level (m bgl) in various seasons

STATE : BIHAR

District	Location	2018			2019
		May	Aug	Nov	Jan
Araria	Araria	4.43	2.58	3.3	3.97
Araria	Bhargama	2.88	0.61	-	2.48
Araria	Bathnaha 1	4.17	2.65	3.26	3.59
Araria	Haripur	2.87	0.86	1.68	2.25
Araria	Matiyari	3.61	1.99	2.59	3.25
Araria	Jokihat	2.1	2.25	2.91	Partially filled
Araria	Jokihat1	2.1	1.55	2.21	2.57
Araria	Pallasi	5.53	-	2.34	Partially filled
Araria	Raniganj	Dry	Dry	1.91	4.5
Aurangabad	Aurangabad	6.84	0.62	1.43	2.22
Aurangabad	Pandrawan	5.47	1.83	1.53	3.88
Aurangabad	Barun	8.95	7.9	7.82	8.93
Aurangabad	Narari Kala	11.1	10.52	10.86	10.4
Aurangabad	Daudnagar	5.6	4.02	5.02	4.52
Aurangabad	Deo1	5.23	2.9	1.85	3.32
Aurangabad	Deohara_goh	11.14	8.7	10.1	Dry
Aurangabad	Dhobi Tola_Goh	5.16	3.56	3.58	4.46
Aurangabad	Etwan	3.3	0.98	1.92	2.62
Aurangabad	Madanpur	7	1.72	4.18	4.42
Aurangabad	Pataya	5.9	1.93	2.46	5.24
Aurangabad	Dhanibar	9	5.75	9	0
Aurangabad	Mahauli	6.72	3.75	4.18	4.7
Aurangabad	Nabinagar dbib	3.23	0.1	Water logged	6.4
Aurangabad	Obra	5.9	3.78	4.44	5.65
Aurangabad	Rafiganj	14	14	9.7	10.1
Aurangabad	Tineri Morh	7.07	2.53	3.98	6.6
Banka	Amarpur ps	5.43	3.27	1.59	1.9
Banka	English More	3.98	2.17	2.27	4.03
Banka	Rampur	4.74	1.93	2.97	3.4
Banka	Banka ps	4.9	0.89	2.44	4.1
Banka	Barahat	4.9	1.37	2.96	4.42
Banka	Baunsi	9	2.74	4.38	5.36
Banka	Bausi pwdib	Dry	Closed		
Banka	Tinmurty	-	0.91	1.83	2.17
Banka	Chandan	5.92	5.07	5.92	6.98
Banka	Panjwara	6.95	4.22	6.95	6.95

Banka	Katoria	7.9	2.36	5.67	7.59
Banka	Rajaun ps	8.97	6.09	7.72	Partially filled
Banka	Fulidumer	8.15	1.21	2.92	8.15
Banka	Kharharia	3.55	1.27	2.37	4.32
Banka	Mirjapur	4.59	1.59	3.21	4.84
Banka	Sambhuganj	6.41	2.18	4.54	7.52
Begusarai	Baraun mile	Partially filled	3.61	-	5.64
Begusarai	Kumharson	5.28	5.09	-	
Begusarai	Naya Nagar Dularpur	5.9	2.14	3.86	4.76
Begusarai	Teghra	8.2	3.6	6.48	7.31
Begusarai	Bagrash	7.01	5.71	6.18	6.57
Begusarai	Bakhari_salauna	6.04	4.01	5.33	5.38
Begusarai	Manjaul	3.62	4.1	9.3	9.3
Begusarai	Peernagar	6.93	6.55	6.46	6.68
Begusarai	Simri	6.08	5.78	6.05	6.19
Begusarai	Badi Balia	8.31	7.3	6.48	7
Begusarai	Bariarpur	7.3	5.5	-	5.27
Begusarai	Chhoti Balia	Dry	6.64	Dry	9.9
Begusarai	Laxminia	6.68	5.92	-	5.99
Begusarai	Parihara	5.81	4.18	4.21	5.84
Begusarai	Rahatpur	7.45	3.04	4.82	5.47
Begusarai	Begusarai	7.2	4.27	4.61	Reported as abandoned
Begusarai	Harpur	6.35	3.75	3.79	4.53
Begusarai	Barieghu	8.67	4.27	2.68	3.14
Begusarai	Begusarai fc_ib	6.27	3.66	4.04	4.77
Begusarai	Gopalpur	5.86	2.81	5.61	6.27
Begusarai	Haridia	6.27	3.66	4.49	5.08
Begusarai	Kaithma	8.09	4.45	6.61	7.11
Begusarai	Lakho	7.18	3.35	4.54	5.29
Begusarai	Matihani	9.19	3.32	8.25	8.25
Begusarai	Mohanpur Usrai	7.8	3.58	6.17	6.57
Begusarai	Pokharia	7.3	3.31	5.36	5.91
Begusarai	Aghara	7.27	5.47	6.75	7.36
Begusarai	Cheriabariarpur	6.41	4.6	4.74	5
Begusarai	Kumbhidera	4.37	4.14	4.69	4.94
Begusarai	Badalpura	7.98	4.23	6.37	7.17
Begusarai	Dariarpur	8.04	2.8	4.87	5.72
Begusarai	Bintoli	5.28	3.01	Dry	9.1
Begusarai	Heera Tola	7.42	Reported as abandoned		
Begusarai	New Jafar Nagar	6.7	2.2	3.88	4.74
Begusarai	Raghunathpur	7.97	2.8	5.56	6.81
Begusarai	Sabdalpur	Dry	3	6.78	7.97
Bhagalpur	Bihpur ib	Reported as abandoned			
Bhagalpur	Marwa	5.05	3.06	2.99	-

Bhagalpur	Ghoga rly stn	4.33	1.78	1.89	2.99
Bhagalpur	Harchandpur	4.22	Not approachable	2.71	3.87
Bhagalpur	Jagnathpur	8.11	Not approachable	6.49	7.61
Bhagalpur	Kahalgaon rlyco	12.5	Not approachable	11.34	12.5
Bhagalpur	Madrauni Chowk	6.32	2.08	2.57	-
Bhagalpur	Bhagalpur city	-	12.15	12.26	13.4
Bhagalpur	Jagadishpur	2.74	1.87	1.56	2.19
Bhagalpur	Naugachhia h.s	5.76	2.34	2.44	0
Bhagalpur	Pirpainti db.ib	7.28	Not approachable	6.17	7.81
Bhagalpur	Sabaur	11.2	1.17	2.54	2.87
Bhagalpur	Shahkund db.ib	Partially filled	3.94	Gate locked	
Bhagalpur	Akbarnagar stn	4.37	2.32	2.15	3.05
Bhagalpur	Sultanganj	5.94	4.23	Gate locked	8.66
Bhojpur	Jarawarpur Milki	5.94	5.69	3.28	5.27
Bhojpur	Bakhorapur	7.31	5.64	6.91	5.2
Bhojpur	Balua	10.05	6.92	6.25	9.8
Bhojpur	Barahara	9.65	5.65	5.65	8.8
Bhojpur	Dhusaria	9.38	4.28	5.26	7.31
Bhojpur	Ekauna	10.48	5.85	4.83	6.92
Bhojpur	Farhda	7.65	3.8	6.2	4.8
Bhojpur	Jagatpur	9.1	5.83	4.58	6.29
Bhojpur	Milki	Partially filled		3.42	5.87
Bhojpur	Simariya	8.2	6.32	5.51	6.02
Bhojpur	Bihiya	5.61	2.55	4.55	-
Bhojpur	Garhani	6.22	3.39	2.7	5.16
Bhojpur	Jagadishpur1	6.1	2.58	2.85	4.12
Bhojpur	Birampur	8.13	3.38	5.31	7.37
Bhojpur	Giddha	Partially filled	4.07	6.52	6.56
Bhojpur	Inglishpur	8.65	5.15	5.15	7.01
Bhojpur	Kulharia	8.2	3.94	3.96	5.17
Bhojpur	Lodhipur	9.48	6.07	5.41	7.72
Bhojpur	Mokhlisa	7.92	5.65	6.89	6.62
Bhojpur	Muhammadpur	7.7	5.81	6.72	7.21
Bhojpur	Pachrukhiya	Partially filled	4.09	6.17	8.5
Bhojpur	Rajapur Bazar	Partially filled		5.35	8.21
Bhojpur	Sakkadi	10.88	3.8	4.6	5.15
Bhojpur	Songhata	8.33	5.87	4.45	8.06
Bhojpur	Pirro	-	2.58	2.67	3.12
Bhojpur	Baruna	4.63	1.35	5.18	8.56
Bhojpur	Guljarpur	6.15	4.45	2.72	4.56
Bhojpur	Kori	6.12	3.01	3.14	4.37
Bhojpur	Nasratpur	8.77	6.24	2.89	4.62
Bhojpur	Pauna	6	3.37	3.06	4.17
Bhojpur	Sandesh	7.22	4.67	2.52	4.07

Bhojpur	Karnempur	7.78	4.41	5.4	6.82
Bhojpur	Chandawa	4.72	2.17	2.66	3.16
Bhojpur	Harnath Kundi	4.38	1.92	4.09	5.12
Bhojpur	Kasap	4.82	1.9	1.66	3.28
Bhojpur	Sasaram Chota	6.07	6.41	3.58	5.11
Bhojpur	Udwantnagar	5.72	2.72	1.55	3.26
Buxar	Bagen Bazar	-	4.82	5.48	6.17
Buxar	Barhampur	7.2	3.92	6.36	6.75
Buxar	Hathilpur	6.5	3.07	5.77	6.02
Buxar	Jugia Dera	9.2	6.46	6.55	5.82
Buxar	Khochariwan	6.25	4.9	6.38	5.42
Buxar	Mharajgunj	6.2	3.45	5.14	6.18
Buxar	Raghunathpur	9.2	6.87	4.93	6.76
Buxar	Buxar(SSA)	5.5	3.4	4.11	4.73
Buxar	Chausa	3.6	0.36	1.2	2.35
Buxar	Churamanpur DW	8.46	4.97	4.65	6.87
Buxar	Danikutia	7.3	4.9	2.15	5.96
Buxar	Dudharchak	10.1	6.85	5	5.29
Buxar	Kritpur	6.3	3.31	5.65	4.73
Buxar	Mishrvalia	7.1	3.85	2.18	4.42
Buxar	Ramobariya	9	6.12	2.78	5.58
Buxar	Thodagaon	10.75	5.5	1	4.39
Buxar	Dumraon	9.4	7.5	4.73	9.24
Buxar	Rajpur	3.6	1.12	2.22	2.1
Buxar	Barka Rajpur	11.02	7.03	4.94	5.32
Buxar	Dumri	6.1	3.77	3.91	4.52
Buxar	Durasan	7.8	4	4.47	4.12
Buxar	Karathar	8.6	6.95	4.5	6.17
Buxar	Manikpur	11.45	7.8	4.88	5.47
Buxar	Neazipur	9.1	6.9	3.79	5.78
Buxar	Sohiar	9.4	4.37	5.07	6.79
Darbhanga	Darbhanga	1.87	1.42	1.72	1.84
Darbhanga	Bithauli	5.19	3.08	4.16	4.24
Darbhanga	Jorja	4.9	4.65	5.28	5.73
Darbhanga	Bahera	4.64	3.93	4.65	4.96
Darbhanga	Baheri1	3.76	3.12	4.2	4.44
Darbhanga	Barhi Tola	Reported as filled			
Darbhanga	Pouram	5	4.88	5.21	5.6
Darbhanga	Rustampur	New well			2.85
Darbhanga	Keoti	3.78	2.28	2.85	3.88
Darbhanga	Sakari1	3.12	Partially filled		
Darbhanga	Simri (bithauli)	4.3	2.27	3.65	4.31
Gaya	Akauna	7	2.74	3.36	5.31
Gaya	Banke Bazar	6.3	3.08	3.95	4.38

Gaya	Bhadeya	8.56	3.64	5.45	7.1
Gaya	Dobhi	7.66	3.1	5.12	5.95
Gaya	Paligaon	7.6	6.8	8	8
Gaya	Bodh Gaya	6.75	3.42	4.52	5.38
Gaya	Magra	6	0.96	3.28	4.64
Gaya	Baraila More	3.69	0.32	4.05	3.1
Gaya	Fatehpur	6.46	4.96	5.47	10.85
Gaya	Bitho Sharif 1	8.79	7.43	9	10
Gaya	Chand Chowra Chowk	7.93	1.62	7.11	6.96
Gaya	Ram Kund	6.26	4.71	5.07	5.01
Gaya	Sangat Gali	7.23	5.07	6.67	6.75
Gaya	Guraru	5.95	1.44	4.93	5.89
Gaya	Raghunath Khap	9.2	4.33	5.2	6.34
Gaya	Baseta	5.05	1.34	2.35	3.12
Gaya	Konch	9.55	9.08	9.33	10
Gaya	Manpur	5.44	5.06	6.9	8
Gaya	Dangra More	7.63	5.98	5.24	6.74
Gaya	Tekari	6.25	3.63	4.94	5.5
Gaya	Wazirganj	6.61	4.53	2.23	2
Gopalganj	Manjwalia	3.91	3.73	3.88	4.18
Gopalganj	Barauli	3.52	2.35	2.43	2.61
Gopalganj	Bhojpurwa	3.81	2.41	2.35	3.67
Gopalganj	Bhore	6.1	4.96	4.68	5.08
Gopalganj	Rampur2	3.77	1.54	2.83	2.18
Gopalganj	Turkaha	3.03	0.72	1.09	2.21
Gopalganj	Yadavpur Sukal	6.38	4.17	6.38	6.38
Gopalganj	Hathua1	4.96	2.54	3.26	4.06
Gopalganj	Jamunaha	6.67	3.96	4.7	4.92
Gopalganj	Katiya	4.93	2.2	2.4	4.05
Gopalganj	Lala Pachmawa	5.26	0.42	3.57	4.79
Gopalganj	Misirbatha1	6.28	5.22	4.92	5.49
Gopalganj	Jalalpur2	4.87	3.67	2.62	3.57
Gopalganj	Kuchaikot	3.02	0.52	1.73	2.57
Gopalganj	Bangra	4.42	1.79	2.77	2.71
Gopalganj	Bangra Deoria	4.39	2.46	3.16	2.93
Gopalganj	Bishambarpur	4.66	3.51	3.85	4.21
Gopalganj	Chanwabe	-	0.87	1.8	Reported as abandoned
Gopalganj	Lachchwar	3.98	3.1	2.57	3.4
Gopalganj	Manjhwa1	5.09	1.72	2.85	3.53
Gopalganj	Nunachapra	3.62	1.34	2.29	1.38
Gopalganj	Phulwariya	3.64	3.04	3.45	3.23
Jamui	Chakai	6.79	4.3	5.35	6.23
Jamui	Chakai B	13.4	4.97	13.4	13.4
Jamui	Tarakhakhar	11.8	8.62	9.79	11.25

Jamui	Aghara	6.32	3.49	4.22	6.97
Jamui	Jamui	10.98	8.95	10.52	10.88
Jamui	Manjhwe	5	2.11	4.13	5.21
Jamui	Ambedkar Nagar	3.75	1.2	2.07	4.14
Jamui	Chandramanita	3.14	2.47	4.63	5.14
Jamui	Harna	5.1	2.62	3.31	5.67
Jamui	Jhajha	11.25	9.37	11.25	11.25
Jamui	Gidhaur O	13.5	8.49	13.5	13.5
Jamui	Purna Khaira	3.98	1.87	1.57	3.79
Jamui	Lalmatia	8.97	6.41	8.92	10.39
Jamui	Laxmipur	5.5	0.43	2.34	4.33
Jamui	Sandipi	7.34	2.01	4.95	9.11
Jamui	Sikandra	7.57	1.63	2.36	5.99
Jamui	Batia1	15.8	11.92	12.86	15.8
Jamui	Sono	7.7	3.79	4.96	5.53
Jehanabad	Arwal1	6.53	4.75	4.53	5.88
Jehanabad	Dirpal Bigha	4.21	2.57	2.15	0
Jehanabad	Madhubani	4.47	2.37	3.45	3.95
Jehanabad	Dholakpur	6.77	1.94	-	5.32
Jehanabad	Ghoshi	7.5	6	5.1	5.3
Jehanabad	Hulasganj	6.37	4.5	5.13	5.87
Jehanabad	Kako	6.93	7.74	7.08	7.86
Jehanabad	Lakhwar	4.83	4.9	3.45	4.42
Jehanabad	Gaurakhini	6.4	7.72	9.21	8.53
Jehanabad	Jahanabad hosp.	3.58	1.56	3.2	3.88
Jehanabad	Teni Bigha	3.07	1.93	2.31	2.77
Jehanabad	Bairbigha	5.99	5.59	7.23	5.51
Jehanabad	Bansi Surajpur	3.98	1.87	2.31	3.2
Jehanabad	Imamganj	5.52	3.69	4.89	5.22
Jehanabad	Kinjer	7.29	6.29	6.65	6.95
Jehanabad	Jhunathi	6.79	6.82	7.46	6.84
Jehanabad	Kurtha bdo	3.46	2.04	2.72	3.05
Jehanabad	Alubikha	4.62	3.94	2.92	3.34
Jehanabad	Makhdumpur	5	3.35	3.46	3.59
Kaimur	Adhaura	7	4.45	Not approachable	
Kaimur	Bhabhua	12.3	12.3	10.26	Dry
Kaimur	Saraiya	13.2	7.3	8	9.42
Kaimur	Tori f.ck.post	11	7.28	7.6	8.48
Kaimur	Chainpur	-	9.7	7.35	-
Kaimur	Khariava	6.2	5.28	4.66	0
Kaimur	Chand in p.s.	5.5	3.95	3.45	3.85
Kaimur	Karmanasa	11.75	8.4	8.88	8.38
Kaimur	Nuawan	11.2	7.84	2.7	5.86
Kaimur	Mohania	9.9	5.2	4.05	5.21

Kaimur	Bevnaliya	8.7	5.5	7.53	5.85
Katihar	Barari-1	5.66	3.39	3.59	5.02
Katihar	Dumaria	5.88	3.88	4.49	5.52
Katihar	Kursela	7.16	2.29	4.01	6.36
Katihar	Paranpur	4.1	1.94	2.86	3.56
Katihar	Mahendrapur	4.66	3.35	3.21	3.71
Katihar	Narahaiya	5.77	3.54	3.4	3.8
Katihar	Kadwa	4.77	2.97	3.63	4.15
Katihar	Sonauli	4.33	2.73	2.78	3.72
Katihar	Hafla1	3.82	2.75	2.52	3.08
Katihar	Katihar	4.58	4.48	4.29	3.88
Katihar	Khiria	4.89	4.16	3.8	-
Katihar	Korha	4.85	3.13	3.14	4.08
Katihar	Manihari	6.14	5.67	5.84	6.08
Katihar	Basantpur	4.63	3.32	3.15	3.78
Katihar	Bastaul1	4.37	3.37	3.52	3.65
Khagaria	Pirnasara	5.72	-		4.49
Khagaria	Basantpur	6.68	3.24	2.85	5.2
Khagaria	Chautham	5.18	1.8	2.56	4.42
Khagaria	Maheshkhunt 1	5.49	4.19	2.52	4.63
Khagaria	Gandhinagar	-	2.47	2.27	3.73
Khagaria	Jamalpur	5.64	5.08	3.16	3.97
Khagaria	Maheshkhunt _Lohiya Chowk	-	3.3	3.82	5.58
Khagaria	Maheshkunt	-	4.76	2.63	4.49
Khagaria	Durgapur	8.4	2.58	4.64	7.15
Khagaria	Gangaut	7.76	3.65	5.08	6.78
Khagaria	Ismailpur	7.66	3.46	4.87	6.6
Khagaria	Kasimpur	5.66	3.5	3.36	6.54
Khagaria	Khagaria	8.05	3.4	4.1	6.35
Khagaria	Labhgaon	7.44	3.94	5.41	7.13
Khagaria	Ranko	6.73	2.1	3.49	5.81
Khagaria	Sabalpur	6.71	3	4.46	6.38
Khagaria	Sonhauli	8.34	4.03	4.98	7.12
Khagaria	Dewri	2.41	1.14	1.29	1.44
Khagaria	Mohaddipur	6.73	5.88	-	8.1
Kishanganj	Bahadurganj	8.72	2.13	2.96	Reported as filled
Kishanganj	Bahadurganj B	3.7	2.17	2.95	4.21
Kishanganj	Gunsagar	3.3	1.63	2.51	3.11
Kishanganj	Kishanganj	3.07	1.63	2.47	2.78
Kishanganj	Kochadhamin	3.07	1.27	2.55	3.22
Kishanganj	Kaswa Kaliganj	2	0.68	1.76	2.06
Kishanganj	Teragachhi	3.27	1.68	2.47	3.37
Kishanganj	Thakurganj	10.4	7.89	8.6	9.71
Lakhisarai	Barhaiya	9.55	2.8	6.27	8.39

Lakhisarai	Kiul_1	2.21	2.3	2.26	2.19
Lakhisarai	Lakhisarai	11.65	7.91	9.11	9.02
Lakhisarai	Surajgarha1	7.43	2.79	3.12	4.81
Lakhisarai	Arma	8.69	1.88	2.06	3.79
Lakhisarai	Kajra	-		2.4	3.87
Lakhisarai	Rishi Paharpur	8.65	3.06	4.35	7.31
Lakhisarai	Saidpur	5.87	3.1	2.64	3.82
Madhepura	Abhiyatola	5.85	3.44	4.39	4.98
Madhepura	Chausa1	5.04	3.35	3.14	3.94
Madhepura	Ganeshpur	Gate locked	3.33	3.29	3.57
Madhepura	Bhimpura	4.14	2.71	2.84	3.53
Madhepura	Hatkora bazar	4.21	2.17	2.36	3.21
Madhepura	Madhepura	4.36	2.37	5.32	5.32
Madhepura	Surajganj	3.23	3.1	1.11	2.37
Madhepura	Gaushala Chowk	3.48	2.66	2.81	3.3
Madhepura	Murliganj	3.1	1.63	1.04	1.64
Madhepura	Rajui Rajni	4.04	2.64	2.44	3.13
Madhepura	Rampur	4.34	2.69	2.88	3.74
Madhepura	Barahari	3.63	1.92	2.35	3.18
Madhepura	Jiwachhapur	4.14	2.11	2.99	3.71
Madhepura	Singeswar	5.47	3.52	3.22	4.15
Madhepura	Gwalpara	-	2.22	2.64	3.44
Madhepura	Kusthan	4.23	3.06	3.02	3.64
Madhepura	Uda Kishanganj	4.93	2.96	3.34	4.22
Madhubani	Harri	6.64	1.31	2.65	3.76
Madhubani	Babubarhi	1.58	0.18	0.64	1.01
Madhubani	Narar	3.5	0.42	1.63	-
Madhubani	Benipatti	1.97	0.58	1.31	1.55
Madhubani	Dhakjari	3.27	1.47	1.93	2.42
Madhubani	Kapasia	2.55	0.46	1.47	1.82
Madhubani	Baurahar Chowk	Partially filled	1.38	2.89	3.5
Madhubani	Harlakhi	Partially filled	3	0.95	5
Madhubani	Jaynagar	2.38	-		2.32
Madhubani	Bideshwar Asthan	5.66	3.13	4.26	4.98
Madhubani	Jhanjharpur	0.53	0.26	0.75	1.31
Madhubani	Bentadih	3.33	0.95	1.9	2.55
Madhubani	Khajauli	3	0.39	1.92	2.54
Madhubani	Thantola	3.67	1.65	2.45	3
Madhubani	Jogiya	4.41	1.35	2.43	2.92
Madhubani	Ambedkar Nagar	2.26	0.78	1.42	1.86
Madhubani	Bihari	Partially filled	1.92	3.2	3.18
Madhubani	Madhubani	2.2	1	1.8	2.2
Madhubani	Bhawanipur	5.84	4.59	5.85	0
Madhubani	Phulparas1	2.14	0.57	-	1.62

Madhubani	Shambhuar	4.51	3.5	4.17	4.65
Madhubani	Kapileshwar	4.88	2.7	4.17	4.84
Madhubani	Siswar	3.6	2.05	2.5	2.9
Madhubani	Karmnali	Dry	0.7	Partially filled	0.65
Madhubani	Pariharpur	3.94	0.57	1.35	3.73
Munger	Bariarpur	Partially filled	Partially filled	4.22	Partially filled
Munger	Singhiya chawk	6.72	3.34	3.48	4.67
Munger	Jamalpur1	7.47	1.53	2.73	5.53
Munger	Gangta Morh	6.91	3.37	7.85	9.74
Munger	Gobadda	3.87	2.34	2.84	3.5
Munger	Havelikhargpur	Reported as abandoned		1.33	Reported as abandoned
Munger	Tarapur	5.35	2.87	3.52	4.86
Munger	Purabsarai	7.32	2.39	2.29	5.16
Munger	Rampur2	6.64	1.71	3.32	5.09
Munger	Asarganj	4.74	3.57	4.25	4.35
Muzaffarpur	Aurai	2.43	0.16	1.1	1.9
Muzaffarpur	Rajkhand	4.16	2.77	3.5	3.95
Muzaffarpur	Bhagwanpur Chowk	7.22	1.56	6.61	6.76
Muzaffarpur	Jaffarpur	5.1	4.2	3.86	3
Muzaffarpur	Mahammadpur Balmi	5.5	3.75	4.46	5.12
Muzaffarpur	Bochaha	6.44	6.49	6.63	6.86
Muzaffarpur	Shukrahat	5.68	5.72	5.67	6.07
Muzaffarpur	Barkurwa	10.4	-	10.4	5.06
Muzaffarpur	Surfuddinpur	5.27	1.42	6.5	6.5
Muzaffarpur	Muzaffarpur	7.53	6.17	7.23	6.6
Muzaffarpur	Katra1	5.79	3.65	4.33	4.88
Muzaffarpur	Ramnagar	5.24	4.81	5.53	8
Muzaffarpur	Sakri chatti	5.06	3.23	3.12	4
Muzaffarpur	Wazitpur	4.93	-	4.81	4.3
Muzaffarpur	Gargaliya	4.06	4.68	4.18	5.33
Muzaffarpur	Digra	4.99	4.48	5.14	5.6
Muzaffarpur	Japaha	5.7	5.37	5.91	6.24
Muzaffarpur	Dewaria	5.16	5.29	4.96	5.4
Muzaffarpur	Paro	5.03	3.3	3.63	4.49
Muzaffarpur	Daha Chhapra	4.02	3.85	4.07	4.35
Muzaffarpur	Parwalpatti Barauna	5.24	4.41	3.93	5.51
Muzaffarpur	Rajwara	5.35	4.64	4.88	5.13
Muzaffarpur	Sahebganj	7.2	4.16	7.2	-
Muzaffarpur	Dholi	6.52	7.39	9	7.82
Muzaffarpur	Mahantmanihari	5.42	5.52	7.8	7.8
Muzaffarpur	Seho	6.24	6.64	6.73	8
Nalanda	Asthwan	3.8	3.49	3.26	3.52
Nalanda	Jangipur	7.77	7	7.5	7.93
Nalanda	Sare	10.69	9.9	11.06	11.62

Nalanda	Shahpur Morh	5	4.03	2.92	3
Nalanda	B Sharif Rly Stn	7.98	2.05	2.83	2.9
Nalanda	Biharsharif	3.05	2.78	2.85	3.2
Nalanda	Maghra	4.67	4.2	3.68	5.3
Nalanda	Muraura	3.69	2.22	2.53	3.32
Nalanda	Ranabigha	10	6	5.65	8.44
Nalanda	Sohdh	3.42	2.02	3.5	3.5
Nalanda	Chandi	4.66	2.04	3.65	4.53
Nalanda	Ekangarsarai	3.74	3.85	2.94	3.5
Nalanda	Parwalpur	5.19	5.65	5.9	6.3
Nalanda	Parwalpur 1	4.69	3.55	3.1	3.25
Nalanda	Giriak	3.9	2.4	2.29	Partially filled
Nalanda	Pawapuri	3.55	3.2	3.73	3.68
Nalanda	Harnaut1	2.6	1.04	1.27	1.26
Nalanda	Hilsa	9.45	7.9	3.74	9.04
Nalanda	Karaiparsurai	6.75	3.9	4.01	4.31
Nalanda	Nischalganj	5.51	4.11	4.4	Reported as filled
Nalanda	Ankuri Bazar	8.1	-	7.6	8.1
Nalanda	Islampur	2.46	2.45	2.06	2.2
Nalanda	Sherpur	2.68	3.07	1.77	2.4
Nalanda	Daudpur	8.4	7.33	6.92	7.62
Nalanda	Doiya	5.2	4.57	5.08	5.2
Nalanda	Heganpura	9.44	8.67	9.16	9.38
Nalanda	Paparnhosa	4.85	4.83	4.29	4.55
Nalanda	Vena	11.76	8.39	11.28	10.61
Nalanda	Bhui	8.43	Partially filled	8.44	5.82
Nalanda	Kundalpur	9.25	8.39	10.33	9.01
Nalanda	Nalanda	8.01	7.45	7.3	7.76
Nalanda	Nirpur	3.33	1.22	2.07	3.6
Nalanda	Pilkhi	7.6	5.4	3.36	4.92
Nalanda	Rajgir	10.56	7.37	6.34	6.76
Nalanda	Silao	7.44	7.15	7.14	6.93
Nalanda	Sithaura	4.9	3.13	3.43	3.5
Nalanda	Sarmera	8.9	6.9	8.81	8.68
Nawada	Tungi	5.23	2.96	4.73	5.31
Nawada	Bishunpur	5.46	2.85	3.89	5.24
Nawada	Hisua	9.5	4.23	5.85	6.6
Nawada	Roh1	Reported as filled		3.48	2.8
Nawada	Kawakol ashram	7.34	6.23	7.09	4.1
Nawada	Rupau	8.08	7.86	7.3	8.24
Nawada	Khanwa	6.48	2.78	4.43	5.43
Nawada	Garhpar	4.47	4.51	4.03	4.61
Nawada	Gonama	7.4	7.36	6.45	8
Nawada	Nawada2	9	8.64	8.49	9.1

Nawada	Pakribrawan Pond	7	6.31	8.2	8.2
Nawada	Dopata	7.46	7	6.94	7.66
Nawada	Meskaur	5.29	0.58	2.27	2.64
Nawada	Nawabganj	6.85	1.63	1.88	1.97
Nawada	Shahpur Morh	3.65	3.9	2.92	3
Nawada	Warshaliganj	2.85	2.65	2	1.7
W Champaran	Bagaha	4.11	1.39	3.41	3.15
W Champaran	Belwa	2.23	1.27	1.07	2.3
W Champaran	Mangalpur	3.94	1.83	2.52	4.16
W Champaran	Bettiah	4.81	Reported as filled		
W Champaran	Chanpatia	5.06	2.54	2.96	4.68
W Champaran	Gurwalia	4.03	1.55	2.63	3.05
W Champaran	Banspur pipra	3.29	Reported as filled	3.11	3.37
W Champaran	Lauria	4.7	1.31	3.42	4.1
W Champaran	Shishwania	Partially filled	1.55	8.8	4
W Champaran	Majhwalia	4.33	1.36	4.33	-
W Champaran	Korigawa Chowk	3.51	0.84	2.29	7.13
W Champaran	Sabuni Pokhra	5.5	4.32	4.9	5.5
W Champaran	Taulaha	3.99	1.88	3.42	3.06
W Champaran	Harnatanr	4.45	1.99	2.46	3.48
W Champaran	Naurangia	3.99	2.13	2.73	3.68
W Champaran	Valmikinagar	2.27	1.62	2.31	0.56
Patna	Bakhtiarpur	11.47	3.94	11.47	11.47
Patna	Agwanpur	6.26	2.21	2.66	3.26
Patna	Barh1	5.98	1.89	2.49	3.88
Patna	Amhara	3.32	1.32	1.95	2.32
Patna	Bishambharpur	Partially filled	0.9	Partially filled	2.42
Patna	Gyaspur Purvatola	Partially filled	3.01	1.62	2.7
Patna	Raghopur	6.9	6.85	5.63	5.95
Patna	Bharatpura	3.45	1.5	1.88	2.32
Patna	Dina Bigha_nhs	7.26	2.65	4.35	6.05
Patna	Dulhin Bazar	5.9	Partially filled	5.69	5.69
Patna	Mariyawa	Partially filled	3.37	3.6	3.6
Patna	Noniatola	Partially filled	2.49	1.98	4.78
Patna	GoptalNHS	4.72	1.04	1.64	2.63
Patna	Khaspur	8.83	3.42	7.6	3.22
Patna	Daniyawan	6.95	4.1	6.87	10.4
Patna	Fatuha	7.55	3.53	6.48	7.32
Patna	Darbeshpur_NHS	9.73	5.85	2.39	8.32
Patna	Gyaspur(purvitola)	6.18	3.01	3.88	2.7
Patna	Lalbegam	7.4	4.55	5.09	5.65
Patna	Maner	10.7	2.69	10.7	3.35
Patna	Nagwa_nhs	7.32	2.25	2.24	3.77
Patna	Maranchi	7.7	3.28	-	7.45

Patna	Faridpur_nhs	5.4	3.75	3.02	5.9
Patna	Snehitola	6.06	3.56	2.98	4.8
Patna	Bali Pakar	8	1.2	2.23	3.22
Patna	Khazpura_nhs	9.02	4.88	7.6	8.15
Patna	Mithapur_NHS	1.68	0.68	Partially filled	1.18
Patna	Patna-City	5.2	1.09	1.7	1.96
Patna	Bishambharpur_NHS	9.26	0.9	1.62	2.42
Patna	Etwarpur	3.88	1.14	3.81	4.65
Patna	Hulas Chak	6.1	4.92	-	5.98
Patna	Parsa Bazar_nhs	10.4	0.4	6.96	7.48
Patna	Deokali	Dry	8.46	8.8	9.02
Patna	Nima Halt	Partially filled	6.92	6.35	6.83
E Champaran	Shyampur	5.79	3.81	3.71	5.3
E Champaran	Dumaria	5.41	3.27	3.1	4.48
E Champaran	Radia	3.17	0.83	2.14	3.5
E Champaran	Chakia1	4.54	4.15	5.2	5.46
E Champaran	Uttari Gavandra	4.24	1.99	3.11	-
E Champaran	Belai	3.65	0.99	3.52	3.1
E Champaran	Chatia	5.29	4.2	5.29	-
E Champaran	Chiraiya	4.6	-	4.09	3.8
E Champaran	Mohabbatpur	3.89	1.3	2.18	3.75
E Champaran	Bhakatiy Tola	4.08	1.44	3.51	3.58
E Champaran	Ghorashan	3.64	1.49	2.81	3.54
E Champaran	Murarpur	6	1.74	6	Dry
E Champaran	Sheoraha	3.38	0.3	2.19	1
E Champaran	Dharampur	4.73	1.55	3.61	4.05
E Champaran	Dipau	3.57	0.88	2.16	2.67
E Champaran	Rajpur	4.01	3.01	3.13	4.47
E Champaran	Dubey Tola	4.01	1.03	3.15	2.66
E Champaran	Husaini	5.11	3.79	3.76	5.19
E Champaran	Kizerpura	5.09	3.62	3.51	4.68
E Champaran	Lala Chapra	4.6	2.88	4.15	4.43
E Champaran	Rampur Kajuria	-	2.74	-	3.95
E Champaran	Sugauli_1	3.81	1.09	3.53	Partially filled
E Champaran	Lakhwara	2.45	0.5	1.01	2.13
E Champaran	Motihari	4.77	3.19	3.02	Dry
E Champaran	Chhauradanu	2.35	0.57	7.09	Partially filled
E Champaran	Bishunpur Matiyarwan	4.26	1.41	2.79	3.32
E Champaran	Gobindganj	3.44	0.25	2.89	2.43
E Champaran	Patahi	4.43	3.8	3.76	0
E Champaran	Raghunathpur	2.89	0.73	1.81	2.31
E Champaran	Raxaul	3.66	2.49	2.41	3.68
E Champaran	Chhapwa	6.27	1.09	6.27	3.57
E Champaran	Bairiya Bazar	5.68	3.15	4.13	4.5

E Champaran	Nawada1	3.95	1.2	2.91	-
Purnia	Amour	5.62	3.43	4.06	5
Purnia	Baisi2	4.24	1.22	2.39	3.27
Purnia	Chadia	4.77	2.76	Partially filled	Partially filled
Purnia	Budhia Gola	4.2	2.53	2.6	3.42
Purnia	Mangujan	5	3.53	3.38	4.51
Purnia	Dargaha	3.78	3.35	3.05	3.3
Purnia	Amri Kukran W	5	4.54	4.31	4.35
Purnia	Banmankhi	3.88	3.36	3.24	3.14
Purnia	Dhamdaha	5.66	4.75	4.53	4.92
Purnia	Kajha	3.5	2.46	2.42	2.85
Purnia	Jalalgarh	4.75	2.06	2.67	3.92
Purnia	Kasba	5.79	4.62	4.29	5.04
Purnia	Khata Hat	3.66	1.92	2.24	2.92
Purnia	Barsoni	4.51	3.13	3.06	3.64
Purnia	Purnia	2.86	2.27	2.3	2.73
Purnia	Ranipatra	4.5	3.14	3.44	4.14
Purnia	Tikapatti Chowk	4	2.37	3.4	4
Purnia	Tilka Patti	4.25	2.27	2.47	3.78
Rohtas	Bikramganj pp	9.9	4.45	3.16	3.26
Rohtas	Chenari hospita	12.4	2.67	4.47	4.67
Rohtas	Maliabagh	7.04	3.81	2.56	4.02
Rohtas	Anikut	9.94	8.57	9.45	6.25
Rohtas	Karbindia(templ	9.33	5.3	2.7	4.21
Rohtas	Dinara1	6.87	1.71	2.9	3.86
Rohtas	Kochas	7	3.02	1.25	5.28
Rohtas	Nokha in temple	5.87	1.7	1.57	4.97
Rohtas	Bahaura	5.37	1.21	3	3.56
Rohtas	Ambwalia	8.2	2.57	1.4	5.6
Rohtas	Belthari	8.17	0.54	1.47	5.86
Rohtas	Sirisiyan	7.49	2.7	1.67	3.97
Rohtas	Jahanabad (kudra)	10.34	6.17	3.77	0
Rohtas	Rajandih	7.87	1.65	2.95	5.12
Rohtas	Nasriganj	11.24	5.38	3.1	5.46
Rohtas	Auraiya	9.5	7.19	8.96	7.2
Rohtas	Akbarpur in bdo	12.36	7.06	9.37	7.65
Rohtas	Sasaram p.o.	9.84	3.89	2.08	4.77
Rohtas	Tilothu bustand	9	8.02	8.02	8.02
Rohtas	Amawan	4.86	0.98	1.98	2.32
Saharsa	Bangaon	3.01	1.62	2.1	2.56
Saharsa	Basudeva	2.54	2.16	1.61	1.84
Saharsa	Chainpur	Partially filled	1.58	2.93	3.44
Saharsa	Kharakuti	4.64	4.4	4.38	4.76
Saharsa	Niralatola	Partially filled	3.27	3.6	4.24

Saharsa	Panchgachhi	3.2	2.34	2.38	3.04
Saharsa	Patodi Bazar	3.12	2.5	2.75	3.31
Saharsa	Patodibazar	3	2.41	2.01	2.46
Saharsa	Potwaha	3.68	3.05	3.01	3.44
Saharsa	Saharsa1	4.18	4.18	4.71	5.2
Saharsa	Tulsiyahi	2.8	1.47	1.64	2.02
Saharsa	Sonbarsaraj1	5.17	2.58	3.69	4.52
Saharsa	Jamunia	3.77	2.38	1.69	2.33
Saharsa	Semribaktiarpur	1.66	4.35	3.65	-
Saharsa	Simri Bakhtiyarpur	3.56	2.85	2.85	3.42
Saharsa	Adrahch	Partially filled	3.03	3.3	3.96
Saharsa	Baidnathpur	4.24	3.27	4.22	-
Saharsa	Chandaur Purbi	Partially filled	3.92	3.93	4.12
Samastipur	Kalyanpur	4.78	1.73	5.01	5.85
Samastipur	Patapara	3.38	1.5	2.96	3.99
Samastipur	Singhia Ghat	7.94	4.24	6.13	7.14
Samastipur	Dalsinghsarai	7	5.4	5.91	6.4
Samastipur	Malipur	4.1	3.4	-	4.09
Samastipur	Basudebpur	4.9	4.59	4.85	5.37
Samastipur	Jakhra	6.77	5.16	6.49	9
Samastipur	Kishanpur2	Dry	0.4	10.7	0.3
Samastipur	Madudabad	7.7	5	5.5	5.3
Samastipur	Bajidpur	7.24	3.9	5.56	6.21
Samastipur	Kerian	6.3	5.35	5.85	6.9
Samastipur	Rosera	7.08	5.61	6.61	7.13
Samastipur	Sarai Ranjan	7.75	7.25	7.25	7.25
Samastipur	Motipur	7.61	7.51	7.76	8.2
Samastipur	Tajpur1	7.72	6.73	7.7	8.28
Samastipur	Vikrampur	5.75	4.91	5.41	5.7
Samastipur	Dandia Asadpur	Dry	6.23	6.89	7.59
Samastipur	Ujiarpur	3.9	1.6	2.8	Partially filled
Samastipur	Raghunathpur	6.9	6.29	7.25	7.25
Saran	Jalalpur	7.8	5.03	7.8	7.8
Saran	Manopali	5.05	3.26	4.18	4.43
Saran	Chirand	8.07	5.88	5.75	6.97
Saran	Daldali Bazar A	7.56	3.57	4.36	5.39
Saran	Mauna Pakri	8.46	3.1	3.53	4.76
Saran	Nagra	8.96	6.47	8.96	8.96
Saran	Taraiya	4.48	2.17	3.29	3.52
Saran	Ammi	8.64	5.09	5.3	7.07
Saran	Bishunpur	6.37	3.34	6.06	7.36
Saran	Ekma	5.19	4.16	4.37	4.92
Saran	Garkha	7.92	6.69	6.72	7.52
Saran	Minapur	7.23	4.2	6.18	6.42

Saran	Bisunpur	-	5.86	6	6.42
Saran	Rampur Kala	-	2.32	3.89	6.41
Saran	Breja	-	5.31	-	-
Saran	Madansath	7.44	6.05	6.18	6.57
Saran	Majhanpura	9.4	8.07	7.75	8.48
Saran	Majhanpura New	8.5	6.24	7.92	6.99
Saran	Manjhi	7.71	6.87	7.4	0
Saran	Manjhi 2	8.86	5.11	6.33	6.95
Saran	Marhaura	3.07	4.37	4.56	5.54
Saran	Masrakh	3.94	3.84	3.88	4.19
Saran	Masrakh1	5	3.92	4	4.31
Saran	Saguni	5.37	3.54	4.33	4.95
Saran	Saidpur1	7	3.36	7	7
Saran	Baleshara	6.24	5.13	-	6.22
Saran	Sanghar Tola	8.43	6.69	5.94	6.63
Saran	Chausia	9.55	5.88	5.95	7.38
Saran	Nayagaon	7.35	4.14	4.52	6.29
Saran	Sonepur1	2.19	0.2	0.75	0.87
Seikhpura	Ambari	6.29	6.03	2.74	3.03
Seikhpura	Barbigha	6.38	7.48	6.47	6.4
Seikhpura	Keoti1	4.14	1.33	2.33	3.52
Seikhpura	Koeri Bigha	6.23	4.53	6.1	6.39
Seikhpura	Sherpar	9.66	5.04	2.24	9.08
Seikhpura	Nemdarganj	3.47	2.37	2.22	2.45
Seikhpura	Seikhpura	8.09	5.51	8.91	7.01
Sheohar	Belsand	3.69	0.56	1.84	2.32
Sheohar	Sarbarpur	-	2.22	2.39	3.73
Sitamarhi	Dheng	3.71	1.26	2.7	3.3
Sitamarhi	Bangaon	4.06	2.17	3.62	4.54
Sitamarhi	Jagwanabazar	3.03	1.38	2.5	3.23
Sitamarhi	Bhpbhana Khaptola	4.21	2.32	3.46	3.95
Sitamarhi	Kodwara Tola	2.99	0.93	1.46	2.48
Sitamarhi	Panaura	3.14	0.94	1.9	2.4
Sitamarhi	Sitamarhi	4.99	2.6	3.21	4.47
Sitamarhi	Sursand	2.56	1.56	2.43	2.57
Sitamarhi	Nanpur	2.34	0.69	1.25	1.61
Sitamarhi	Khairwa	3.15	0.7	2.05	2.57
Sitamarhi	Pupri	3.53	1.52	2.32	2.9
Sitamarhi	Karahniya Chowk	3.54	0.85	1.89	2.58
Sitamarhi	Kushmari	4.2	0.51	1.51	6.1
Sitamarhi	Thumba	2.58	0.55	1.41	2.18
Sitamarhi	Bhutahi	2.8	0.71	1.73	2.16
Sitamarhi	Dastiya	3.22	1.4	2.27	2.67
Siwan	Andar	6.56	5.13	5.55	6.14

Siwan	Tarwara1	9.32	3.7	9.5	0
Siwan	Basantpur	6.26	6.26	6.26	6.26
Siwan	Chimanpur	5.47	3.8	4.19	4.89
Siwan	Hardia	4.66	3.96	4.42	-
Siwan	Malmalia Chowk	3.95	3.55	3.67	4.81
Siwan	Sarripatti	4	3.47	3.4	3.67
Siwan	Darauli	8.72	7.32	5.82	6.8
Siwan	Agaya1	12	12	12	12
Siwan	Tarwara	9.32	9.5	9.5	-
Siwan	Chitakhal	4.31	4.82	4.35	9
Siwan	Deoria	6.13	4.23	4.55	4.95
Siwan	Maharajganj	4.86	3.13	3.14	4.17
Siwan	Patrehi	5.43	3.91	5.5	5.87
Siwan	Sadikpur	4.83	4.58	4.03	5.22
Siwan	Jamanpura	4.33	1.51	-	3.02
Siwan	Murarpatti	5.56	4.99	4.2	5.05
Siwan	Bhagar	7.07	4.28	4.15	5.83
Siwan	Gangapur Siswan1	-	5.5	4.2	5.5
Siwan	Siwan1	6.03	5.49	4.82	5.4
Supaul	Balua	1.28	1.4	4.76	4.76
Supaul	Bhawanipur1	2.21	1.26	1.71	2.26
Supaul	Bhimnagar	1.55	0.52	1.18	3.75
Supaul	Birpur	2.1	1.28	1.84	2.31
Supaul	Ratanpura1	1.73	1.17	1.82	2.5
Supaul	Balua 1	2.81	1.47	2.25	2.5
Supaul	Balua Bazar	2.07	1.07	1.51	2.72
Supaul	Bhasanpatti	0.75	1.42	-	-
Supaul	Andauli	-	2.42	3.64	4.09
Supaul	Hardi	3.92	1.95	2.29	3.26
Supaul	Kario	3.04	1.1	1.88	2.71
Supaul	Malhani	3.51	2.57	2.6	9.02
Supaul	Malhani New	3.1	1.96	2.05	2.33
Supaul	Supaul	2.96	1.42	2	2.5
Supaul	Thumba	3.63	2.21	2.58	3.2
Supaul	Pipra chowk	4.92	2.36	4.42	5.16
Supaul	Shyam Nagar	4.33	2.43	2.76	3.71
Supaul	Ganpatganj1	2.55	1.31	2.02	4.4
Supaul	Kaithtola	3.25	1.04	-	3.42
Supaul	Karjain	2.91	1.87	4.4	4.4
Supaul	Norha	1.93	1.56	-	2.85
Supaul	Parsarma	2.74	1.61	1.92	2.51
Supaul	Pratapganj	3.37	2.03	2.28	3.08
Supaul	Jadia	3.47	1.19	1.98	2.9
Supaul	Tribeniganj	3.85	2.47	2.75	4.54

Vaishali	Chak Sikandar	7.48	6.58	6.3	7.41
Vaishali	Kachanpur	-	4.97	6.35	5.17
Vaishali	Mathura	8.48	3.48	4.89	6.37
Vaishali	Baksama	6.04	3.27	3.38	4.71
Vaishali	Bhaluhia (Garaul)	3.78	2.43	2.69	3.66
Vaishali	Chandpur Kala	5.2	4.83	10	5.02
Vaishali	Garaul	7.76	0.9	4.55	3.19
Vaishali	Harpur	6.26	5.79	5.83	5.97
Vaishali	Hajipur	8.3	4.27	5.83	6.98
Vaishali	Sahjadpur	7.55	3.82	4.77	5.72
Vaishali	Chakiyai	7.5	4.44	4.36	5.06
Vaishali	Kumharkal	7.7	5.7	5.43	6.36
Vaishali	Mahnar	8.29	4.25	10.53	6.51
Vaishali	Mahua1	7.73	3.82	5.4	6.39
Vaishali	Sarai				5.31
Vaishali	Tariya Supaul	5.92	4.27	5.22	5.63
Vaishali	Patepur	6.03	5.99	7.24	6.16
Vaishali	Gajipur1	6.4	6.11	7.24	7.24

Annexure II

Districtwise, Monthly Rainfall and its departure during the year 2018

SN	District	JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEPT		OCT		NOV		DEC	
		R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP
1	Araria	0	-100	0.5	-94	4.6	-70	89	141	232.8	103	93.7	-66	332.1	-25	363.9	3	211.9	-24	30.7	-64	0	-100	6.4	21
2	Arwal	0	-100	0	-100	0	-100	0	-100	0.9	-92	42.3	-63	156.6	-36	203.6	-18	96.3	-47	0	-100	0	-100	0	-100
3	Aurangabad	0	-100	0	-100	0	-100	0	-100	5.2	-64	55.2	-55	311.7	7	200.9	-21	132.3	-32	17	-62	0	-100	11	79
4	Banka	0	-100	0	-100	2.7	-77	8	-49	52.9	15	165	20	406.2	50	309.7	28	71.5	-67	30.5	-64	0	-100	6.6	18
5	Begusarai	0	-100	0	-100	0	-100	27	56	15	-69	102	-34	140.6	-53	283.6	11	86.5	-60	10.6	-83	0	-100	12	119
6	Bhabhua	0	-100	0	-100	0	-100	0	-100	0	-100	81.1	-38	364.6	17	216.3	-28	187.5	-26	6.3	-85	0	-100	0.6	-91
7	Bhagalpur	0	-100	0	-100	14	32	36	53	49.3	-25	156	-21	338.3	16	345.9	33	83.3	-63	61.6	-30	0	-100	13	102
8	Bhojpur	0	-100	0	-100	0	-100	3.5	-66	4.9	-80	16.7	-85	289.9	-13	196.4	-29	65.2	-68	0	-100	0	-100	0	-100
9	Buxar	0	-100	0	-100	0	-100	0	-100	11	-38	79.4	-28	429.2	49	444.1	69	107.4	-46	0	-100	0	-100	0	-100
10	Darbhanga	0	-100	0	-100	2.1	-83	12	-44	22.3	-63	97	-38	246.8	-17	195.9	-31	96.5	-48	1.8	-97	0	-100	0	-100
11	E Champaran	0	-100	0	-100	0.2	-98	19	45	26.2	-47	76	-54	258	-27	240.1	-19	63	-69	0.2	-99	0	-100	0	-100
12	Gaya	0	-100	3.2	-71	0	-100	1	-84	8.2	-55	122	-5	285.5	-4	251.3	-8	102.3	-43	15.3	-72	0	-100	6	6
13	Gopalganj	0	-100	0	-100	0	-100	9.6	-23	69.1	119	51.1	-67	302	-3	348	14	60	-73	0	-100	0	-100	0	-100
14	Jehanabad	0	-100	0	-100	0	-100	0	-100	3	-87	59.6	-47	228.8	-10	113.6	-56	83.5	-58	0.7	-98	0	-100	8	38
15	Jamui	0	-100	0	-100	0	-100	0.3	-97	45.1	28	49.1	-70	302.2	-3	194.8	-23	52.3	-77	24.1	-66	0	-100	14	259
16	Katihar	0	-100	0	-100	9.9	8	0	-100	10.6	-89	185	-13	185	-48	205.9	-24	77.1	-71	50.2	-32	0	-100	8.9	117
17	Khagaria	0	-100	0	-100	12	61	15	0	30.4	-34	51.5	-72	216.2	-30	237.5	-20	91.4	-66	95.9	17	0	-100	8.6	121
18	Kishanganj	0	-100	0	-100	10	-41	212	310	112.2	-28	304	-17	535.7	-7	436	-6	211.3	-39	4.7	-94	0	-100	5.7	23
19	Lakhisarai	0	-100	0	-100	0	-100	0	-100	37.1	-17	123	-26	273.2	-11	163	-40	51.9	-78	77.4	8	0	-100	4.3	-25
20	Madhepura	0	-100	0	-100	0	-100	0	-100	48.8	-42	208	-2	218.9	-42	257.8	-15	169.5	-35	27.2	-61	0	-100	4.9	-37
21	Madhubani	0	-100	0	-100	0	-100	12	-62	44.5	-44	152	-18	420.9	12	255.4	-17	142.8	-25	4.2	-94	0	-100	0.6	-95
22	Munger	0	-100	0	-100	1.1	-89	8.1	-43	9.7	-78	59.3	-64	275.2	-10	265.8	-2	105	-55	198	177	0	-100	8.8	52
23	Muzaffarpur	0	-100	0	-100	0	-100	24	81	37.3	-31	54	-66	188.2	-42	237.1	-19	57.3	-72	8.6	-86	0	-100	0	-100
24	Nalanda	0	-100	3.5	-61	0	-100	0.9	-85	14.1	-49	85.6	-33	221.8	-22	196	-26	102.8	-49	8.3	-84	0	-100	6.1	6
25	Nawada	0	-100	0	-100	0	-100	6.9	24	9.5	-72	64.9	-52	292.5	-3	207.8	-25	162.5	-11	3.3	-95	0	-100	3.6	-24
26	Patna	0	-100	0	-100	0.7	-93	7.6	-7	17	-35	42	-67	260.3	-22	224.6	-15	96.8	-56	1.4	-98	0	-100	1.1	-74
27	Purnia	0	-100	0	-100	0	-100	85	151	75.6	-38	215	-12	244.2	-44	394.3	16	159.8	-46	23.4	-72	0	-100	11	59
28	Rohtas	0	-100	2.2	-83	0	-100	0.2	-97	3.8	-73	73.3	-19	221.8	-19	219.7	-21	147.9	-23	3.4	-92	0	-100	4	-17
29	Saharsa	0	-100	0	-100	0	-100	6.1	-85	22.7	-79	117	-53	141.3	-73	271.6	-23	73.2	-75	35.1	-63	0	-100	2.1	-79
30	Samastipur	0	-100	0	-100	0	-100	0	-100	71.7	68	79.6	-55	230.1	-27	354.5	23	109.1	-55	11.4	-82	0	-100	12	206
31	Saran	0	-100	0.6	-94	0	-100	0.8	-91	32	-10	29.3	-78	182.2	-45	181.3	-38	59.2	-72	0	-100	1	-84	0	-100
32	Sheikhpura	0	-100	0	-100	0	-100	0	-100	20.2	-40	35.2	-76	293.1	1	147.4	-39	79.7	-58	20.3	-65	0	-100	5.8	16
33	Sheohar	0	-100	0	-100	11	15	11	-58	34.8	-51	99.4	-50	360.8	-9	194.3	-37	37.7	-79	0	-100	0	-100	0	-100
34	Sitamarhi	0	-100	0	-100	4.2	-58	0	-100	38.8	-46	100	-50	405.8	2	275	-11	90.2	-50	0	-100	0	-100	0	-100
35	Siwan	0	-100	0	-100	0	-100	0	-100	69.4	152	32.4	-76	209.6	-38	238.7	-17	76.2	-68	0	-100	0	-100	0	-100
36	Supaul	0	-100	0	-100	1.3	-90	50	117	73.2	-12	151	-25	258.6	-31	230.4	-15	143.4	-32	11.3	-85	0	-100	5.1	37
37	Vaishali	0	-100	0	-100	0	-100	1.1	-93	41.1	53	6.6	-95	174.3	-54	254.9	-11	88.5	-60	1.9	-97	0	-100	0	-100
38	W Champaran	0	-100	0	-100	0	-100	94	411	137.8	145	145	-37	521.7	17	428.5	23	202.6	-19	3.8	-94	0	-100	0	-100

Source: IMD

District wise percentage of well showing Rise, fall or no significant decline trend (2009-2018) during Pre-Monsoon and Post-Monsoon Season

S.N.	District	Pre-monsoon (in percent)			Post-monsoon (in percent)		
		Rise	Fall	No Significant trend	Rise	Fall	No Significant trend
1	Araria	50	50	100	50	50	100
2	Aurangabad	22	78	89	33	67	50
3	Banka	38	62	88	42	58	75
4	Begusarai	80	20	60	38	62	75
5	Bhagalpur	44	56	56	50	50	92
6	Bhojpur	33	67	100	67	33	56
7	Buxar	50	50	67	67	33	67
8	Darbhanga	50	50	100	20	80	100
9	Gaya	75	25	75	57	43	71
10	Gopalganj	45	55	91	36	64	91
11	Jamui	29	71	57	50	50	50
12	Jehanabad & Arwal	50	50	75	38	62	88
13	Kaimur	57	43	71	38	62	38
14	Katihar	58	42	92	54	46	100
15	Khagaria	50	50	50	58	42	83
16	Kishanganj	50	50	100	67	33	100
17	Lakhisarai	33	67	67	33	67	100
18	Madhepura	60	40	100	63	37	100
19	Madhubani	38	62	88	31	69	100
20	Munger	40	60	60	80	20	80
21	Muzaffarpur	29	71	79	6	94	44
22	Nalanda	50	50	63	19	81	44
23	Nawada	33	67	17	29	71	57
24	W. Champaran	40	60	100	11	89	91
25	Patna	31	69	35	33	67	50
26	E. Champaran	70	30	80	20	80	65
27	Purnia	83	17	67	43	57	100
28	Rohtas	100	0	60	72	28	78
29	Saharsa	86	14	57	50	50	80
30	Samastipur	75	25	75	40	60	80
31	Saran	58	42	50	23	77	69
32	Seikhpura	100	0	0	20	80	40
33	Sheohar	0	100	0	100	0	100
34	Sitamarhi	60	40	80	67	33	100
35	Siwan	10	90	80	8	92	67
36	Supaul	63	37	100	67	33	100
37	Vaishali	50	50	83	14	86	86