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

Government of India
Ministry of Jal Shakti
Department of Water Resources, River Development and Ganga Rejuvenation
Central Ground Water Board

वार्षिक भूजल पुस्तिका, बिहार
Ground Water Year Book, Bihar

2020 - 21

मध्य पूर्वी क्षेत्र
लोक नायक जय प्रकाश भवन , फ्रेज़र, रोड, पटना – 01
Mid-Eastern Region
Lok Nayak Jai Prakash Bhawan, Fraser Road, Patna- 01

दिसंबर 2021
December 2021

भारत सरकार
GOVT. OF INDIA
जल शक्ति मंत्रालय
MINISTRY OF JAL Shakti
केंद्रीय भूमि जल बोर्ड
CENTRAL GROUND WATER BOARD

वार्षिक भूजल पुस्तिका, बिहार

(2020-2021)

GROUND WATER YEAR BOOK, BIHAR

(2020 - 2021)

मध्य पूर्वी क्षेत्र, पटना
MID-EASTERN REGION, PATNA

December 2021

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(2020-21)
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LIST OF CONTRIBUTORS

DATA COLLECTION

S.S.Purty, Sc – C
Sanjiv Chakrabarty- Sc – B
Aneesh V, Sc – B
Sulekha Bhaya, Sc – B
Pankaj Kumar, Sc – B
Fakhre Aalam, Asst (Hg)
Suresh Kumar, Asst. Chemist
Somaru Ram, STA (GP)
P. K. Singh, Chief Draftsman
A.C. Saurabh, Sr. Surveyor

HYDROGEOCHEMISTRY

Ms. Manasi Bhattacharya
Shri Suresh Kumar, Asst. Chemist

MAP PREPARATION

Singaren Sandeep Purty
Scientist – 'C'

ISSUANCE

Report Processing Cell
CGWB, MER, Patna

GROUND WATER YEAR BOOK, BIHAR (2020-2021)

ABSTRACT

Monitoring of ground water levels from 729 Hydrograph Network Stations (HNS) were carried out in the year 2019-2020 with an objective to assess ground water regime of phreatic aquifer. The water level monitoring was carried out in the months of May'19, August'19, November'19, and January'20. The ground water samples from the HNS were collected in the month of May'19 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 2019 the ground water levels were found to vary between 0.74 and 16.11 m bgl. The depth to water level rests in range of 2-5 m bgl is 34% 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 57% NHS wells which spatially covers southern part of North Bihar Plains (NBP) and maximum part of South Bihar Plains (SBP). During post-monsoon 2019, water level rested in the range of 2 – 5 m bgl in 55% of the HNS which covers major part (67% area) of the state. The fluctuation of water level between pre and post-monsoon 2018 indicated rise in water level in 97% of the HNS. Annual change of water level of May 2019 with respect to May 2018 indicated rise in water level in 39% of the HNS, and during November 2019 with respect to November 2018 indicated rise in 81% of the HNS. The change in water level of May 2019 with respect to the decadal mean of May (May 2009 to May 2018) indicated fall in 68% of the HNS and during November 2019 with respect to the decadal mean of November (November 2009 to November 2018) indicated rise in 78% of HNS.

GROUND WATER YEAR BOOK, BIHAR
(2020-2021)

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

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.,

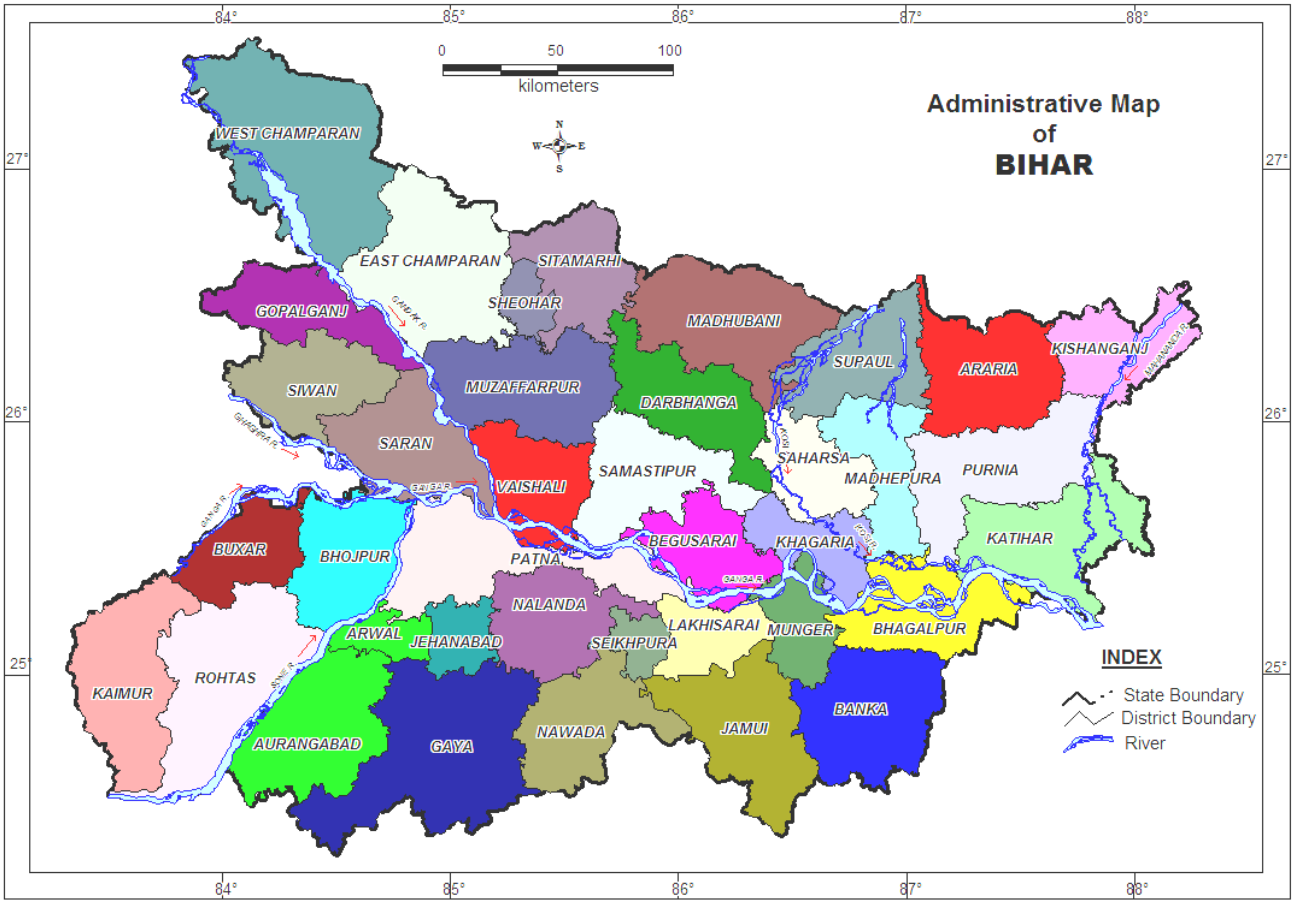


Fig. 1 *Administrative Map of Bihar state*

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.

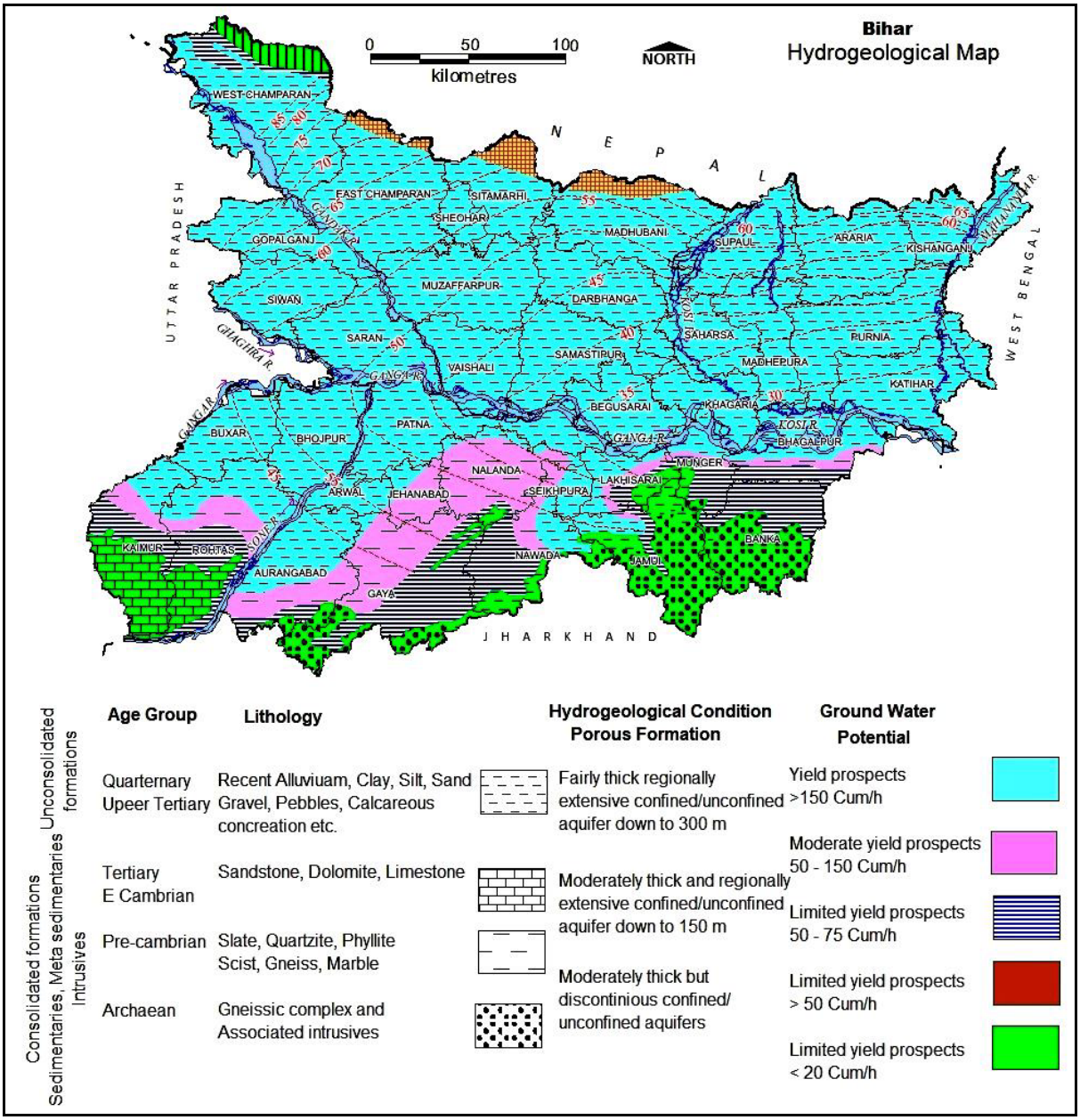


Fig. 2 *Hydrogeological Map of Bihar state*

3. GROUND WATER SCENARIO

A total of 733 Hydrograph Network Stations (HNS) which are dug wells tapping phreatic aquifer have 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.

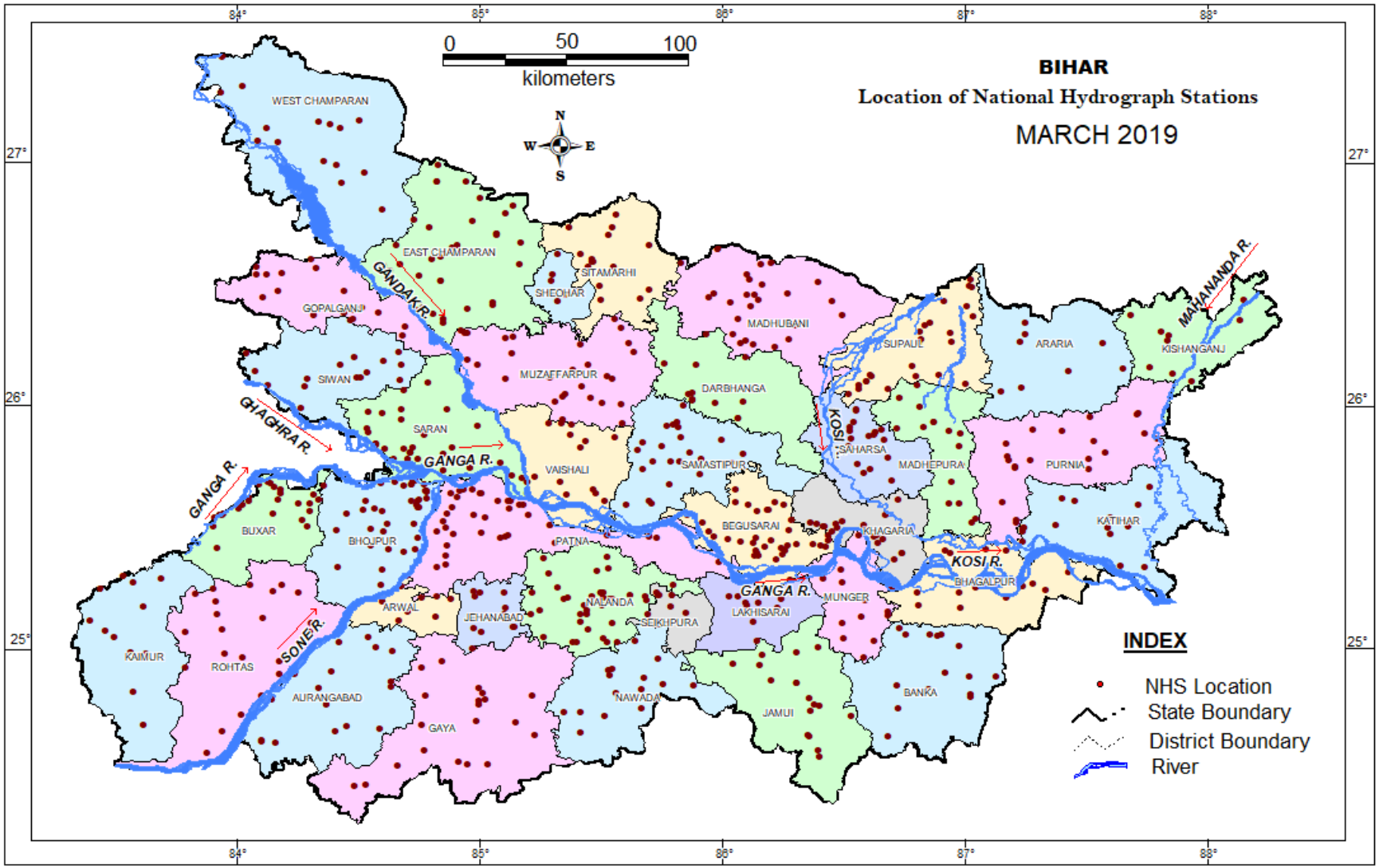


Fig. 3 *Location of Hydrograph Network Stations in Bihar state, 2019*

Table 2 *District wise distribution of the HNS as on 31.03.20*

SN	District	DW	Total
1	Araia	8	
2	Aurangabad	16	
3	Banka	16	
4	Begusarai	36	
5	Bhagalpur	14	3
6	Bhojpur	36	
7	Buxar	25	
8	Darbhanga	11	
9	Gaya	21	
10	Gopalganj	22	
11	Jamui	17	
12	Jehanabad & Arwal	18	
13	Kaimur/Bhabhua	12	
14	Katihar	15	
15	Khagaria	19	
16	Kishanganj	9	
17	Lakhisarai	9	
18	Madhepura	17	
19	Madhubani	26	
20	Munger	10	
21	Muzaffarpur	26	
22	Nalanda	39	
23	Nawada	16	
24	W Champaran	14	
25	Patna	35	20
26	E Chamaparan	34	
27	Purnia	20	
28	Rohtas	19	
29	Saharsa	18	
30	Samastipur	24	
31	Saran	30	
32	Sheikhpura	10	
33	Sheohar	5	
34	Sitamarhi	16	
35	Siwan	20	
36	Supaul	25	
37	Vaishali	25	
Total		**733**	**23**

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 monitoring work has been badly affected by the **Covid-19 pandamic** during the month of May and August 2020. The observed 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'20	August'20	November'20	January'21
Bihar	209	327	647	663

3.1 DEPTH TO WATER LEVEL

3.1.1 May 2020

During Pre- Monsoon period (May 2020), 209 HNS were analysed. The water level data observed has been ranged from 0.54 (Patna) to 9.20 m bgl (Samastipur) m bgl. The Major part of the area covered under monitoring has shown depth to water level within 2 to 5 m. Shallowest category of upto 2 m has been observed in northern part and as patches in SBP also. Majority of the NHS in deepest category of 5 to 10 m depth to water level has been recorded in Gaya, Nawada, Samastipur, Sheikhpura, Vaishali and Begusarai district. No well has shown water level more than 10 m bgl during the month of May 2020.

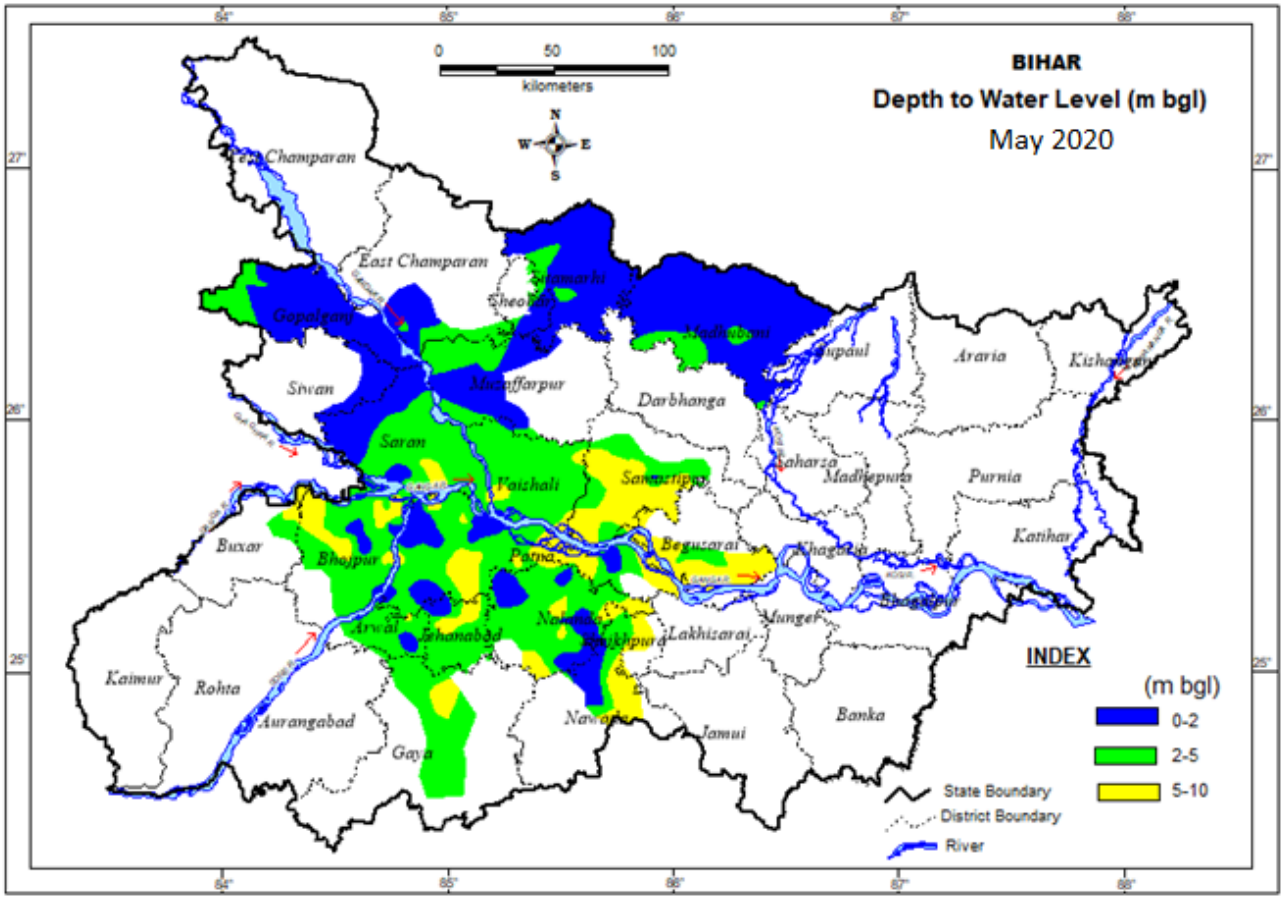


***Fig. 4**: Depth to water level in May 2020*

Table 5 District wise well frequency for different ranges of depth to water level of HNS in **May. 2020** 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	Begusarai	11	5.34	9.20	0	0	0	0	11	100	0	0
2	Bhojpur	27	1.63	8.21	1	3.7	13.0	48	13	48	0	0
3	Buxar	3	4.15	7.63	0	0.0	1.0	33	2	67	0	0
4	Gaya	8	4.05	8.58	0	0.0	4.0	50	4	50	0	0
5	Gopalganj	7	1.44	3.98	2	28.	5.0	71	0	0	0	0
6	Jehanabad	17	1.83	7.53	1	5.9	8.0	47	8	47	0	0
7	Madhubani	12	0.62	4.75	5	41.	7.0	58	0	0	0	0
8	Muzaffarpur	7	2.58	4.21	0	0.0	7.0	100	0	0	0	0
9	Nalanda	22	0.60	8.52	3	13.	11.0	50	8	36	0	0
10	Nawada	4	1.80	7.47	1	25.	1.0	25	2	50	0	0
11	Patna	31	0.54	8.92	6	19.	13.0	42	12	39	0	0
12	E Champaran	3	2.71	3.56	0	0.0	3.0	100	0	0	0	0
13	Samastipur	13	3.20	9.20	0	0.0	2.0	15	11	85	0	0
14	Saran	11	1.89	6.99	1	9.1	5.0	45	5	45	0	0
15	Seikhpura	6	3.50	7.02	0	0.0	2.0	33	4	67	0	0
16	Sitamarhi	9	1.20	5.30	3	33.	5.0	56	1	11	0	0
17	Siwan	2	2.99	3.83	0	0.0	2.0	100	0	0	0	0
18	Vaishali	16	3.98	7.09	0	0.0	7.0	44	9	56	0	0
	Total	**209**	**0.54**	**9.20**	**23**	**11.**	**96.0**	**46**	**90**	**43**	**0**	**0**

3.1.2 August 2020

During mid-monsoon (August 2020), the monitoring work was affected by Covid-19 pandamic therefore partly or fully only 9 districts have been covered. Total 327 NHS has been analysed where depth to water level ranged from 0.04 (Muzaffarpur) to 11.00 m bgl (Nawada). Except Samastipur and Begusarai district and few disseminated locations, the depth to water level has been observed less than 2 m bgl in which covered major part of the monitored area in NBP. Major part of the monitored area in SBP has shown water level between 2 and 5 m bgl. However, deeper water level has also been observed at few locations in SBP.

In Begusarai district, deeper water level category (> 5 m bgl) has been recorded in 70% of the NHS. Only one well located in Nawada has shown water level > 10 m bgl.

(Fig. 5; Table 6)

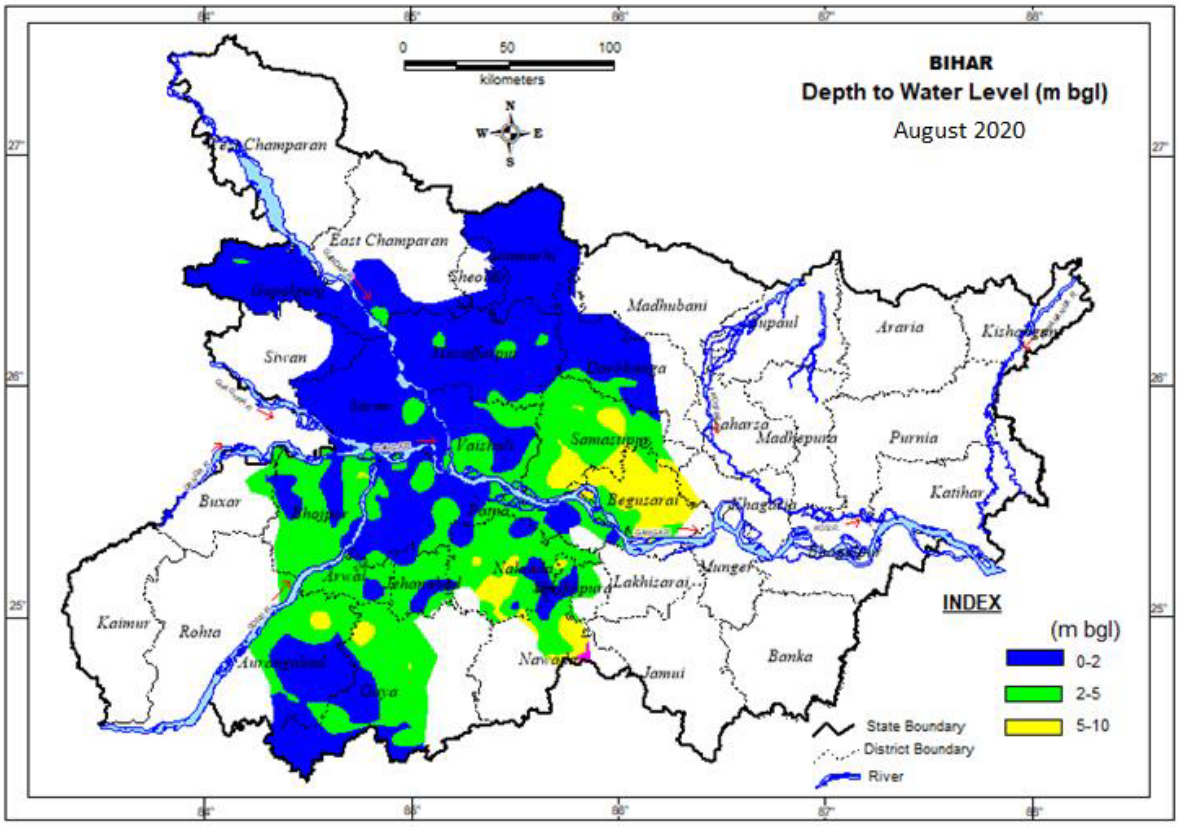


***Fig. 5**: Depth to water level in August 2020*

Table 5 District wise well frequency for different ranges of depth to water level of HNS in **August. 2020** 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	Aurangabad	8	0.97	7.73	2	25	5	63	1	13	0	0
2	Begusarai	20	2.28	9.20	0	0	6	30	14	70	0	0
3	Bhojpur	31	0.46	6.19	8	26	20	65	3	10	0	0
4	Buxar	4	1.03	3.57	2	50	2	50	0	0	0	0
5	Darbhanga	8	0.68	2.12	6	75	2	25	0	0	0	0
6	Gaya	17	0.60	6.50	6	35	9	53	2	12	0	0
7	Gopalganj	11	0.26	2.11	10	91	1	9	0	0	0	0
8	Jehanabad	17	1.05	4.90	6	35	11	65	0	0	0	0
9	Muzaffarpur	25	0.04	3.33	21	84	4	16	0	0	0	0
10	Nalanda	39	0.19	9.10	7	18	21	54	11	28	0	0
11	Nawada	12	0.77	11.00	3	25	5	42	3	25	1	8
12	Patna	33	0.12	5.03	23	70	9	27	1	3	0	0
13	E. Champaran	13	0.52	2.30	12	92	1	8	0	0	0	0
14	Samastipur	18	3.20	6.20	0	0	12	67	6	33	0	0
15	Saran	16	0.30	2.21	15	94	1	6	0	0	0	0
16	Seikhpura	9	1.00	8.40	2	22	5	56	2	22	0	0
17	Sheohar	4	0.45	1.54	4	100	0	0	0	0	0	0
18	Sitamarhi	16	0.19	1.47	16	100	0	0	0	0	0	0
19	Siwan	4	0.95	1.34	4	100	0	0	0	0	0	0
20	Vaishali	22	0.72	3.90	11	50	11	50	0	0	0	0
	Total	**327**	**0.04**	**11.00**	**158**	**48**	**125**	**38**	**43**	**13**	**1**	**0**

3.1.3 November 2020

Total 647 HNS wells were analysed during post-monsoon period (November 2020). The minimum and the maximum depth to water levels have been recorded to be 0.25 m bgl (Darbhanga district) and 16.00 m bgl (Rohtas district) respectively. In major area of the State (70%) water level rests in range of 2 – 5 m bgl which covers almost entire NBP and major part of NBP of Bihar State. The depth to water level in the range of >10 m bgl occurs in about 3% of the area, which covers part of Kaimur, Rohtas, Bhagalpur and many other places as small patches. The water level in the range of 5-10 m bgl has been observed in only 12% of HNS wells, spatially covers as small patches at many locations in SBP. The shallowest category of >2 m bgl has been shown by Sitamarhi, Sheohar Darbhange district and many localised areas mostly in NBP.

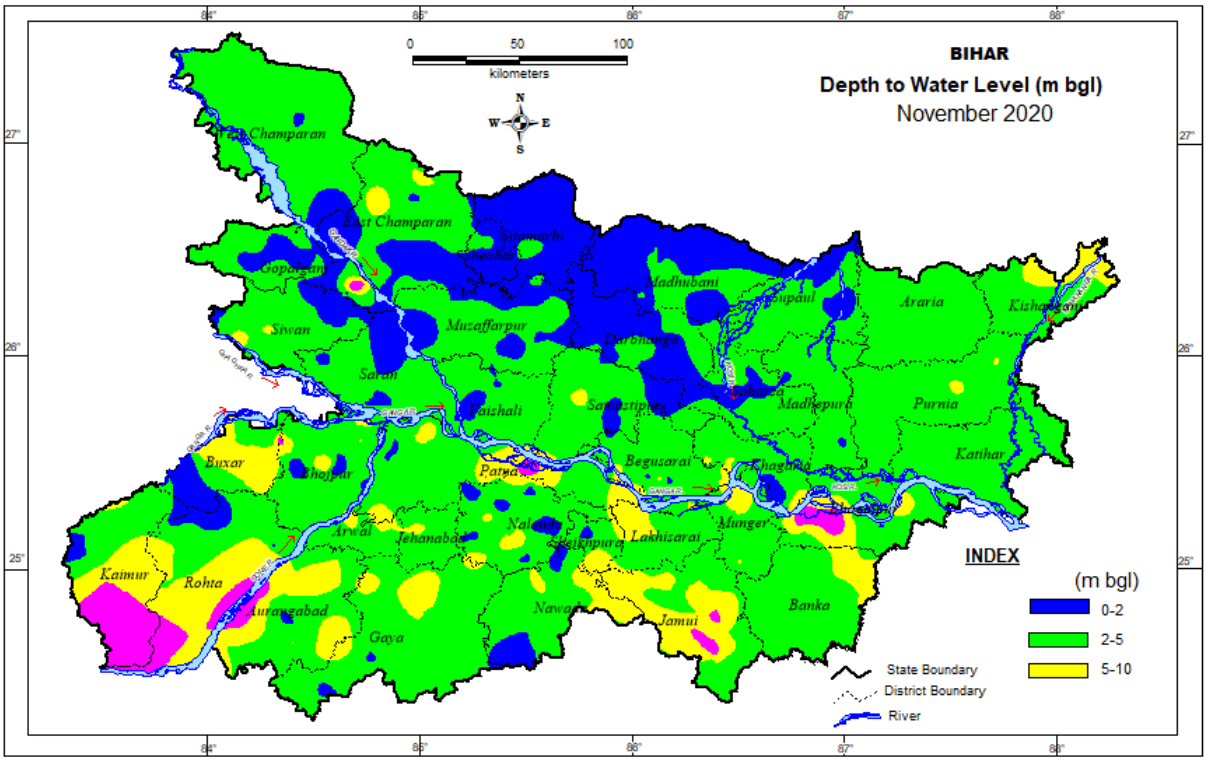


***Fig. 6**: Depth to water level in November 2020*

Table 7 District wise well frequency for different ranges of depth to water level of HNS in **Nov. 2020** 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	8	2.92	4.98	0	0	8	100	0	0	0	0
2	Aurangabad	16	1.72	14.00	1	6.3	8	50	4	25	3	19
3	Banka	12	2.75	6.95	0	0	10	83.3	2	16.7	0	0
4	Begusarai	36	1.58	6.46	2	5.6	28	77.8	6	16.7	0	0
5	Bhagalpur	11	1.97	12.20	1	9.1	7	63.6	1	9.1	2	18
6	Bhojpur	34	0.83	8.37	5	14.7	23	67.6	6	17.6	0	0
7	Buxar	21	1.16	11.33	4	19.0	9	42.9	6	28.6	2	10
8	Darbhanga	10	0.25	2.57	8	80	2	20	0	0	0	0
9	Gaya	18	1.83	6.65	2	11.1	12	66.7	4	22.2	0	0
10	Gopalganj	20	0.80	15.00	6	30	13	65	0	0	1	5
11	Jamui	15	2.27	14.50	0	0	7	46.7	6	40	2	13
12	Jehanabad	16	2.04	7.17	0	0	12	75	4	25	0	0
13	Kaimur	10	1.37	12.30	1	10	5	50	3	30	1	10
14	Katihar	11	3.23	4.70	0	0	11	100	0	0	0	0
15	Khagaria	19	1.18	5.57	4	21.1	11	57.9	4	21.1	0	0
16	Kishanganj	8	2.62	9.62	0	0	7	87.5	1	12.5	0	0
17	Lakhisarai	9	2.10	9.42	0	0	5	55.6	4	44.4	0	0
18	Madhepura	17	1.75	4.05	2	11.8	15	88.2	0	0	0	0
19	Madhubani	26	0.55	3.52	16	61.5	10	38.5	0	0	0	0
20	Munger	10	2.64	7.37	0	0	7	70	3	30	0	0
21	Muzaffarpur	25	0.36	7.20	9	36	15	60	1	4	0	0
22	Nalanda	39	0.64	8.50	11	28.2	20	51.3	8	20.5	0	0
23	Nawada	13	1.50	6.55	3	23.1	7	53.8	3	23.1	0	0
24	W. Champaran	13	1.52	3.55	1	7.7	12	92.3	0	0	0	0
25	Patna	15	1.82	11.47	3	20	7	46.7	3	20	2	13
26	E. Champaran	30	0.38	7.09	12	40	16	53.3	2	6.7	0	0
27	Purnia	14	2.62	5.85	0	0	12	85.7	2	14.3	0	0
28	Rohtas	14	1.38	16.00	4	28.6	5	35.7	3	21.4	2	14
29	Saharsa	18	1.24	3.84	5	27.8	13	72.2	0	0	0	0
30	Samastipur	20	0.68	5.39	3	15	16	80	1	5	0	0
31	Saran	28	0.64	4.60	9	32.1	19	67.9	0	0	0	0
32	Seikhpura	9	1.40	5.96	2	22.2	5	55.6	2	22.2	0	0
33	Sheohar	4	1.10	2.13	3	75	1	25	0	0	0	0
34	Sitamarhi	16	0.70	2.95	14	87.5	2	12.5	0	0	0	0
35	Siwan	16	1.22	5.60	5	31.25	9	56.3	2	12.5	0	0
36	Supaul	22	1.14	4.38	4	18.2	18	81.8	0	0	0	0
37	Vaishali	24	1.12	4.68	6	25.0	18	75	0	0	0	0
	Total	**647**	**0.25**	**16.00**	**146**	**22.6**	**405**	**62.60**	**81**	**12.5**	**15**	**2**

3.1.0 January 2021

During the recession period (Jan. 2020), total 663 HNS were analysed. The minimum depth to water level of 0.47 m bgl has been observed in Muzaffarpur district, and maximum water level of 15.8 m bgl in the Rohtas district. During Nov. 2021, depth to water level rests within the range of 2–5 m bgl in major part (74% area) of Bihar State. The shallowest water level category of < 2 m bgl has been found in many localised areas, mostly in NBP. A patch, comprising major part of Kaimur, Rohtas and Buxar district and a strip covering part of Jamui, Nawada, Lakhisarai, Munger, Begusarai, Khagaria and Bhagalpur have shown water level between 5 and 10 m bgl. The water level of more than 10 m bgl has been observed at many locations including five locations in Rohtas district.

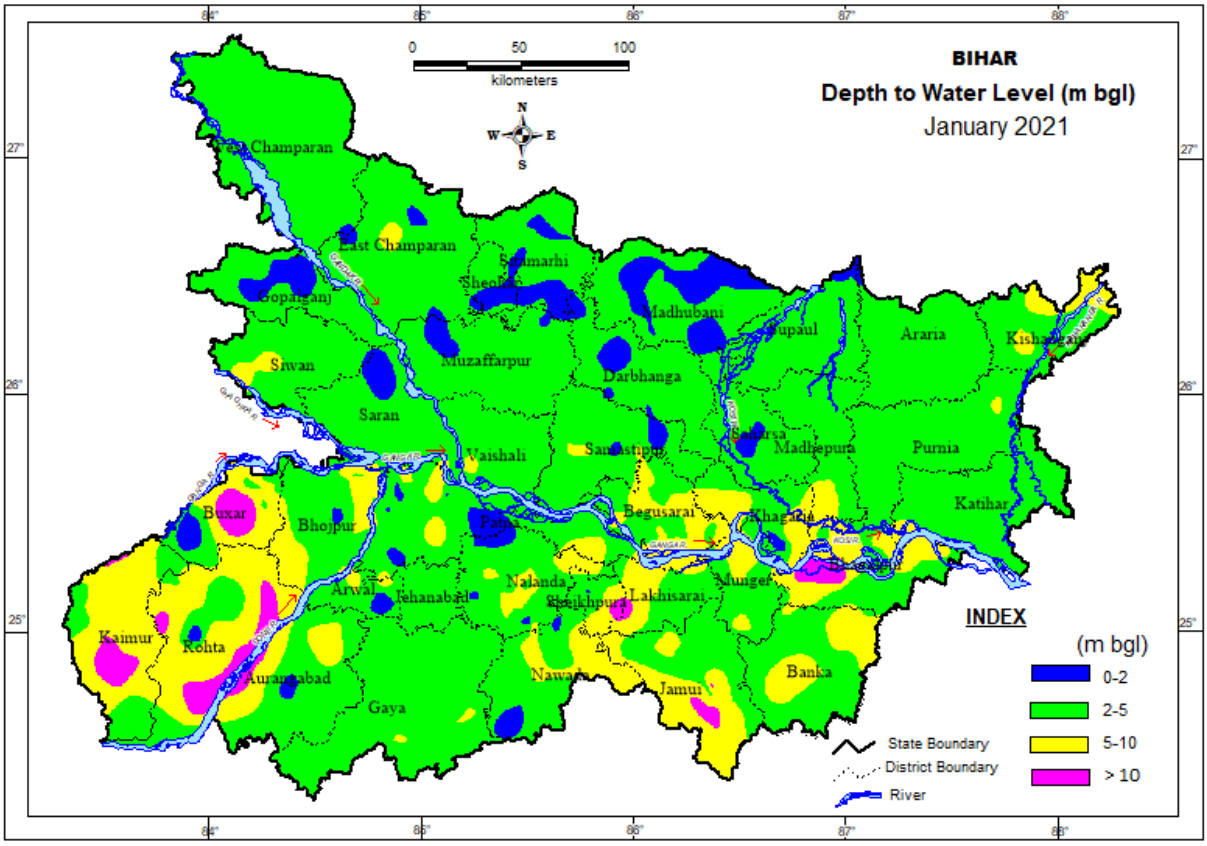


Fig. *7: Depth to water level in January 2021*

Table 8 District wise well frequency for different ranges of depth to water level of HNS in **Jan. 2021** 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	8	2.32	4.06	0	0	8	100	0	0	0	0
2	Aurangabad	11	1.62	10.87	1	9.1	7	63.6	1	9	2	18
3	Banka	14	2.85	8.30	0	0.0	8	57.1	6	42.9	0	0
4	Begusarai	35	2.90	8.07	0	0.0	14	40.0	21	60.0	0	0
5	Bhagalpur	15	2.62	13.03	0	0.0	5	33.3	7	46.7	3	20
6	Bhojpur	36	1.32	8.37	3	8.3	16	44.4	17	47.2	0	0
7	Buxar	23	1.04	16.20	3	13.0	6	26.1	12	52.2	2	9
8	Darbhanga	10	1.32	3.05	3	30.0	7	70.0	0	0.0	0	0
9	Gaya	11	2.71	5.21	0	0.0	9	81.8	2	18.2	0	0
10	Gopalganj	21	1.02	4.06	5	23.8	16	76.2	0	0.0	0	0
11	Jamui	17	2.46	14.50	0	0.0	9	52.9	6	35.3	2	12
12	Jehanabad	19	1.11	6.02	3	15.8	13	68.4	3	15.8	0	0
13	Kaimur	11	2.86	12.30	0	0.0	2	18.2	7	63.6	2	18
14	Katihar	14	2.73	6.00	0	0.0	13	92.9	1	7.1	0	0
15	Khagaria	18	1.33	7.27	2	11.1	6	33.3	10	55.6	0	0
16	Kishanganj	8	2.09	9.98	0	0.0	6	75.0	2	25.0	0	0
17	Lakhisarai	9	2.15	9.60	0	0.0	5	55.6	4	44.4	0	0
18	Madhepura	16	2.28	6.40	0	0.0	15	93.8	1	6.3	0	0
19	Madhubani	26	0.50	4.63	10	38.5	16	61.5	0	0.0	0	0
20	Munger	11	2.48	7.30	0	0.0	8	72.7	3	27.3	0	0
21	Muzaffarpur	25	0.47	4.30	3	12.0	22	88.0	0	0.0	0	0
22	Nalanda	37	0.73	8.92	3	8.1	21	56.8	13	35.1	0	0
23	Nawada	13	1.68	7.12	2	15.4	5	38.5	6	46.2	0	0
24	W Champaran	12	2.20	5.50	0	0.0	11	91.7	1	8.3	0	0
25	Patna	23	0.78	7.99	7	30.4	12	52.2	4	17.4	0	0
26	E Champaran	26	1.50	8.92	3	11.5	22	84.6	1	3.8	0	0
27	Purnia	16	2.43	5.05	0	0.0	15	93.8	1	6.3	0	0
28	Rohtas	19	0.87	16.00	1	5.3	3	15.8	10	52.6	5	26
29	Saharsa	18	1.74	4.58	3	16.7	15	83.3	0	0.0	0	0
30	Samastipur	22	1.05	5.63	2	9.1	17	77.3	3	13.6	0	0
31	Saran	28	0.50	5.66	4	14.3	22	78.6	2	7.1	0	0
32	Seikhpura	9	1.94	11.50	1	11.1	4	44.4	3	33.3	1	11
33	Sheohar	4	1.74	3.01	2	50.0	2	50.0	0	0.0	0	0
34	Sitamarhi	16	1.04	2.76	7	43.8	9	56.3	0	0.0	0	0
35	Siwan	16	1.61	6.12	1	6.3	13	81.3	2	12.5	0	0
36	Supaul	23	1.70	5.32	2	8.7	20	87.0	1	4.3	0	0
37	Vaishali	23	1.50	5.97	2	8.7	19	82.6	2	8.7	0	0
	Total	663	0.47	16.0	73.00	11.0	421.00	63.5	152.00	22.9	17.00	114.2

3.2 SEASONAL FLUCTUATION

3.2.1 May 2020 to August 2020

A total of 181 wells have been been analysed to study the monsoon fluctuation during August 2020. Rise in water level has been recorded in 176 (97%), whereas the fall is observed only in 4 (3%) of HNS analysed. The area covered by the analysed wells has been depicted on **fig. 7.** Fluctuation has been further categorised in different ranges. Majority of HNS have shown rise of water level in the range of 2 to 4 m and 0-2 m which constituets 42% and 40% of the total wells analysed. These ranges of water level rise have been observed in almost entire area covered in monitoring. The category of > 4 m water level rise has been observed as patches in Patna, Saran, Vaishali, Sitamarhi, Bhojpur and Samastipur district.

Total 4 wells located in Nalanda, Patna and Gaya district have shown fall in water level due to some local reason. (**Table 9).**

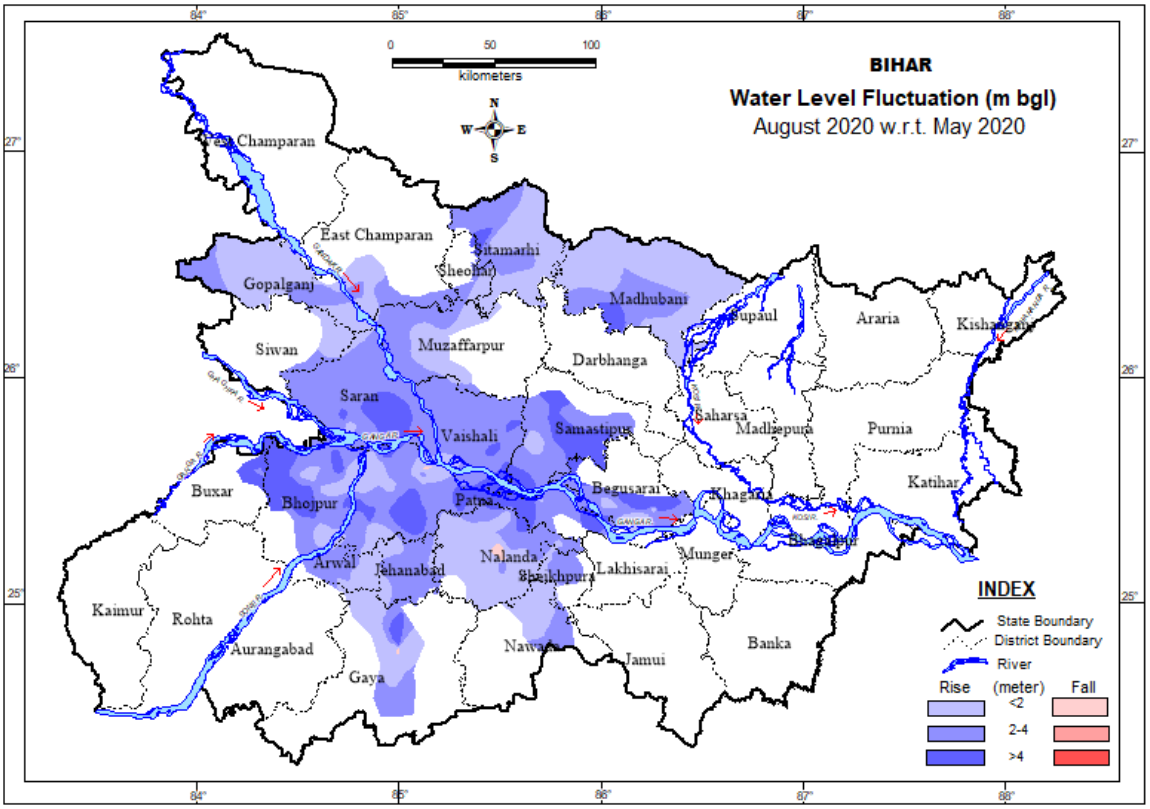


***Fig.** 7 Water level Fluctuation between May 2020 and August 2020*

Table – 9 District wise categorization of fluctuation and their frequency of water levels of HNS in **Aug. 2020 w.r.t. May 2020**																			
SN	**District**	**No. of wells analysed**	**Range of fluctuation (m)**				**No. of wells showing fluctuation in the range of**												**Total**
									Rise						**Fall**				
			Rise		**Fall**		**0 to 2**		**2 to 4**		**> 4**		**0 to 2**		**2 to 4**		**> 4**		
			Min.	***Max.***	***Min.***	***Max.***	***No.***	***%***	***No.***	***%***	***No.***	***%***	***No.***	***%***	***No.***	***%***	***No.***	***%***	***Rise***	***Fall***
1	Begusarai	10	0.28	3.8	-	-	6	60	4	40	0	0	0	0	0	0	0	0	10	0
2	Bhojpur	24	0.49	5.1	-	-	6	25	12	50	6	25	0	0	0	0	0	0	24	0
3	Buxar	2	2.43	6.6	-	-	0	0	1	50	1	50	0	0	0	0	0	0	2	0
4	Gaya	7	0.44	3.23	1.65	1.65	3	43	3	43	0	0	1	14	0	0	0	0	6	1
5	Gopalganj	7	0.45	2.11	-	-	5	71	2	29	0	0	0	0	0	0	0	0	7	0
6	Jehanabad	17	0.78	3.44	-	-	7	41	10	59	0	0	0	0	0	0	0	0	17	0
7	Muzaffarpur	7	0.95	2.94	-	-	3	43	4	57	0	0	0	0	0	0	0	0	7	0
8	Nalanda	22	0.1	3.67	0.9	1.61	14	64	6	27	0	0	2	9	0	0	0	0	20	2
9	Nawada	4	0.53	2.83	-	-	3	75	1	25	0	0	0	0	0	0	0	0	4	0
10	Patna	26	0.12	6.64	0.24	0.24	11	42	6	23	8	31	1	4	0	0	0	0	25	1
11	E Champaran	3	1.06	2.24	-	-	2	67	1	33	0	0	0	0	0	0	0	0	3	0
12	Samastipur	10	1.26	4.22	-	-	1	10	6	60	2	20	0	0	0	0	0	0	9	0
13	Saran	10	1.38	5.22	-	-	2	20	4	40	4	40	0	0	0	0	0	0	10	0
14	Seikhpura	6	0.38	3.88	-	-	2	33	4	67	0	0	0	0	0	0	0	0	6	0
15	Sitamarhi	9	0.38	4.66	-	-	6	67	1	11	2	22	0	0	0	0	0	0	9	0
16	Siwan	1	1.65	1.65	-	-	1	100	0	0	0	0	0	0	0	0	0	0	1	0
17	Vaishali	16	1.89	4.26	-	-	1	6	11	69	4	25	0	0	0	0	0	0	16	0
	Total	**181**	**0.1**	**6.64**	**0.9**	**1.65**	**73**	**40**	**76**	**42**	**27**	**15**	**4**	**2**	**0**	**0**	**0**	**0**	**176**	**4**

3.2.2 May 2020 to November 2020

Although entire State has been covered during November 2020 by monitoring, water level of only 181 HNS could be analysed as to compare with the water level during May 2020. As per the comparison between Nov. 2020 and May 2020, rise of water level observed in 157 (87%) up to 6.64 m (Nawada) whereas, only 24 (13%) HNS have shown fall in water. The majority of HNS (87 well, 48%) have shown rise in the range of 0-2 m, whereas the 57 (31%) and 13 (7%) NHS have shown rise in water level rise 2 to 4 and > 4m m respectively.

The water level fluctuation has been depicted in **Fig. 9**. Almost entire area covered by analysed wells has shown rise in water level. An area covering major part of Samastipur and part of Begusarai district has shown rise in water level in the range of > 4 m.

Major part of Madhubani district has shown fall in water level down to 1.87 m. The localised areas covering part of Patna, Jehanabad and Gopalganj district have also shown fall in water level. (**Table 10).**

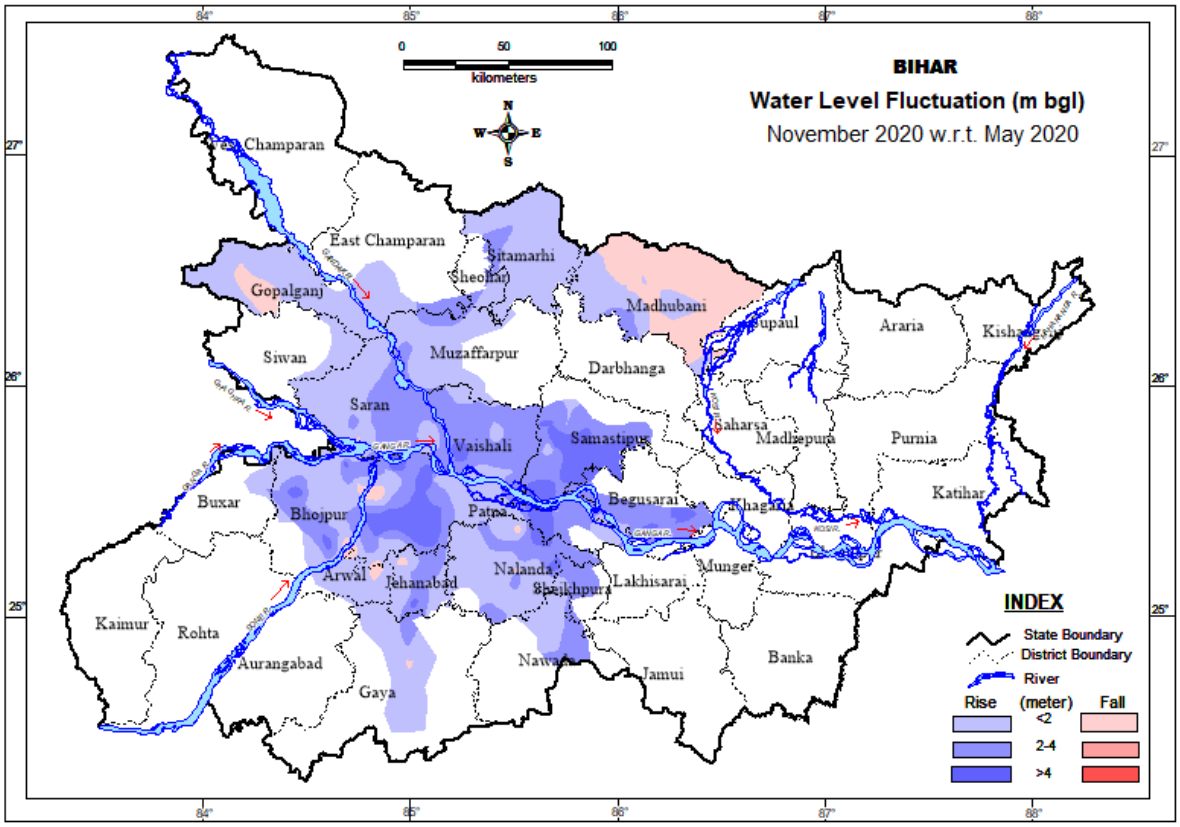


***Fig. 9**: Fluctuation in ground water level between May 2020 and Nov. 2020.*

Table – 9 District wise categorization of fluctuation and their frequency of water levels of HNS in **Nov. 2020 w.r.t. May 2020**																				
SN	District	No. of wells analysed	Range of fluctuation (m)				No. of wells showing fluctuation												Total	
							Rise						Fall							
			Rise		Fall		0 to 2		2 to 4		> 4		0 to 2		2 to 4		> 4			
			Min.	*Max.*	*Min.*	*Max.*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*Rise*	*Fall*
1	Begusarai	11	1.87	3.8		-	2	18	7	64	2	18	0	0	0	0	0	0	11	0
2	Bhojpur	23	0.24	5.1	0.91	0.91	12	52	10	43	0	0	1	4	0	0	0	0	22	1
3	Buxar	3	0.55	6.6	3.7	3.7	2	67	0	0	0	0	0	0	1	33	0	0	2	1
4	Gaya	8	0.63	3.23	0.03	1.93	6	75	0	0	0	0	2	25	0	0	0	0	6	2
5	Gopalganj	7	0.01	2.11	0.11	11.98	4	57	0	0	0	0	2	29	0	0	1	14	4	3
6	Jehanabad	16	0.1	3.44	0.01	1.42	10	63	1	6	0	0	5	31	0	0	0	0	11	5
7	Madhubani	12	0.04	2.94	0.32	1.87	4	33	2	17	0	0	6	50	0	0	0	0	6	6
8	Muzaffarpur	7	0.49	3.67		-	5	71	2	29	0	0	0	0	0	0	0	0	7	0
9	Nalanda	22	0.12	2.83	0.21	1.45	12	55	7	32	1	5	2	9	0	0	0	0	20	2
10	Nawada	4	0.3	6.64	-	-	3	75	1	25	0	0	0	0	0	0	0	0	4	0
11	Patna	9	0.15	2.24	0.29	3.16	4	44	1	11	1	11	1	11	2	22	0	0	6	3
12	E Champaran	3	0.46	4.22		-	3	100	0	0	0	0	0	0	0	0	0	0	3	0
13	Samastipur	12	1.78	5.22	-	-	2	17	4	33	6	50	0	0	0	0	0	0	12	0
14	Saran	11	0.73	3.88	0.06	0.06	4	36	5	45	1	9	1	9	0	0	0	0	10	1
15	Seikhpura	6	0.45	4.66	-	-	1	17	4	67	1	17	0	0	0	0	0	0	6	0
16	Sitamarhi	9	0.3	1.65	-	-	8	89	1	11	0	0	0	0	0	0	0	0	9	0
17	Siwan	2	0.81	4.26	-	-	2	100	0	0	0	0	0	0	0	0	0	0	2	0
18	Vaishali	16	0.47	4.95	-	-	3	19	12	75	1	6	0	0	0	0	0	0	16	0
		181	**0.01**	**6.64**	**0.01**	**11.98**	**87**	**48**	**57**	**31**	**13**	**7**	**20**	**11**	**3**	**2**	**1**	**1**	**157**	**24**

3.2.3 May 2020 to January 2021

Water level data of January 2021 has been compared with the Water level data of May 2020. Total 184 HNS have been analysed to study seasonal fluctuation in the different depth range and depicted in **Fig. 10**. About 80% (147) HNS has shown rise in water level and rest 20% (37) has shown fall.

Majority of HNS (59%) has shown rise in water level in the range of 0 – 2 in major part of the area covered by analysed wells. The localised areas falling in part of Patna, Samastipur, Gaya, Bhojpur and Sitmarhi have shown rise in water level between 2 and 4 m. A patch of more than 4 m rise has been observed in Samastipur district.

Major part of the Madhubani district, northern part of Jehanabad district, 2 patches in Bhojpur district and a localised area in Patna district have shown fall in water level down to 2 m. The fall of water level has been recorded only in 2 HNS located in Madhubani and Nalanda district **(Table 11).**

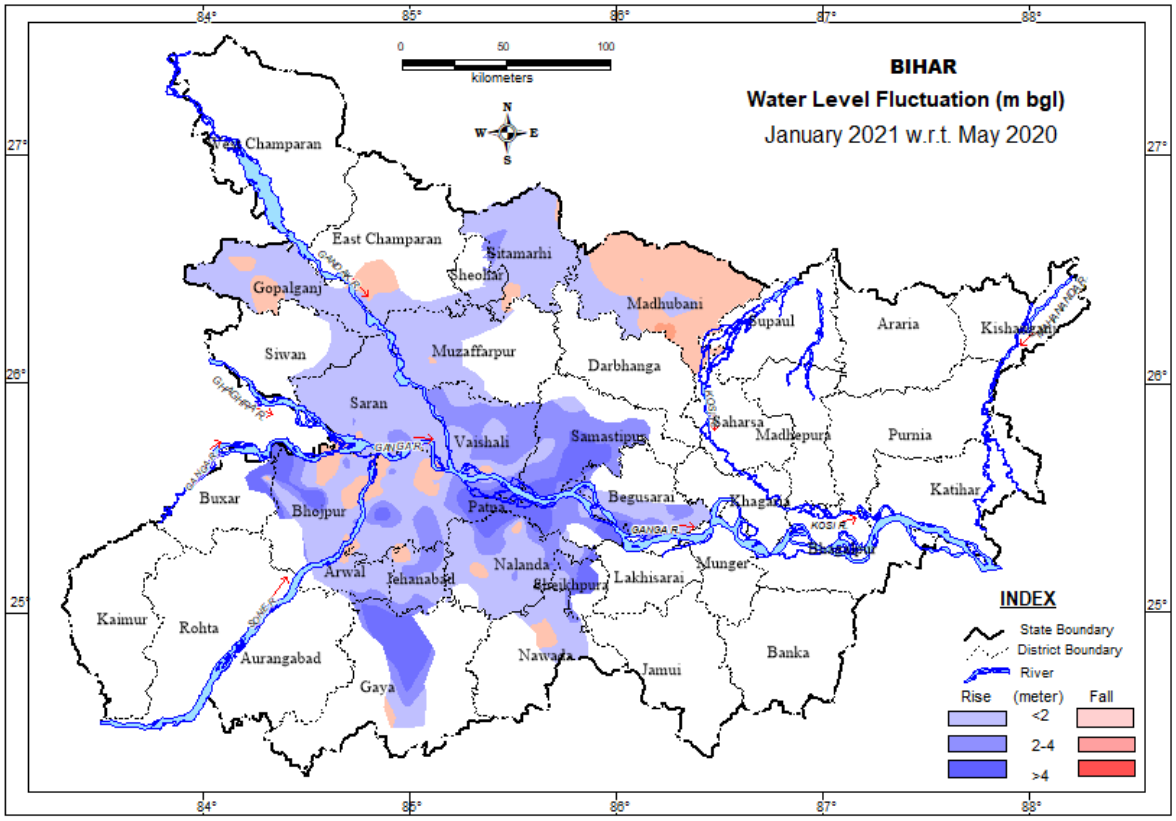


***Fig. 10**: Fluctuation in ground water level between May 2020 and Jan. 2021.*

Table – 9 District wise categorization of fluctuation and their frequency of water levels of HNS in **Jan. 2021 w.r.t. May 2020**																				
SN	District	No. of wells analysed	Range of fluctuation (m)				No. of Wells / Percentage showing fluctuation in the range of												Total	
							Rise						Fall							
			Rise		Fall		0 to 2		2 to 4		> 4		0 to 2		2 to 4		> 4			
			Min.	*Max.*	*Min.*	*Max.*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*Rise*	*Fall*
1	Begusarai	11	0.4	3.71	-	-	8	73	3	27	0	0	0	0	0	0	0	0	11	0
2	Bhojpur	24	0.03	2.2	0.04	1.8	17	71	1	4	0	0	6	25	0	0	0	0	18	6
3	Buxar	2	4.85	4.85	1.37	1.37	0	0	0	0	1	50	1	50	0	0	0	0	1	1
4	Gaya	3	0.46	0.75	0.16	0.16	2	67	0	0	0	0	1	33	0	0	0	0	2	1
5	Gopalganj	7	0.18	0.62	0.43	0.47	5	71	0	0	0	0	2	29	0	0	0	0	5	2
6	Jehanabad	17	0.37	3.3	0.28	0.64	10	59	4	24	0	0	3	18	0	0	0	0	14	3
7	Madhubani	12	0.55	1.92	0.48	2.57	4	33	0	0	0	0	7	58	1	8	0	0	4	8
8	Muzaffarpur	7	0.55	1.81	0.08	0.08	6	86	0	0	0	0	1	14	0	0	0	0	6	1
9	Nalanda	22	0.07	4.46	0.22	2.01	16	73	2	9	1	5	2	9	1	5	0	0	19	3
10	Nawada	4	0.04	0.77	0.38	0.38	3	75	0	0	0	0	1	25	0	0	0	0	3	1
11	Patna	16	0.18	6.46	0.07	1.45	10	63	1	6	1	6	4	25	0	0	0	0	12	4
12	E Champaran	3	0.61	0.61	0.04	0.54	1	33	0	0	0	0	2	67	0	0	0	0	1	2
13	Samastipur	13	1.57	5.02	-	-	2	15	8	62	3	23	0	0	0	0	0	0	13	0
14	Saran	11	0.4	3.24	0.22	0.22	8	73	2	18	0	0	1	9	0	0	0	0	10	1
15	Seikhpura	5	0.3	3.54	-	-	3	60	2	40	0	0	0	0	0	0	0	0	5	0
16	Sitamarhi	9	0.2	2.96	0.08	0.22	5	56	1	11	0	0	3	33	0	0	0	0	6	3
17	Siwan	2	0.25	1.26	-	-	2	100	0	0	0	0	0	0	0	0	0	0	2	0
18	Vaishali	16	0.78	3.05	0.41	0.41	6	38	9	56	0	0	1	6	0	0	0	0	15	1
		184	**0.03**	**6.46**	**0.04**	**2.57**	**108**	**59**	**33**	**18**	**6**	**3**	**35**	**19**	**2**	**1**	**0**	**0**	**147**	**37**

3.3.0 ANNUAL FLUCTUATION

3.3.1 May 2019 to May 2020

Fluctuation of ground water level between May 2019 and May 2020 of only 174 HNS could be analysed due to Covid-19 pandamic. These HNS represents limited area of the State as shown in **Fig. 11**. The analysis indicates rise in water level in 158 wells (91%) of the HNS covering major part of the area monitored. Out of which rise to the tune of 0 – 2 m has been recorded in 47% (81) of the HNS monitored. About 10% of the well monitored has shown rise in water level more than 4 m.

Fall in water level has been observed only in 8% of the well analysed which covered the localised areas only in parts of Samastipur, Begusarai, Nalanda and Buxar. Fall of water level from 2 to 4 m and more than 4 m has been observed in 2 and 1 HNS only out of the wells analysed.

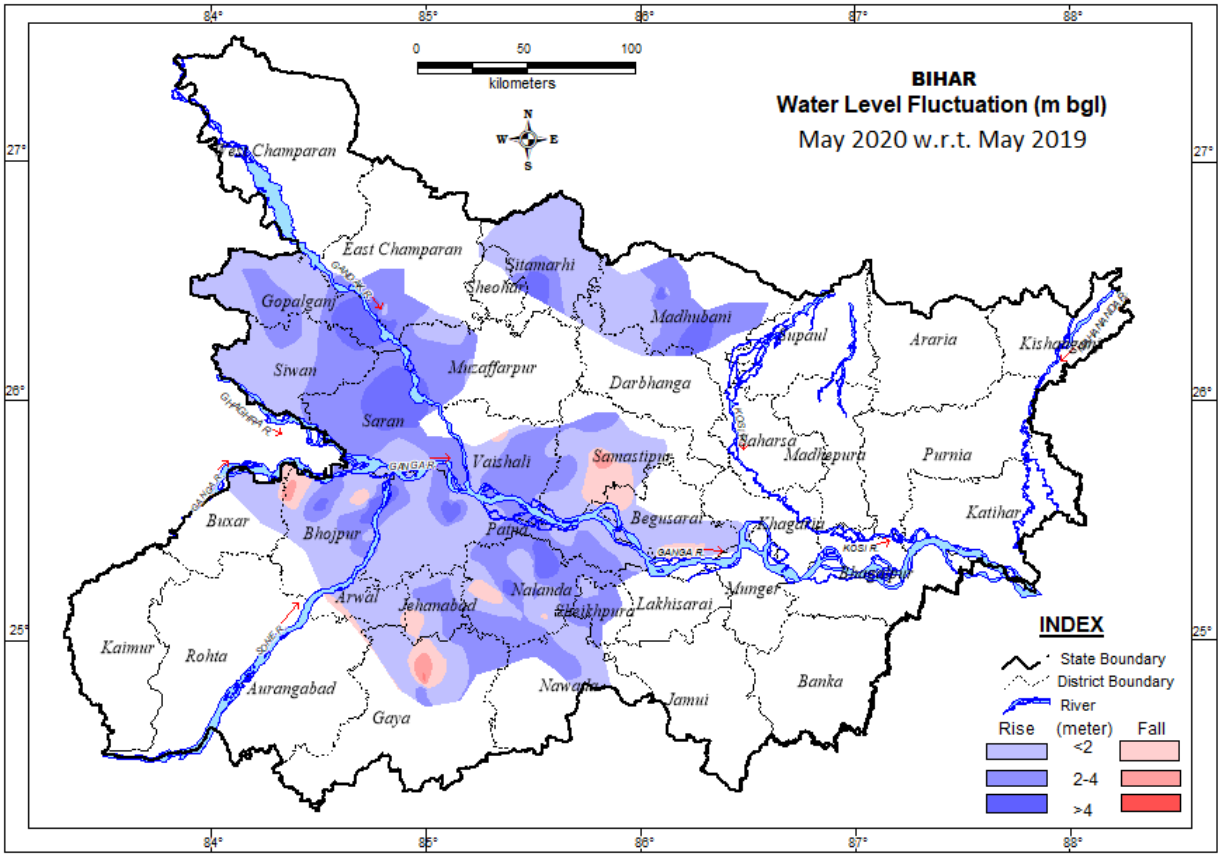


***Fig. 11**: Fluctuation in ground water level between May 2020 and May 2019.*

Table –12 District-wise categorization of frequency and fluctuation water levels of HNS of **May. 2020 w.r.t. May. 2019** for Bihar State																				
SN	**District**	**No. of HNS**	**Range of fluctuation (m)**				**No. of Wells / Percentage showing fluctuation in the range of**												**Total**	
			Rise		**Fall**		**Rise**						**Fall**							
			Min.	**Max.**	**Min.**	**Max.**	**<2m**	**%**	**2-4m**	**%**	**>4m**	**%**	**<2m**	**%**	**2-4m**	**%**	**>4m**	**%**	**Rise**	**Fall**
1	Begusarai	11	0.13	1.75	0.16	0.72	9	82	0	0	0	0	2	18	0	0	0	0	9	2
2	Bhojpur	25	0.29	6.57	1.34	1.34	13	52	7	28	3	12	1	4	0	0	0	0	23	1
3	Buxar	2	1.35	1.35	2.68	2.68	1	50	0	0	0	0	0	0	1	50	0	0	1	1
4	Gaya	7	1.82	4.07	0.38	4.28	1	14	3	43	1	14	1	14	0	0	1	14	5	2
5	Gopalganj	6	0.95	11.98	-	-	3	50	2	33	1	17	0	0	0	0	0	0	6	0
6	Jehanabad	9	0.12	2.89	1.22	1.22	5	56	3	33	0	0	1	11	0	0	0	0	8	1
7	Madhubani	12	0.65	5.66	-	-	3	25	6	50	3	25	0	0	0	0	0	0	12	0
8	Muzaffarpur	6	1.78	3.08	-	-	2	33	4	67	0	0	0	0	0	0	0	0	6	0
9	Nalanda	20	0.08	7.8	0.06	0.75	5	25	8	40	4	20	3	15	0	0	0	0	17	3
10	Nawada	4	0.38	3.05	-	-	3	75	1	25	0	0	0	0	0	0	0	0	4	0
11	Patna	22	0.14	8.35	-	-	12	55	7	32	2	9	0	0	0	0	0	0	21	0
12	E. Champaran	3	1.53	4.14	-	-	1	33	1	33	1	33	0	0	0	0	0	0	3	0
13	Samastipur	13	0.64	2.78	0.88	3.38	7	54	3	23	0	0	2	15	1	8	0	0	10	3
14	Saran	7	0.54	7.12	-	-	2	29	4	57	1	14	0	0	0	0	0	0	7	0
15	Seikhpura	6	0.37	3.5	-	-	3	50	3	50	0	0	0	0	0	0	0	0	6	0
16	Sitamarhi	8	0.47	5.8	-	-	7	88	0	0	1	13	0	0	0	0	0	0	8	0
17	Siwan	2	0.87	2.55	-	-	1	50	1	50	0	0	0	0	0	0	0	0	2	0
18	Vaishali	11	1.72	3.74	0.3	0.3	3	27	7	64	0	0	1	9	0	0	0	0	10	1
	Total	174	0.08	11.98	0.06	4.28	81	47	60	34	17	10	11	6	2	1	1	1	158	14

3.3.2 August 2020 to August 2019

During August 2020, HNS monitoring was affected by covid-19 pandamic therefore water level fluctuation between August 2019 and August 2020 has been done for 283 HNS only. The covered area for annual fluctuation has been shown in **Fig. 12.** The comparison indicates the rise of water level in 79% of the HNS analysed whcich covered major part of the area. About 15% wells have shown rise > 4 m which located in Bhojpur, Darbhanga, Muzaffarpur, Nalanda, Nawada, Patna, Samastipur, Saran and Sheikhpura district.

Total 57 wells have shown fall in water level. Out of which fall within 2 m has been found in 47 well. Water level fall has saptially been observed in parts of Samastipur, Begusarai, Bhojpur, Jehanabad, Nalanda, Arwal, Aurangabad and Gaya district

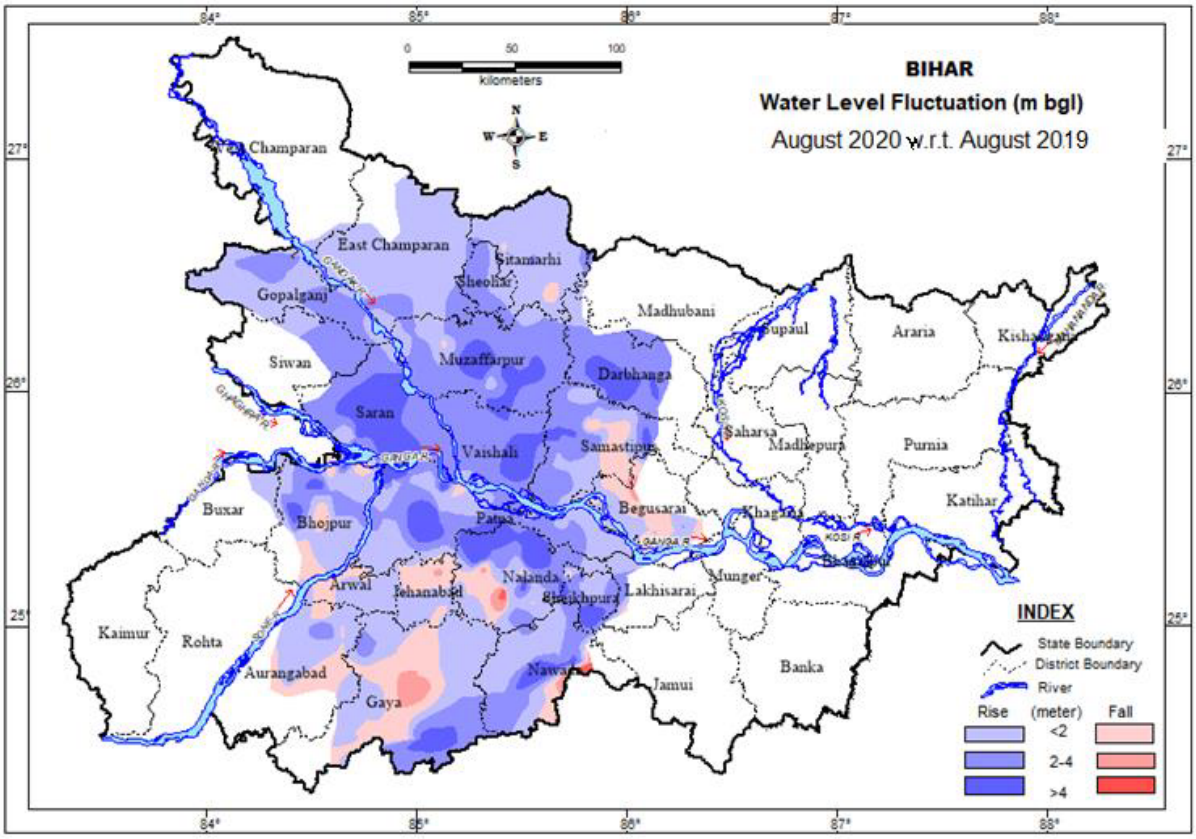


***Fig. 12**: Fluctuation in ground water level between Aug. 2020 and Aug. 2021*

Table –13 District-wise categorization of frequency and fluctuation water levels of HNS of **Aug. 2020 w.r.t. Aug. 2019** for Bihar State

SN	District	No. of HNS	Range of fluctuation (m)				No. of Wells / Percentage showing fluctuation in the range of												Total	
			Rise		Fall		Rise						Fall							
			Min.	Max.	Min.	Max.	<2m	%	2-4m	%	>4m	%	<2m	%	2-4m	%	>4m	%	Rise	Fall
1	Aurangabad	8	0.33	3.41	0.1	1.75	2	25	1	13	0	0	5	63	0	0	0	0	3	5
2	Begusarai	19	0.14	2.12	0.08	2.57	8	42	2	11	0	0	7	37	2	11	0	0	10	9
3	Bhojpur	23	0.04	5.66	0.3	1.36	8	35	4	17	3	13	8	35	0	0	0	0	15	8
4	Buxar	2	0.75	1.61	-	-	2	100	0	0	0	0	0	0	0	0	0	0	2	0
5	Darbhanga	6	2.42	4.99	-	-	0	0	3	50	3	50	0	0	0	0	0	0	6	0
6	Gaya	16	0.14	4.43	0.27	3.51	4	25	2	13	1	6	7	44	2	13	0	0	7	9
7	Gopalganj	11	1.02	3.2	-	-	7	64	4	36	0	0	0	0	0	0	0	0	11	0
8	Jehanabad	12	0.16	1.33	0.12	2.16	6	50	0	0	0	0	5	42	1	8	0	0	6	6
9	Muzaffarpur	22	0.36	6.86	0.13	0.13	4	18	12	55	4	18	1	5	0	0	0	0	20	1
10	Nalanda	36	0.87	8.63	0.02	6.07	10	28	6	17	8	22	8	22	2	6	1	3	24	11
11	Nawada	12	0.03	6.29	6.7	6.7	6	50	2	17	3	25	0	0	0	0	1	8	11	1
12	Patna	28	0.03	9.8	0.33	0.33	15	54	7	25	5	18	1	4	0	0	0	0	27	1
13	E Champaran	10	0.03	2.72	-	-	6	60	3	30	0	0	0	0	0	0	0	0	9	0
14	Samastipur	18	1.05	4.3	0.39	1.7	4	22	7	39	4	22	3	17	0	0	0	0	15	3
15	Saran	15	1.2	5.97	-	-	2	13	6	40	7	47	0	0	0	0	0	0	15	0
16	Seikhpura	9	0.19	5.16	3.19	3.19	3	33	3	33	2	22	0	0	1	11	0	0	8	1
17	Sheohar	3	0.66	2.2	-	-	1	33	2	67	0	0	0	0	0	0	0	0	3	0
18	Sitamarhi	15	0.36	2.16	0.09	0.46	12	80	1	7	0	0	2	13	0	0	0	0	13	2
19	Siwan	3	2.49	3.84	-	-	0	0	3	100	0	0	0	0	0	0	0	0	3	0
20	Vaishali	15	1.41	5.47	-	-	1	7	10	67	4	27	0	0	0	0	0	0	15	0
	Total	**283**	**0.03**	**9.80**	**0**	**6.7**	**101**	**36**	**78**	**28**	**44**	16	**47**	**17**	**8**	**3**	**2**	**1**	**223**	**57**

3.3.3 November 2019 to November 2020

Water level fluctuation between November 2019 and November 2020 has been analysed for 582 HNS after carrying out monitoring in entire State. The nalysis indicates that there is a fall of water level in about 59% of the HNS. About 52% NHS has shown water level fall within 2 m spatialy covered about 56% area of the State. Second largest category of water level fluctuation is rise upto 2 m which covered about 34% area of the State, shown by central part of NBP, SBP and in an area including major part of Buxar and Bhojpur district. Only 7% NHS has shown rise more than 2 m located disseminately in Central part of NBP and SBP. About 7% NHS has also shown fall in water level upto 2 m mostly located in SBP.

(Fig.13, Table 14).

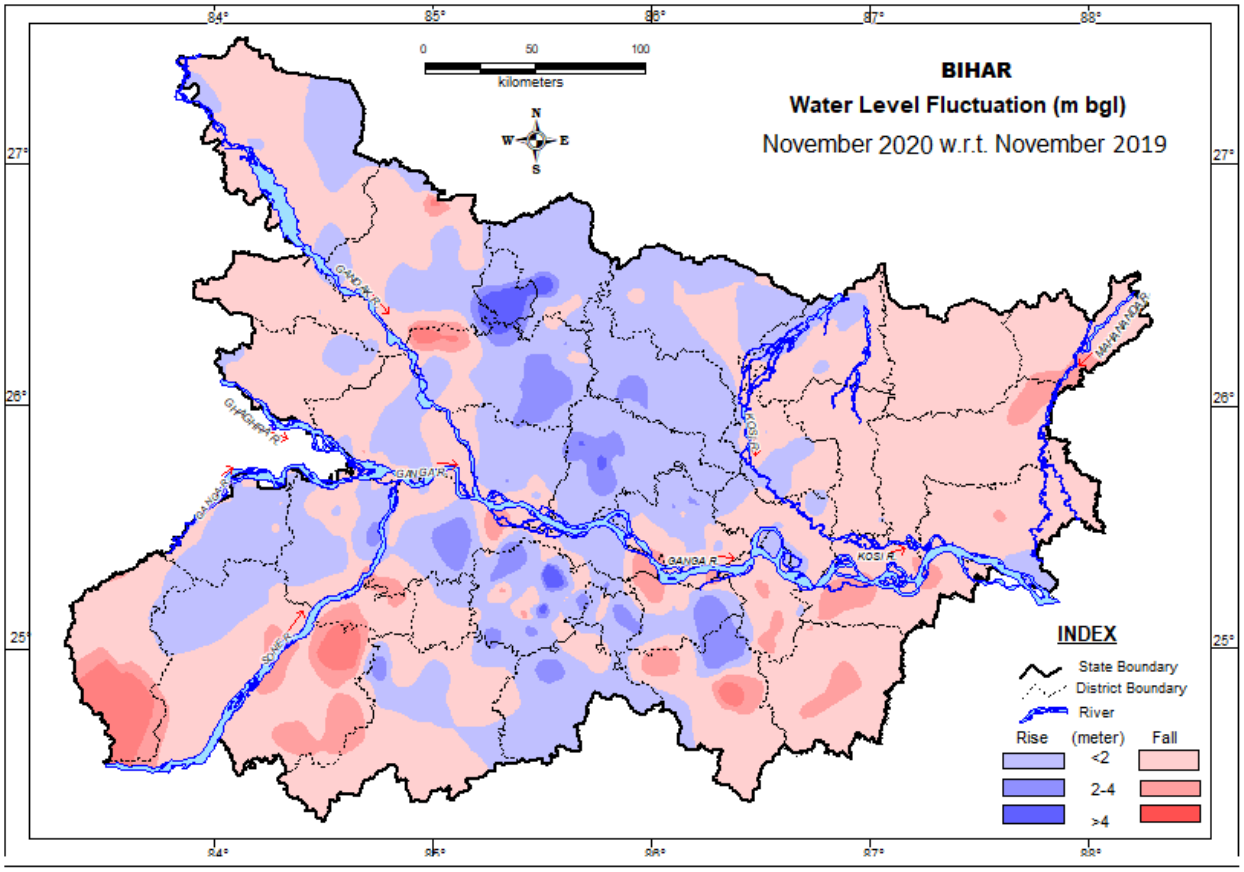


***Fig. 13**: Fluctuation in ground water level between Nov 2019 and Nov. 2020.*

Table –14 District-wise categorization of frequency and fluctuation water levels of HNS of **Nov. 2020 w.r.t. Nov. 2019** for Bihar State																				
SN	**District**	**No. of HNS**	**Range of fluctuation (m)**				**No. of Wells / Percentage showing fluctuation in the range of**												**Total**	
			Rise		**Fall**		**Rise**						**Fall**							
			Min.	**Max.**	**Min.**	**Max.**	**<2m**	**%**	**2-4m**	**%**	**>4m**	**%**	**<2m**	**%**	**2-4m**	**%**	**>4m**	**%**	**Rise**	**Fall**
1	Araria	8	-	-	0.19	1.9	0	0	0	0	0	0	8	100	0	0	0	0	0	8
2	Aurangabad	15	-	-	0.87	8.45	0	0	0	0	0	0	10	67	3	20	1	7	0	14
3	Banka	9	-	-	0.02	2.5	0	0	0	0	0	0	6	67	3	33	0	0	0	9
4	Begusarai	33	0.13	2.09	0.31	1.73	14	42	2	6	0	0	17	52	0	0	0	0	16	17
5	Bhagalpur	9	-	-	0.17	2.85	0	0	0	0	0	0	6	67	3	33	0	0	0	9
6	Bhojpur	31	0.07	2.8	0.06	0.71	16	52	1	3	0	0	13	42	0	0	0	0	17	13
7	Buxar	20	0.03	2.2	0.05	9.31	11	55	1	5	0	0	7	35	0	0	1	5	12	8
8	Darbhanga	9	0.22	2.44	-	-	7	78	2	22	0	0	0	0	0	0	0	0	9	0
9	Gaya	18	0.12	3.03	0.02	1.67	5	28	1	6	0	0	11	61	0	0	0	0	6	11
10	Gopalganj	19	0.05	0.05	0.03	13.28	1	5	0	0	0	0	17	89	0	0	1	5	1	18
11	Jamui	13	3.28	3.93	0.17	5.75	0	0	2	15	0	0	9	69	0	0	2	15	2	11
12	Jehanabad	14	1.57	1.57	0.23	3.17	1	7	0	0	0	0	11	79	2	14	0	0	1	13
13	Kaimur	10	-	-	0.07	6.2	0	0	0	0	0	0	8	80	1	10	1	10	0	10
14	Katihar	11	0.27	0.27	0.72	2.17	1	9	0	0	0	0	9	82	1	9	0	0	1	10
15	Khagaria	19	0.1	0.44	0.53	1.75	4	21	0	0	0	0	15	79	0	0	0	0	4	15
16	Kishanganj	8	-	-	0.12	2.44	0	0	0	0	0	0	6	75	2	25	0	0	0	8
17	Lakhisarai	8	0.08	3.1	0.05	2.47	2	25	1	13	0	0	2	25	2	25	0	0	3	4
18	Madhepura	15	0.03	0.22	0.19	1.08	2	13	0	0	0	0	13	87	0	0	0	0	2	13
19	Madhubani	23	0.03	1.65	0.01	0.48	14	61	0	0	0	0	7	30	0	0	0	0	14	7
20	Munger	10	0.16	1.25	0.33	2.45	2	20	0	0	0	0	5	50	3	30	0	0	2	8
21	Muzaffarpur	21	0.01	3.52	0.21	5.38	7	33	7	33	0	0	5	24	0	0	2	10	14	7
22	Nalanda	39	0.1	9.69	0.01	3.86	17	44	6	15	3	8	11	28	2	5	0	0	26	13
23	Nawada	11	0.06	2.96	0.49	0.62	7	64	2	18	0	0	2	18	0	0	0	0	9	2
24	W. Champaran	12	0.06	0.3	0.14	1.1	4	33	0	0	0	0	7	58	0	0	0	0	4	7
25	Patna	13	0.34	3.02	0.55	3.91	2	15	1	8	0	0	7	54	2	15	0	0	3	9
26	E. Champaran	23	0.04	1.57	0.01	4.51	7	30	0	0	0	0	14	61	0	0	1	4	7	15
27	Purnia	13	-	-	0.34	2.63	0	0	0	0	0	0	12	92	1	8	0	0	0	13
28	Rohtas	12	0.06	1.52	0.12	3.37	5	42	0	0	0	0	5	42	1	8	0	0	5	6
29	Saharsa	15	0.23	0.45	0.17	0.64	5	33	0	0	0	0	10	67	0	0	0	0	5	10
30	Samastipur	18	0.02	4.6	-	-	13	72	3	17	2	11	0	0	0	0	0	0	18	0
31	Saran	27	0.46	1.48	0.09	2.13	10	37	0	0	0	0	15	56	2	7	0	0	10	17
32	Seikhpura	8	0.3	3.28	0.2	2.87	1	13	4	50	0	0	2	25	1	13	0	0	5	3
33	Sheohar	3	0.22	7.63	-	-	2	67	0	0	1	33	0	0	0	0	0	0	3	0
34	Sitamarhi	16	0.17	7.05	0.07	0.21	13	81	0	0	1	6	2	13	0	0	0	0	14	2
35	Siwan	15	0.72	1.76	0.02	1.39	3	20	0	0	0	0	12	80	0	0	0	0	3	12
36	Supaul	19	0.21	0.83	0.11	1.21	4	21	0	0	0	0	15	79	0	0	0	0	4	15
37	Vaishali	15	0.2	3.07	0.17	1.33	8	53	3	20	0	0	4	27	0	0	0	0	11	4
	Total	**582**	**0.01**	**9.69**	**0.01**	**13.28**	**188**	**32**	**36**	**6**	**7**	**1**	**303**	**52**	**29**	**5**	**9**	**2**	**231**	**341**

3.3.4 January 2020 to January 2021

Water level fluctuation between January 2019 and January 2020 has been analysed for 619 HNS. The rise in water level within the range from 0.01 to 8.72 m as shown by 255 wells whereas the fall of water level between 0.01 to10.22 observed in 342 (55%) wells.

Major part of the area (53%) of the state has shown fall in water level to the tune of 0 to 2 m. The localised areas, including part of Kaimur, Rohtas, Bhagalpur, represented by 4% of NHS monitored, has shown fall in water level between 2 and 4 m. Total 11 NHS, including 4 NHS of Kaimur district has shown fall of water level >4 m.

About 37% area of the State has shown rise of water level upto 2 m which covered central part of NBP and major part of Rohtas, Gaya, Patna, Nalanda, Jehanabad and Arwal in SBP. Water level rise to the tune of 2 to 4 m has been observed in total 32 wells mostly located in Vaishali, Samastipur, Nalanda and Muzaffarpur district. Including 4 in Patna, 2 in Samastipur and 2 Jamui district total 13 HNS have shown rise in water level > 4m.

(Fig. 14, Table 15).

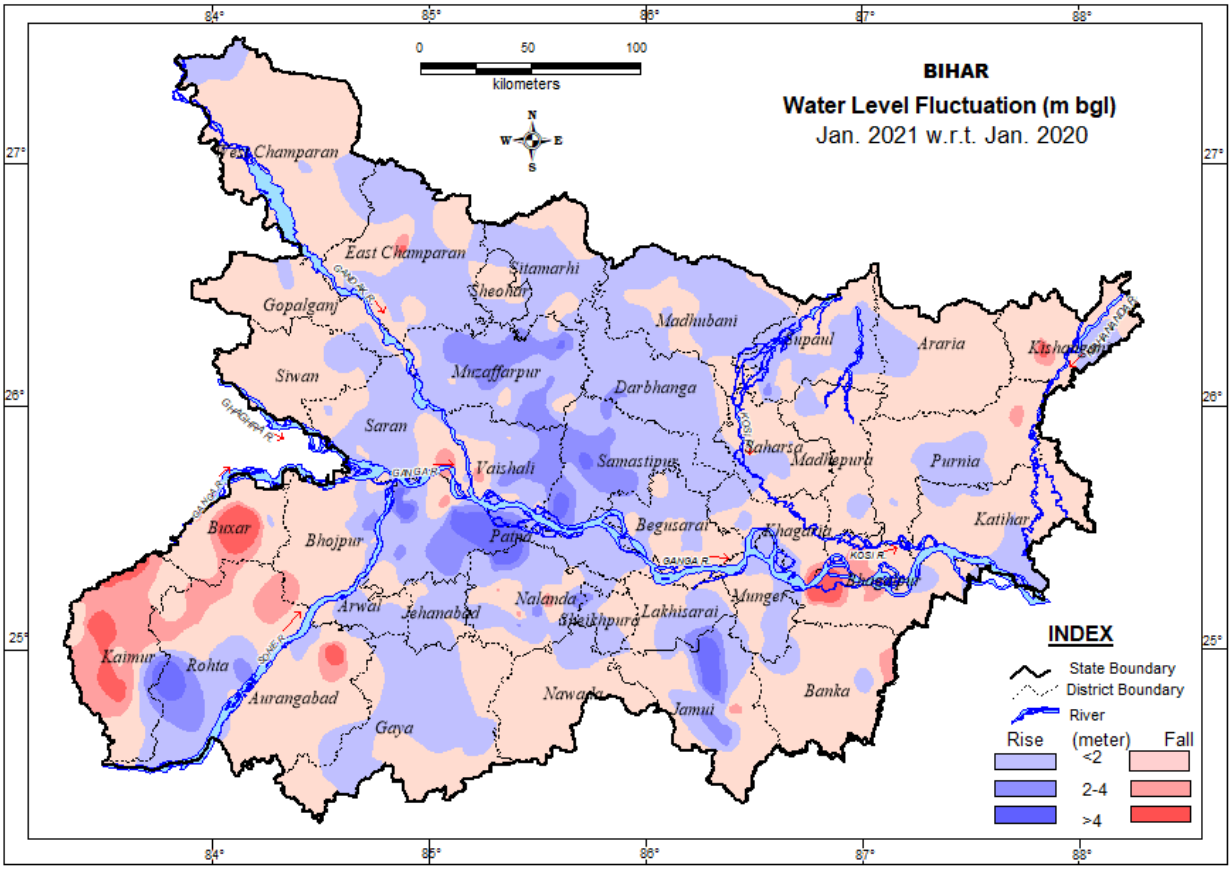


***Fig. 14**: Fluctuation in ground water level between Jan. 2020 and Jan. 2019.*

Table – 15 District-wise categorization of fluctuation and their frequency of water levels of HNS of **Jan 2021 w.r.t. Jan 2020** for Bihar State																				
SN	**District**	**No. of HNS analysed**	**Range of fluctuation (m)**				**No. of Wells / Percentage showing fluctuation in the range of**												**Total**	
			Rise		**Fall**		**Rise**						**Fall**							
			Min.	**Max.**	**Min.**	**Max.**	**<2m**	**%**	**2-4m**	**%**	**>4m**	**%**	**<2m**	**%**	**2-4m**	**%**	**>4m**	**%**	**Rise**	**Fall**
1	Araria	7	0.14	0.14	0.06	0.92	1	14	0	0	0	0	5	71	0	0	0	0	1	5
2	Aurangabad	11	0.3	0.3	0.17	6.32	1	9	0	0	0	0	9	82	0	0	1	9	1	10
3	Banka	12	0.84	0.84	0.13	2.35	1	8	0	0	0	0	10	83	1	8	0	0	1	11
4	Begusarai	35	0.08	1.9	0.04	2.71	13	37	0	0	0	0	19	54	2	6	0	0	13	21
5	Bhagalpur	14	0.9	1.65	0.4	10.22	2	14	0	0	0	0	9	64	2	14	1	7	2	12
6	Bhojpur	34	0.01	4	0.1	1.67	8	24	2	6	1	3	23	68	0	0	0	0	11	23
7	Buxar	22	0.16	0.46	0.05	8.34	2	9	0	0	0	0	16	73	0	0	2	9	2	18
8	Darbhanga	10	0.18	2.34	-	-	9	90	1	10	0	0	0	0	0	0	0	0	10	0
9	Gaya	11	0.07	1.92	0.05	1.59	4	36	0	0	0	0	7	64	0	0	0	0	4	7
10	Gopalganj	21	0.06	0.08	0.12	1.24	3	14	0	0	0	0	10	48	0	0	0	0	3	10
11	Jamui	15	0.9	6.53	0.01	2.63	2	13	2	13	2	13	8	53	1	7	0	0	6	9
12	Jehanabad	17	0.09	1.73	0.01	0.53	9	53	0	0	0	0	8	47	0	0	0	0	9	8
13	Kaimur	11	-	-	0.33	7.06	0	0	0	0	0	0	3	27	4	36	4	36	0	11
14	Katihar	14	0.07	0.8	0.02	1.88	3	21	0	0	0	0	11	79	0	0	0	0	3	11
15	Khagaria	17	0.06	1.6	0.09	1.18	4	24	0	0	0	0	13	76	0	0	0	0	4	13
16	Kishanganj	8	0.13	0.13	0.02	5.54	1	13	0	0	0	0	6	75	0	0	1	13	1	7
17	Lakhisarai	9	0.35	1.65	0.46	1.07	4	44	0	0	0	0	5	56	0	0	0	0	4	5
18	Madhepura	16	0.04	0.38	0.14	0.61	3	19	0	0	0	0	12	75	0	0	0	0	3	12
19	Madhubani	24	0.02	1.13	0.02	1.72	14	58	0	0	0	0	8	33	0	0	0	0	14	8
20	Munger	10	0.19	2	0.03	1.75	5	50	0	0	0	0	5	50	0	0	0	0	5	5
21	Muzaffarpur	22	0.05	4.86	0.01	0.7	8	36	6	27	1	5	7	32	0	0	0	0	15	7
22	Nalanda	37	0.03	4.6	0.02	7.69	20	54	4	11	1	3	9	24	2	5	1	3	25	12
23	Nawada	5	0.39	1.14	0.42	1.98	3	60	0	0	0	0	2	40	0	0	0	0	3	2
24	W. Champaran	12	0.14	0.6	0.08	0.59	2	17	0	0	0	0	9	75	0	0	0	0	2	9
25	Patna	19	0.21	8.72	0.4	2.61	6	32	3	16	4	21	5	26	1	5	0	0	13	6
26	E. Champaran	23	0.04	2.45	0.08	5.38	9	39	1	4	0	0	11	48	0	0	1	4	10	12
27	Purnia	14	0.01	1.35	0.11	2.09	5	36	0	0	0	0	8	57	1	7	0	0	5	9
28	Rohtas	17	0.24	5.25	0.24	3.93	3	18	1	6	1	6	5	29	6	35	0	0	5	11
29	Saharsa	18	0.03	1.25	0.01	1.11	4	22	0	0	0	0	14	78	0	0	0	0	4	14
30	Samastipur	19	0.1	5.5	-	-	11	58	6	32	2	11	0	0	0	0	0	0	19	0
31	Saran	28	0.05	1.93	0.04	3.01	17	61	0	0	0	0	9	32	1	4	0	0	17	10
32	Seikhpura	9	0.56	3.33	0.07	0.89	4	44	2	22	0	0	3	33	0	0	0	0	6	3
33	Sheohar	4	0.11	1.31	0.1	1.18	2	50	0	0	0	0	2	50	0	0	0	0	2	2
34	Sitamarhi	14	0.05	1.5	0.11	0.34	8	57	0	0	0	0	4	29	0	0	0	0	8	4
35	Siwan	16	0.89	1.3	0.05	0.79	2	13	0	0	0	0	14	88	0	0	0	0	2	14
36	Supaul	21	0.15	7.3	0.04	0.79	5	24	0	0	1	5	14	67	0	0	0	0	6	14
37	Vaishali	23	0.15	2.6	0.05	2.91	12	52	4	17	0	0	6	26	1	4	0	0	16	7
	Total	**619**	**0.01**	**8.72**	**0.01**	**10.22**	**210**	**34**	**32**	**5**	**13**	**2**	**309**	**50**	**22**	**4**	**11**	**2**	**255**	**342**

3.4 DECADAL FLUCTUATION

3.4.1 Decadal Mean of May to May 2020

Fluctuation in water level of May 2020 with respect to decadal mean of May has been analysed for 202 HNS, which indicates rise in 87% and fall in remaining 27 HNS. Only limited area of Bihar State has been covered as shown in **fig. 15** due to covid-19 pandamic**.** The rise in the tune of 0 – 2 m is observed in the major part of the area monitored. The range of water level rise between 2 and 4 m has been observed in many localised area including boardering area of Gopalganj and Siwan and central part of Madhubani. Total 9 HNS have shown rise of water level > 4m including 3 in Patna, 2 in Madhubani and 2 HNS in Bhojpur district,

Majority of the well showing fall, are within the range of 2m observed in many localised area. In Samstipur district 6 HNS have shown fall within this category out of 13 well monitored. Only 1 HNS located in Buxar district has been categorised within the range of 2 to 4 m. No well has shown fall > 4 m. (**Table – 16)**

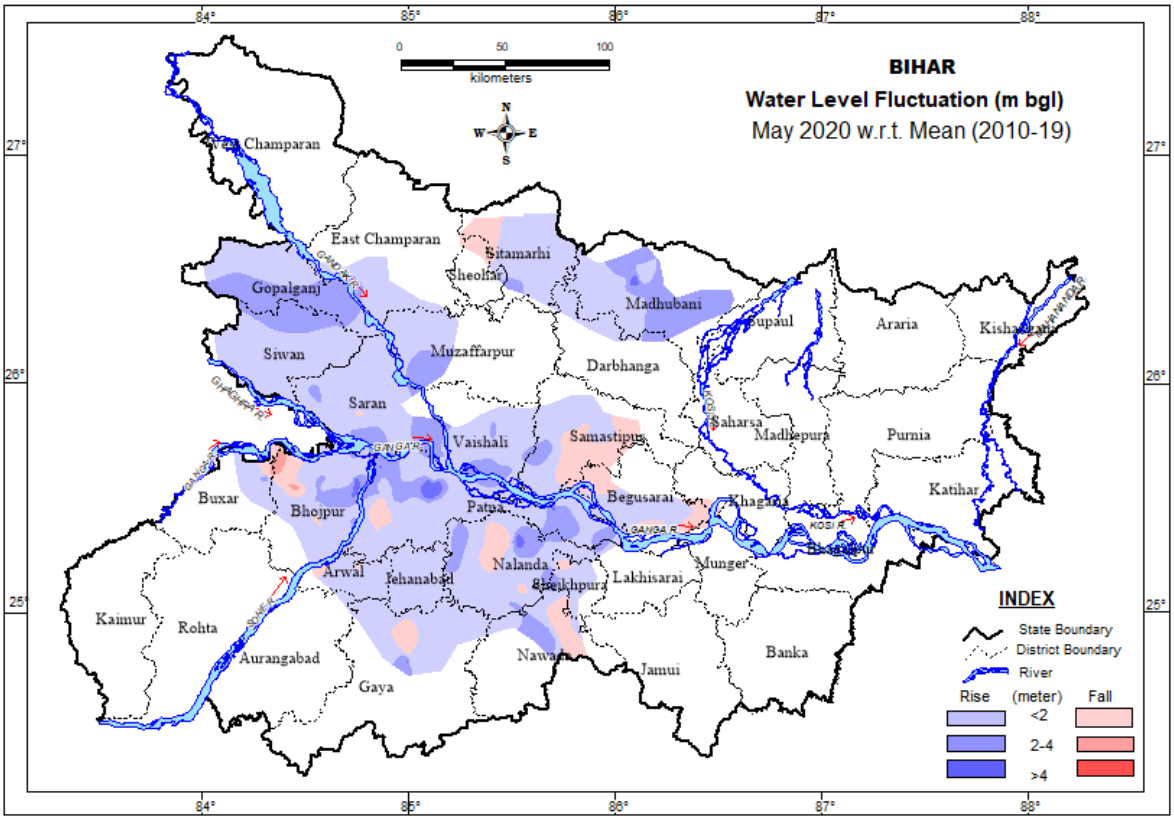


Fig. 15 *Fluctuation in water level between May (mean) and May 2020.*

Table – 16 District-wise categorization of fluctuation and their frequency of water levels of HNS of **May. 2020 w.r.t. May mean (2010-2019)** for Bihar State

SN	District	No. of HNS	Range of fluctuation (m)				No. of Wells / Percentage showing fluctuation In the range of												Total	
			Rise		Fall		Rise						Fall							
			Min.	Max.	Min.	Max.	<2m	%	2-4m	%	>4m	%	<2m	%	2-4m	%	>4m	%	Rise	Fall
1	Begusarai	11	0.02	1.67	0.37	0.6	9	81.8	0	0	0	0	2	18.2	0	0	0	0	9	2
2	Bhojpur	27	0.01	6.17	0.01	0.06	20	74.1	3	11.1	2	7.4	2	7.4	0	0	0	0	25	2
3	Buxar	3	1.34	2.66	2.05	2.05	1	33.3	1	33.3	0	0	0	0	1	33.3	0	0	2	1
4	Gaya	8	0.38	4.38	1.26	1.26	4	50	2	25	1	12.5	1	12.5	0	0	0	0	7	1
5	Gopalganj	7	0.71	2.66	-	-	4	57.1	3	42.9	0	0	0	0	0	0	0	0	7	0
6	Jehanabad	17	0.01	3.06	0.01	0.08	14	82.4	1	5.9	0	0	2	11.8	0	0	0	0	15	2
7	Madhubani	12	0.29	5.66	-	-	5	41.7	5	41.7	2	16.7	0	0	0	0	0	0	12	0
8	Muzaffarpur	7	1.24	2.84	-	-	5	71.4	2	28.6	0	0	0	0	0	0	0	0	7	0
9	Nalanda	20	0.18	4.57	0.14	0.9	11	55	5	25	1	5	3	15	0	0	0	0	17	3
10	Nawada	4	0.46	3.05	0.12	1.81	1	25	1	25	0	0	2	50	0	0	0	0	2	2
11	Patna	31	0.05	8.35	0.13	1.38	14	45.2	10	32.3	3	9.7	4	12.9	0	0	0	0	27	4
12	E. Champaran	3	1.35	1.87	-	-	3	100.0	0	0	0	0	0	0	0	0	0	0	3	0
13	Samastipur	13	0.21	3.14	0.09	1.66	6	46.2	1	7.7	0	0	6	46.2	0	0	0	0	7	6
14	Saran	11	0.68	2.37	0.04	0.04	5	45.5	5	45.5	0	0	1	9.1	0	0	0	0	10	1
15	Seikhpura	6	0.06	2.58	0.08	1.18	3	50	1	16.7	0	0	2	33.3	0	0	0	0	4	2
16	Sitamarhi	9	0.58	2.65	0.72	0.72	5	55.6	3	33.3	0	0	1	11.1	0	0	0	0	8	1
17	Siwan	2	0.8	1.24	-	-	2	100	0	0	0	0	0	0	0	0	0	0	2	0
18	Vaishali	11	0.53	3.51	-	-	7	63.6	4	36.4	0	0	0	0	0	0	0	0	11	0
	Total	**202**	**0.01**	**8.35**	**0.01**	**2.05**	**119**	**58.9**	**47**	**23.3**	**9**	**4.5**	**26**	**12.9**	**1**	**0.5**	**0**	**0**	**175**	**27**

3.4.2 Decadal Mean of August to August 2020

Fluctuation in water level of August 2020 with respect to decadal mean of August has been analysed for 320 HNS which covers the limited area (45%) of the State. **(Fig 16).** About 79% of the HNS analysed, are categorised under rise in water level and remaining under fall. The rise to the tune of up to 2 m has covered major part of the area (55%) monitored. The rise between 2 and 4 m has been observed in 24% of the HNS analysed wiich spread in 20% of the area monitored. Only 3 HNS haave shown rise in water level > 4 m.

The fall up to 2 m has been observed in many localised area including major part of Begusarai district, and part of Nalanda, Gaya and Aurangabad district. Total 12 HNS have shown fall in the the range of 2 to 4 m out of which 7 are located in Begusarai district and 3 in Nalanda district. Only 3 HNS have shown fall of water level > 4 located in Nalanda and Nawada district. **(Table 17).**

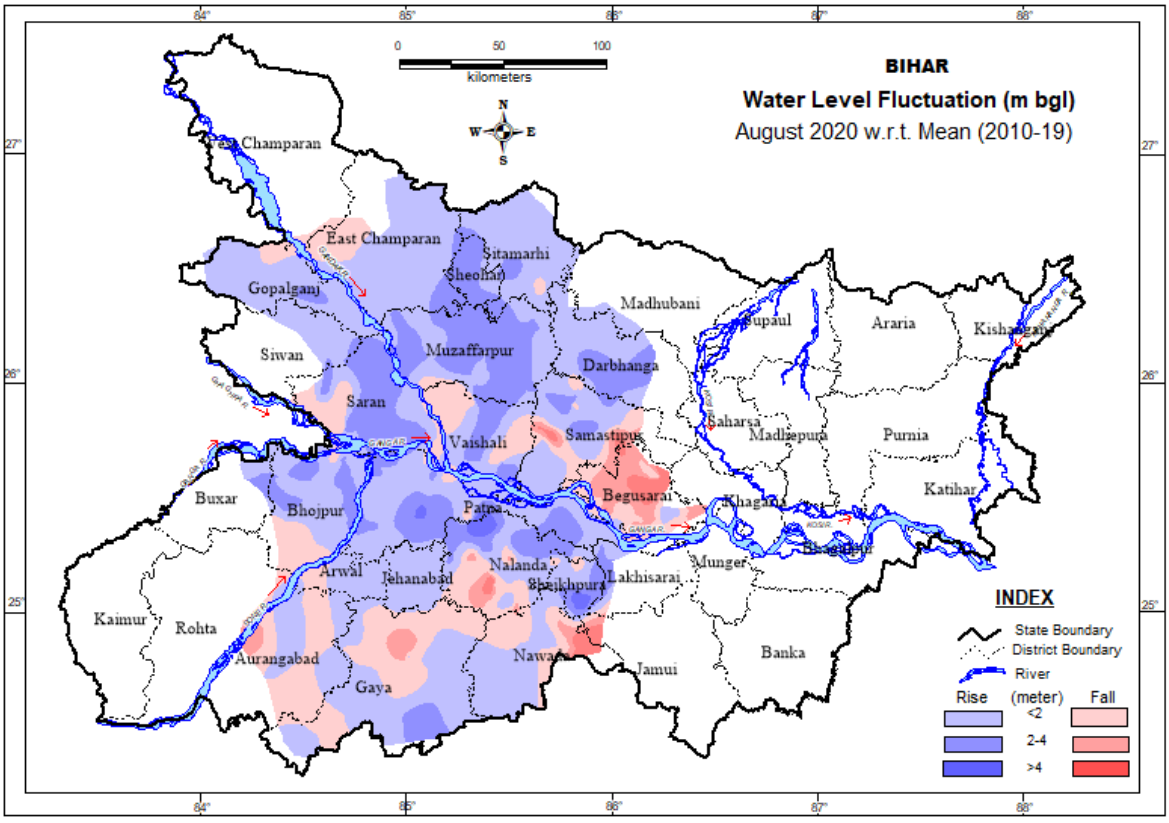


Fig. 16 *Fluctuation in water level between Aug. (mean) and Aug. 2020*

Table – 17 District-wise categorization of fluctuation and their frequency of water levels of HNS of **Aug. 2020 w.r.t. Aug. mean (2010-2019)** for Bihar

SN	District	No. of HNS	Range of fluctuation (m)				No. of Wells / Percentage showing fluctuation In the range of												Total	
			Rise		Fall		Rise						Fall							
			Min.	Max.	Min.	Max.	<2m	%	2-4m	%	>4m	%	<2m	%	2-4m	%	>4m	%	Rise	Fall
1	Aurangabad	8	0.01	0.7	0.02	0.88	3	37.5	0	0	0	0	5	62.5	0	0	0	0	3	5
2	Begusarai	20	0.19	1.42	0.01	3.86	2	10	0	0	0	0	11	55	7	35	0	0	2	18
3	Bhojpur	31	0.51	3.32	0.5	1.32	22	71.0	7	22.6	0	0	2	6.5	0	0	0	0	29	2
4	Buxar	4	0.98	2.67	-	-	1	25	3	75	0	0	0	0	0	0	0	0	4	0
5	Darbhanga	8	1.06	2.76	-	-	4	50	4	50	0	0	0	0	0	0	0	0	8	0
6	Gaya	17	0.02	2.79	0.41	1.91	11	64.7	1	5.9	0	0	5	29.4	0	0	0	0	12	5
7	Gopalganj	11	0.2	2.58	0.16	0.16	9	81.8	1	9.1	0	0	1	9.1	0	0	0	0	10	1
8	Jehanabad	17	0.09	1.5	0.06	0.44	15	88.2	0	0	0	0	2	11.8	0	0	0	0	15	2
9	Muzaffarpur	25	0.43	3.94	-	-	11	44	14	56	0	0	0	0	0	0	0	0	25	0
10	Nalanda	39	0.02	6.92	0.01	5.39	15	38.5	6	15.4	1	2.6	12	30.8	3	7.7	2	5.1	22	17
11	Nawada	12	0.54	2	0.35	6.57	6	50	0	0	0	0	4	33.3	1	8.3	1	8.3	6	6
12	Patna	33	0.25	3.8	0.37	0.57	22	66.7	9	27.3	0	0	2	6.1	0	0	0	0	31	2
13	E Champaran	13	0.06	2.01	0.63	0.63	11	84.6	1	7.7	0	0	1	7.7	0	0	0	0	12	1
14	Samastipur	18	0.07	4.11	0.06	1.75	8	44.4	4	22.2	1	5.6	5	27.8	0	0	0	0	13	5
15	Saran	16	1.58	3.73	-	-	4	25	12	75	0	0	0	0	0	0	0	0	16	0
16	Seikhpura	9	0.43	5.16	0.16	3.93	5	55.6	1	11.1	1	11.1	1	11.1	1	11.1	0	0	7	2
17	Sheohar	4	0.66	2.47	-	-	2	50	2	50	0	0	0	0	0	0	0	0	4	0
18	Sitamarhi	16	0.43	3.34	0.2	0.2	14	87.5	1	6.3	0	0	1	6.3	0	0	0	0	15	1
19	Siwan	4	1.21	1.93	-	-	4	100	0	0	0	0	0	0	0	0	0	0	4	0
20	Vaishali	15	0.47	3.67	-	-	4	26.7	11	73.3	0	0	0	0	0	0	0	0	15	0
	Total	320	0.01	6.92	0.01	6.57	173	54.1	77	24.1	3	0.9	52	16.25	12	3.75	3	0.9	253	67

3.4.3 Decadal Mean of November to November 2020

Fluctuation in water level during November 2020 with respect to decadal mean of November has been analysed for 626 HNS, which shows Rise of water level in 63% of the HNS and and remaining fall. Major part (49%) of the State has shown water level rise in the range of 0 to 2m. The rise rise between 2 and 4 m has been observed in 7% of NHS analysed which covered and elongated area in NBP and many localised area in SBP. Only 4 HNS have shown water level rise > 4 m.

About 39% area of the state has shown fall in water level which cover major part of the districts located in Kosi mega fan and also Banka, Aurangabad, Rohtas and Arwal district. Total 20 HNS have shown fall of water level in the range of 2 to 4 m including 4 HNS located in Aurangabad district and 2 HNS located in Jamui district. The fall > 4m has been observed in total 10 HNS located in many part of the district including 2 in Aurangabad and 2 in Buxar district. **(Fig. 17, Table 18.)**

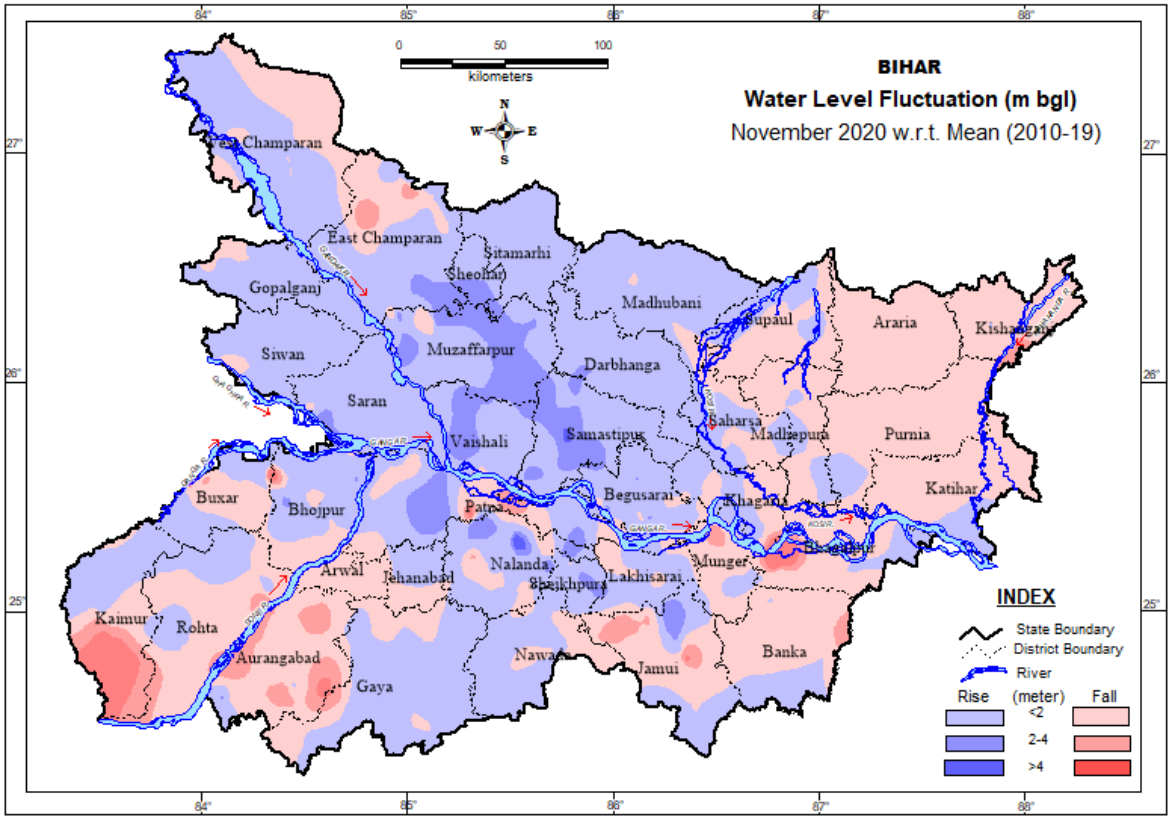


Fig. 17 *Fluctuation in water level between Nov. (mean) and Nov. 2019*

Table – 18 District-wise categorization of fluctuation and their frequency of water levels of HNS of **Nov. 2020 w.r.t. Nov. mean (2010-2019)** for Bihar State

SN	District	No. of HNS analysed	Range of fluctuation (m)				No. of Wells / Percentage showing fluctuation In the range of												Total	
			Rise		Fall		Rise						Fall							
			Min.	Max.	Min.	Max.	<2m	%	2-4m	%	>4m	%	<2m	%	2-4m	%	>4m	%	Rise	Fall
1	Aurangabad	16	0.07	2.11	0.18	7.07	1	6	1	6	0	0	8	50	4	25	2	13	2	14
2	Banka	12	0.03	0.98	0.21	2.74	2	17	0	0	0	0	9	75	1	8	0	0	2	10
3	Begusarai	36	0.02	2.4	0.05	1.42	24	67	3	8	0	0	9	25	0	0	0	0	27	9
4	Bhagalpur	11	0.07	0.19	0.21	9.41	3	27	0	0	0	0	7	64	0	0	1	9	3	8
5	Bhojpur	34	0.07	3.74	0.02	2.55	27	79	3	9	0	0	3	9	1	3	0	0	30	4
6	Buxar	21	0.25	2.53	0.17	6.99	13	62	1	5	0	0	4	19	1	5	2	10	14	7
7	Darbhanga	10	0.35	2.19	-	-	9	90	1	10	0	0	0	0	0	0	0	0	10	0
8	Gaya	18	0.06	1.95	0.02	0.34	14	78	0	0	0	0	4	22	0	0	0	0	14	4
9	Gopalganj	19	0.03	0.78	0.07	12.93	15	79	0	0	0	0	3	16	0	0	1	5	15	4
10	Jamui	15	0.15	3.64	0.31	4.73	4	27	1	7	0	0	6	40	3	20	1	7	5	10
11	Jehanabad	15	0.27	0.75	0.15	1.75	5	33	0	0	0	0	10	67	0	0	0	0	5	10
12	Kaimur	10	0.55	1.62	0.9	5.17	6	60	0	0	0	0	3	30	0	0	1	10	6	4
13	Katihar	11	0.91	0.91	0.09	0.98	1	9	0	0	0	0	10	91	0	0	0	0	1	10
14	Khagaria	19	0.01	1.66	0	0.82	7	37	0	0	0	0	12	63	0	0	0	0	7	12
15	Kishanganj	8	0.09	0.09	0.67	2.28	1	13	0	0	0	0	6	75	1	13	0	0	1	7
16	Lakhisarai	9	0.59	1.52	0.02	1.4	4	44	0	0	0	0	5	56	0	0	0	0	4	5
17	Madhepura	17	0.01	0.73	0.01	1.02	6	35	0	0	0	0	11	65	0	0	0	0	6	11
18	Madhubani	25	0.01	1.87	0.37	0.37	24	96	0	0	0	0	1	4	0	0	0	0	24	1
19	Munger	10	0.44	1.92	0.18	3.03	3	30	0	0	0	0	6	60	1	10	0	0	3	7
20	Muzaffarpur	25	0.01	3.51	2.04	3.38	10	40	13	52	0	0	0	0	2	8	0	0	23	2
21	Nalanda	39	0.09	5.77	0.02	2.25	21	54	4	10	1	3	12	31	1	3	0	0	26	13
22	Nawada	13	0.1	1.4	0.16	1.66	9	69	0	0	0	0	4	31	0	0	0	0	9	4
23	W. Champaran	13	0.08	1.87	0.01	0.56	9	69	0	0	0	0	4	31	0	0	0	0	9	4
24	Patna	15	0.06	3.56	0.31	5.96	6	40	1	7	0	0	5	33	2	13	1	7	7	8
25	E. Champaran	30	0.04	3.77	0.03	3.17	20	67	1	3	0	0	7	23	2	7	0	0	21	9
26	Purnia	14	0.66	0.66	0.03	1.46	1	7	0	0	0	0	13	93	0	0	0	0	1	13
27	Rohtas	14	0.02	1.51	0.2	13.7	7	50	0	0	0	0	5	36	1	7	1	7	7	7
28	Saharsa	18	0.01	0.68	0.03	0.39	10	56	0	0	0	0	8	44	0	0	0	0	10	8
29	Samastipur	20	0.07	4.6	-	-	12	60	7	35	1	5	0	0	0	0	0	0	20	0
30	Saran	28	0.02	4.16	0.16	1.58	21	75	4	14	1	4	2	7	0	0	0	0	26	2
31	Seikhpura	9	0.3	2.49	0.15	1.42	5	56	2	22	0	0	2	22	0	0	0	0	7	2
32	Sheohar	4	0.22	2.25	-	-	3	75	1	25	0	0	0	0	0	0	0	0	4	0
33	Sitamarhi	16	0.32	1.7	-	-	16	100	0	0	0	0	0	0	0	0	0	0	16	0
34	Siwan	15	0.13	1.84	0.36	0.54	13	87	0	0	0	0	2	13	0	0	0	0	13	2
35	Supaul	22	0.02	0.93	0.07	0.69	4	18	0	0	0	0	18	82	0	0	0	0	4	18
36	Vaishali	15	0.84	4.26	0.09	0.09	11	73	2	13	1	7	1	7	0	0	0	0	14	1
	Total	**626**	**0.01**	**5.77**	**0**	**13.7**	**347**	**55**	**45**	**7**	**4**	**1**	**200**	**32**	**20**	**3**	**10**	**2**	**396**	**230**

3.4.4 Decadal Mean of January to January 2021

Fluctuation in water level of January 2021 with respect to decadal mean of January has been analysed for 627 HNS. In 67% of the HNS, rise in water level is recorded and remaining in fall. The rise up to 2 m has covered major part (60%) of the. Few Patches mostly in central part of the State has shown rise in the range of 2 to 4 m. Total 5 HNS have shown more than 4 m rise in water level located in Patna, Jamui and Nalanda district.

About 32% area of the State has shown fall in the tune of 0 to 2 m including major part of W Champaran, Buxar, Rohtas Kaimur Jamui, Madhepura, Saharsa and Bhagalpur district. Few localised areas, mostly in Rohtas and Kaimur district have shown fall between 2 and 4 m. The fall of water level has been observed in total 9 HNS disseminated in the State. (**Fig. 18, Table 19).**

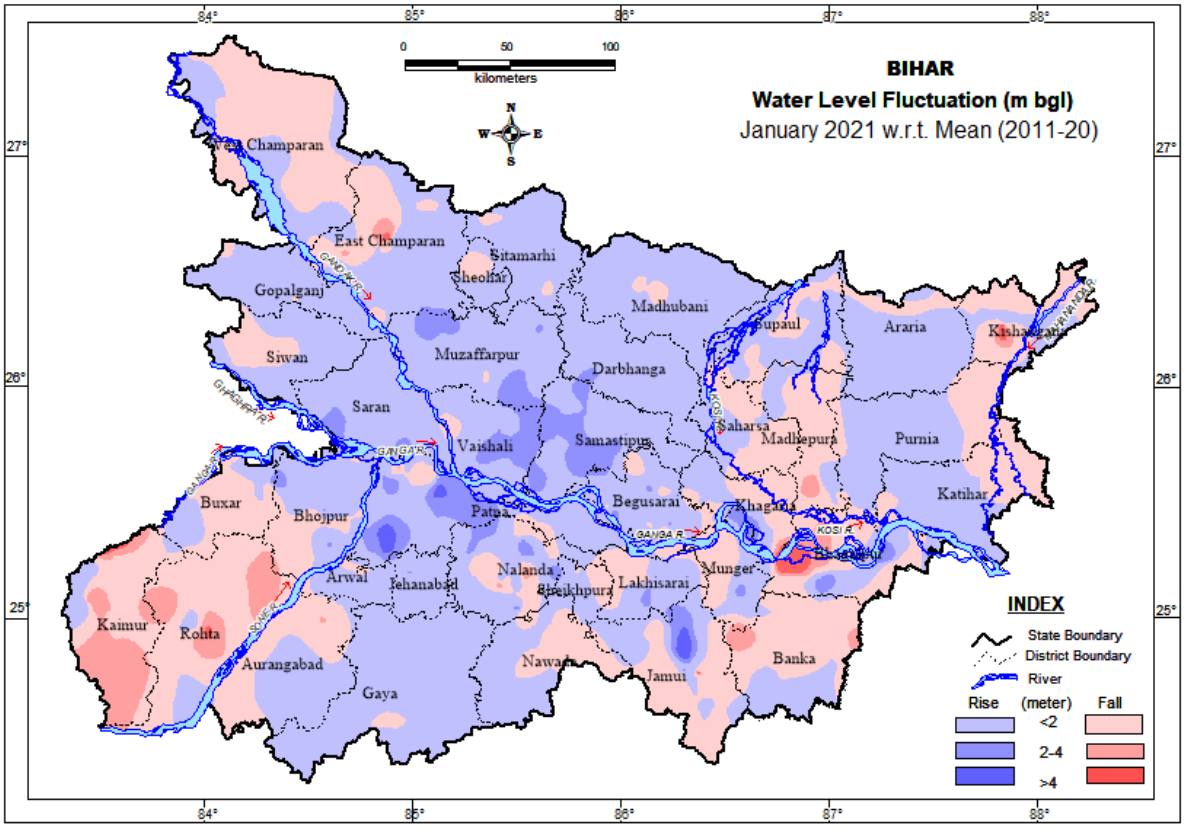


Fig. 18 *Fluctuation in water level between Jan. (mean) and Jan. 2021*

Table – 19 District-wise categorization of fluctuation and their frequency of water levels of HNS of **Jan. 2021 w.r.t. Jan. mean (2011-2020)** for Bihar State

SN	District	No. of HNS analysed	Range of fluctuation (m)				No. of Wells / Percentage showing fluctuation in the range of												Total	
			Rise		Fall		Rise						Fall							
			Min.	Max.	Min.	Max.	<2m	%	2-4m	%	>4m	%	<2m	%	2-4m	%	>4m	%	Rise	Fall
1	Araria	8	0.08	0.46	0.07	0.07	7	87.5	0	0	0	0	1	12.5	0	0.0	0	0.0	7	1
2	Aurangabad	11	0.43	1.19	0.1	2.15	3	27.3	0	0	0	0	7	63.6	1	9.1	0	0.0	3	8
3	Banka	14	0.24	0.61	0.02	2.86	3	21.4	0	0	0	0	9	64.3	2	14.3	0	0.0	3	11
4	Bhagalpur	15	0.58	1.08	0.1	9.18	3	20	0	0	0	0	8	53.3	3	20.0	1	6.7	3	12
5	Bhojpur	36	0.12	3.53	0.04	1.58	25	69.4	2	5.6	0	0	9	25.0	0	0.0	0	0.0	27	9
6	Buxar	23	0.01	3.97	0.74	8.16	12	52.2	2	8.7	0	0	6	26.1	1	4.3	1	4.3	14	8
7	Darbhanga	10	0.05	2.16	-	-	9	90	1	10	0	0	0	0.0	0	0.0	0	0.0	10	0
8	Gaya	11	0.09	1.44	0.48	0.48	10	90.9	0	0	0	0	1	9.1	0	0.0	0	0.0	10	1
9	Gopalganj	21	0.01	1.03	0.08	0.27	18	85.7	0	0	0	0	2	9.5	0	0.0	0	0.0	18	2
10	Jamui	17	0.07	6.29	0.03	7.69	6	35.3	1	5.9	2	11.8	7	41.2	0	0.0	1	5.9	9	8
11	Jehanabad	19	0.06	2.06	0.08	0.12	15	78.9	2	10.5	0	0	2	10.5	0	0.0	0	0.0	17	2
12	Kaimur	11	0.06	1.76	0.61	5.28	4	36.4	0	0.0	0	0	3	27.3	3	27.3	1	9.1	4	7
13	Katihar	14	0.04	1.84	0.06	0.64	10	71.4	0	0	0	0	4	28.6	0	0.0	0	0.0	10	4
14	Khagaria	18	0.1	2.51	0.04	0.67	7	38.9	1	5.6	0	0	10	55.6	0	0.0	0	0.0	8	10
15	Kishanganj	8	0.04	0.39	0.02	5.48	4	50	0	0	0	0	3	37.5	0	0.0	1	12.5	4	4
16	Lakhisarai	9	0.35	2.27	0.01	2.56	2	22.2	1	11.1	0	0	5	55.6	1	11.1	0	0.0	3	6
17	Madhepura	16	0.07	0.9	0.06	2.73	5	31.3	0	0	0	0	10	62.5	1	6.3	0	0.0	5	11
18	Madhubani	26	0.11	1.25	0.82	1.05	23	88.5	0	0	0	0	2	7.7	0	0.0	0	0.0	23	2
19	Munger	11	0.16	2.76	0.24	2.6	4	36.4	2	18.2	0	0	4	36.4	1	9.1	0	0.0	6	5
20	Muzaffarpur	25	0.19	3.69	0.26	0.26	19	76	5	20	0	0	1	4.0	0	0.0	0	0.0	24	1
21	Nalanda	37	0.11	4.08	0.15	7.22	18	48.6	5	13.5	1	2.7	11	29.7	1	2.7	1	2.7	24	13
22	Nawada	13	0.2	0.6	0.28	2.25	7	53.8	0	0	0	0	5	38.5	1	7.7	0	0.0	7	6
23	Pashchim	12	0.12	0.29	0.01	0.5	4	33.3	0	0	0	0	8	66.7	0	0.0	0	0.0	4	8
24	Patna	23	0.21	5.27	0.54	1.23	14	60.9	4	17.4	2	8.7	3	13.0	0	0.0	0	0.0	20	3
25	Purba	26	0.01	1.94	0.19	4.95	18	69.2	0	0	0	0	6	23.1	1	3.8	1	3.8	18	8
26	Purnia	16	0.01	1.34	0.77	0.77	15	93.8	0	0	0	0	1	6.3	0	0.0	0	0.0	15	1
27	Rohtas	19	0.14	0.74	0.01	12.03	3	15.8	0	0	0	0	11	57.9	3	15.8	2	10.5	3	16
28	Saharsa	18	0.07	0.56	0.04	1.09	5	27.8	0	0	0	0	12	66.7	0	0.0	0	0.0	5	12
29	Samastipur	21	0.44	3.5	-	-	10	47.6	11	52.4	0	0	0	0.0	0	0.0	0	0.0	21	0
30	Saran	28	0.42	3.76	1.22	1.22	22	78.6	5	17.9	0	0	1	3.6	0	0.0	0	0.0	27	1
31	Seikhpura	9	0.44	1.94	0.4	0.89	6	66.7	0	0	0	0	3	33.3	0	0.0	0	0.0	6	3
32	Sheohar	4	0.32	0.87	1.18	1.18	3	75	0	0	0	0	1	25.0	0	0.0	0	0.0	3	1
33	Sitamarhi	16	0.21	1.66	0.08	0.08	14	87.5	0	0	0	0	2	12.5	0	0.0	0	0.0	14	2
34	Siwan	16	0.03	1.51	0.1	0.79	12	75	0	0	0	0	4	25.0	0	0.0	0	0.0	12	4
35	Supaul	23	0.01	2.61	0.02	2.51	8	34.8	1	4.3	0	0	13	56.5	1	4.3	0	0.0	9	14
36	Vaishali	23	0.2	2.6	0.26	0.26	17	73.9	5	21.7	0	0	1	4.3	0	0.0	0	0.0	22	1
	Total	**627**	**0.01**	**6.29**	**0.01**	**12.03**	**365**	**58.2**	**48**	**7.6**	**5**	**0.8**	**176**	**28.1**	**20**	**3.2**	**9**	**1.4**	**418**	**205**

4. HYDROCHEMISTRY

In order to assess the chemical quality of ground water of phreatic aquifers of Bihar 252 ground water samples have been collected during May 2020 and analysed for 14 major parameters viz. pH, EC, TH, Ca, Mg, Na, K, CO_3, HCO_3, Cl, NO_3, SO_4, F, PO_4. The results of the completed chemical analysis of the ground water samples are given in Annexure-II. A perusal of the Annexure-II indicates that the water is by and large suitable for domestic and drinking purposes. The pH of ground water mostly lies between 6.5 and 8.5 Majority of the ground water samples are mildly alkaline in nature. The EC ranged from 220 to 4170 with the average value of 774.3 ms/cm@25°C.

The minimum, maximum and average value of parameter is given in table below:

Table – 20 Minimum, Maximum and Average value of Chemical Parameter

pH	EC (µs@ 25°C)	TH as ($CaCO_3$)	Ca^{2+}	Mg^{2+}	Na^{+}	K^{+}	CO_3^{2-}	HCO_3^{-}	Cl^{-}	NO_3^{-}	SO_4^{2-}	F^{-}	PO_4^{3-}
		mg/l											
4.8	220	50	6	1	3	0.03	0	31	0	0	0	0	0
8.37	4170	900	170	175	573	141.62	6	958	820	185	185	3.12	2.1
7.7	786.6	235.3	46.4	28.8	62.4	9.6	0.1	292.9	65.1	26.9	33.8	0.2	0.0

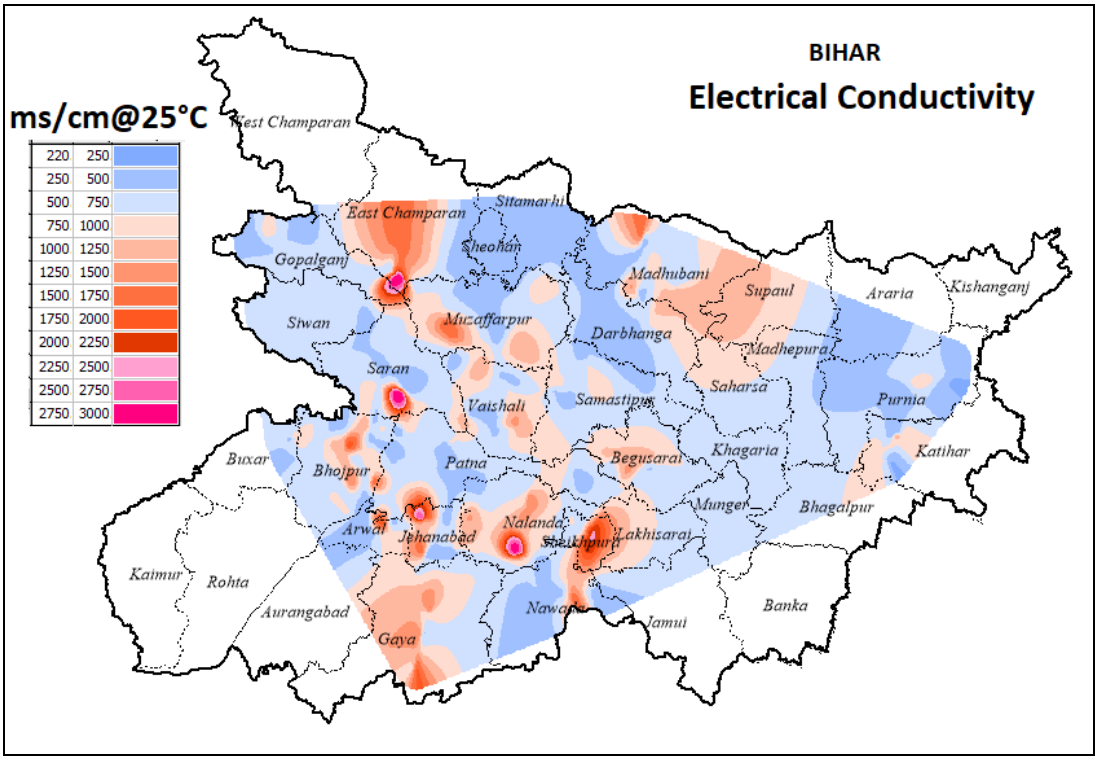
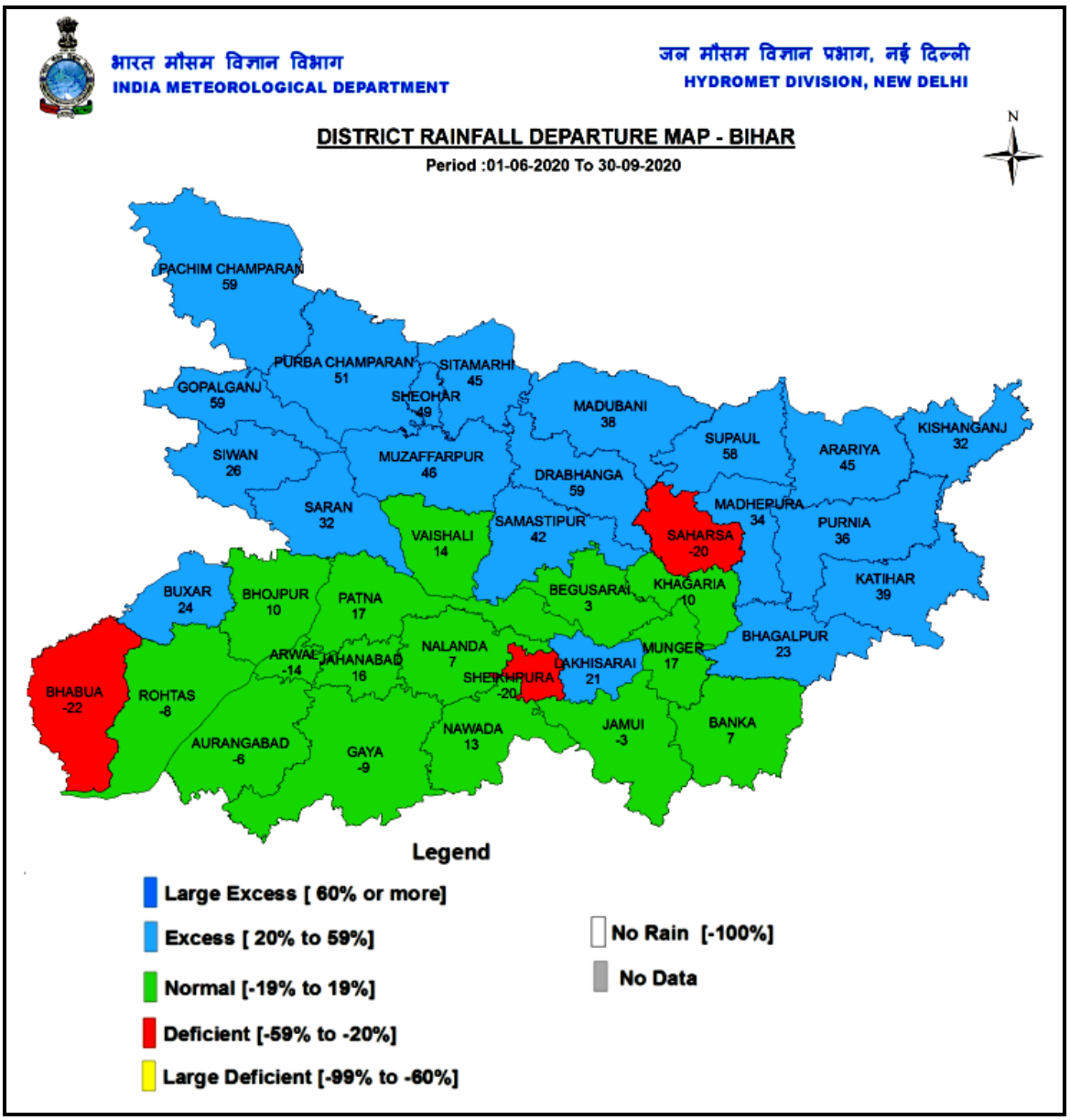


Fig. 19 *Map of Electrical Conductivity (In Micro Siemens/cm@25°C)*

The map, prepared by the interpolation of observed data, reveals that major part of the district has electrical conductivity (EC) value between 500 and 750 µs. There are some spots where elevated value of EC has been observed which may be due to some anthopogenic causes.

5. RAINFALL DATA ANALYSIS

The state with 38 districts had 1272.5 mm rainfall, 25% above normal. Three districts had deficit rainfall, with Bhabua (722.5 mm) having the highest deficit of 22%. 20 districts had Excess rain, with three districts having the highest surplus at 59%: Pachim Champaran (2024.9 mm), Supaul (1728.9 mm) and Darbhanga (1419.2 mm). Remaining 15 districts had normal rainfall. Arwal had the lowest rainfall at 642.2 mm (-14%) and Kishanganj had the highest rainfall at 2364.6 mm (+32%). It is noteworthy in the map that top half of Bihar had mostly Excess Rainfall, while generally the bottom half had normal or deficit rainfall. This possibly indicates these two halves belong to different meteorological sub divisions.



https://sandrp.in/2020/09/30/monsoon-2020-district-wise-rainfall/

During pre monsoon 2020 months also, Bihar had 182.5 mm, 123% above normal rains. Range was from 55.6 mm in Arwal district to 417.2 mm in Purnia.

6. TREND ANALYSIS DURING PRE AND POST MONSOON

Trend of the ground water level for the last ten year (2011-2020) 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 – III. It has been observed from long term water level trend data that more than 50% NHS wells have shown falling trend in 10 districts in premonsoon period and 18 districts in Postmonsoon period.

Depth to Water Level (m bgl) in various seasons:- 2020-21

STATE : BIHAR

District	Location	May 2020	Aug. 2020	Nov. 2020	Jan. 2021
Araria	Araria			4.98	4.06
Araria	Bathnaha 1			3.62	3.47
Araria	Bhargama			4.26	2.8
Araria	Haripur			3.12	2.32
Araria	Jokihat1			3.02	2.55
Araria	Matiyari			3.1	3.32
Araria	Palasi			3.82	2.34
Araria	Raniganj			2.92	3.2
Aurangabad	Aurangabad		0.97	1.72	1.62
Aurangabad	Barun		3.18	11.55	10.3
Aurangabad	Daudnagar		2.04	4.75	4.38
Aurangabad	Deo1			2.9	3.42
Aurangabad	Deohara_goh		7.73	9.82	9.48
Aurangabad	Dhanibar			4.9	
Aurangabad	Dhobi Tola_Goh		2.31	4.27	4.48
Aurangabad	Etwan		2.03	3.62	2.94
Aurangabad	Madanpur			7.5	
Aurangabad	Mahauli			4.53	4.68
Aurangabad	Nabinagar dbib			Water logged	
Aurangabad	Narari Kala			11.5	10.87
Aurangabad	Obra			5.46	
Aurangabad	Pandrawan			2.42	
Aurangabad	Pataya		2.02	5.02	2.61
Aurangabad	Tineri Morh		1.1	3.92	4.72
Banka	Banka ps			3.5	4.15
Banka	Barahat			3.32	4.03
Banka	Baunsi			4.66	4.95
Banka	Chandan			3.61	4.2
Banka	English More			2.75	2.85
Banka	Fulidumer			4.93	5.3
Banka	Katoria			4.57	6.02
Banka	Kharharia				6.02
Banka	Mirjapur			2.75	4.1
Banka	Panjwara			6.95	6.95
Banka	Rajaun ps			5.93	8.3
Banka	Rampur				3.8
Banka	Sambhuganj			3.52	5.5
Banka	Tinmurty			3.08	
Begusarai	Aghara		9.2	4.19	5.53
Begusarai	Badalpura		7.8	5.22	7.09
Begusarai	Badi Balia	6.7	5.83	4.81	6.3
Begusarai	Bagrash		6.25	4.53	6
Begusarai	Bakhari_salauna		5.98	3.57	5.04
Begusarai	Baraun mile		4.3	2.4	2.95
Begusarai	Bariarpur	7.1	5.02	3.81	5.32
Begusarai	Barieghu	8.4	5.32	4.63	6.2
Begusarai	Begusarai	6.24	4.84	3	4.46
Begusarai	Begusarai fc_ib			2.18	3.82
Begusarai	Bintoli			4.5	
Begusarai	Cheriabariarpur			3.35	4.11

Begusarai	Chhoti Balia	9.2		3	5.49
Begusarai	Dariarpur			4.71	7.2
Begusarai	Gopalpur	5.6		2.81	4.26
Begusarai	Haridia	5.34		2.21	3.81
Begusarai	Harpur		4.68	1.83	3.22
Begusarai	Heera Tola	8.9	6.2	6.17	7.87
Begusarai	Kaithma	8.6	7.6	4.03	5.37
Begusarai	Kumbhidera		5.85	2.27	2.9
Begusarai	Kumharson			4.26	5.75
Begusarai	Lakho		6.33	1.58	4.03
Begusarai	Laxminia			4	5.5
Begusarai	Manjaul			2.9	3.2
Begusarai	Matihani	7.6	5.21	5.73	6.88
Begusarai	Mohanpur Usrai			4.03	5.7
Begusarai	Naya Nagar Dularpur		2.28	2.24	4.2
Begusarai	New Jafar Nagar			3	4.53
Begusarai	Parihara			3.85	5.3
Begusarai	Peernagar			4.63	6
Begusarai	Pokharia			3.06	3.77
Begusarai	Raghunathpur		6.2	5.26	6.9
Begusarai	Rahatpur		4.34	3.68	5.4
Begusarai	Sabdalpur			6.46	8.07
Begusarai	Simri		5.2	3.31	4.15
Begusarai	Teghra	8.3	4.5	6.13	7.42
Bhagalpur	Akbarnagar stn			12.2	12.2
Bhagalpur	Bhagalpur city			12.2	13.03
Bhagalpur	Bihpur ib				8.83
Bhagalpur	Ghoga rly stn			1.97	2.62
Bhagalpur	Harchandpur			2.32	2.97
Bhagalpur	Jagadishpur				3.66
Bhagalpur	Jagnathpur			6.1	6.05
Bhagalpur	Madrauni Chowk			4.07	5.15
Bhagalpur	Marwa			3.74	4.75
Bhagalpur	Naugachhia h.s			3.47	4.85
Bhagalpur	Pirpainti db.ib			4.52	5.2
Bhagalpur	Sabaur			4.55	5.2
Bhagalpur	Shahkund db.ib			4.87	5.8
Bhagalpur	Sultanganj				6.3
Bhojpur	Bakhorapur	8.2	2.62	3.43	4.87
Bhojpur	Balua	7.79	3.1	7.42	
Bhojpur	Barahara	3.38	2.78	6.71	7.83
Bhojpur	Baruna	4.33	2.73		2.79
Bhojpur	Bihiya	7.4	2.3	2.46	3.21
Bhojpur	Birampur	7.4	2.86	5.05	6.18
Bhojpur	Chandawa	3.08	0.7	2.31	2.91
Bhojpur	Dhusaria	7.19	3.51	5.08	6.54
Bhojpur	Ekauna	8.21	3.13	7.32	8.35
Bhojpur	Farhda	4.53	1.45	3.77	5.58
Bhojpur	Garhani	5.92		2.8	4.4
Bhojpur	Giddha	4.51	3.12	3.74	5.39
Bhojpur	Guljarpur		3.96		4.9
Bhojpur	Harnath Kundi	2.33	1.84	2.07	3.24
Bhojpur	Inglishpur	6.83	4.82	3.7	5.4
Bhojpur	Jagadishpur1	4.47	0.46	1.4	4.44
Bhojpur	Jagatpur		2.19	2.64	4.79

Bhojpur	Jarawarpur Milki		2.34	3.11	4.2
Bhojpur	Karnempur			2.49	3.28
Bhojpur	Kasap			0.83	1.32
Bhojpur	Kori	5.04	2.32	3.39	4.86
Bhojpur	Kulharia	1.63		2.54	2.69
Bhojpur	Lodhipur	4.82	3.78	4.58	6.62
Bhojpur	Milki	4.71	1.69	1.87	3.67
Bhojpur	Mokhlisa	7.28	5.25	4.85	6.2
Bhojpur	Muhammadpur		5.13	4.53	6.24
Bhojpur	Nasratpur	7.57	2.91	3.73	7.08
Bhojpur	Pachrukhiya		3.46	4.43	6.15
Bhojpur	Pauna	4.72	1.88	2.96	4.2
Bhojpur	Pirro		3.82		5.12
Bhojpur	Sakkadi			4.87	6.88
Bhojpur	Sandesh	4.12	0.86	1.38	1.92
Bhojpur	Sasaram Chota	4.34	2.53	2.86	3.69
Bhojpur	Simariya	6.79	2.92	4.48	6
Bhojpur	Songhata		6.19	4.52	5.95
Bhojpur	Udwantnagar	2.76	0.84	1.41	1.88
Buxar	Bagen Bazar			7.6	7.6
Buxar	Barhampur	4.15	1.72	3.6	5.52
Buxar	Barka Rajpur			4.03	5.04
Buxar	Buxar(SSA)			4.56	5.05
Buxar	Chausa			1.38	1.66
Buxar	Churamanpur DW			7.98	8.4
Buxar	Danikutia			2	2.52
Buxar	Dudharchak			7.04	8.26
Buxar	Dumraon				16.2
Buxar	Dumri			2.26	3.34
Buxar	Durasan			4.54	5.58
Buxar	Hathilpur		3.57	3.77	4.93
Buxar	Jugia Dera	6.24		4.5	
Buxar	Karathar			4.3	5.48
Buxar	Khochariwan				4.24
Buxar	Kritpur			1.16	1.98
Buxar	Manikpur			5.8	9.79
Buxar	Mharajgunj	7.63	1.03	11.33	2.78
Buxar	Mishrvalia			1.33	2.41
Buxar	Neazipur			5.64	7.02
Buxar	Raghunathpur		2.63	5.44	9.2
Buxar	Rajpur				1.04
Buxar	Sohiar			4.49	5.72
Buxar	Thodagaon			10.75	10.75
Darbhanga	Bahera		0.85	1.8	2.87
Darbhanga	Baheri1		0.68	1.38	1.96
Darbhanga	Bithauli		2.12	2.49	2.56
Darbhanga	Darbhanga			1.32	1.5
Darbhanga	Jorja		2.12	2.57	3.05
Darbhanga	Keoti		1.27	1.2	2.15
Darbhanga	Pouram		1.34	1.88	2.42
Darbhanga	Rustampur			0.25	1.32
Darbhanga	Sakari1		1.37	1.42	2.6
Darbhanga	Simri (bithauli)		0.75	1.38	2.4
Gaya	Akauna		0.97	1.85	3.65
Gaya	Banke Bazar		2.34	3.22	4.04

Gaya	Baraila More				3.53
Gaya	Baseta		1	1.83	2.77
Gaya	Bhadeya	4.6	1.37	2.65	4.14
Gaya	Bitho Sharif 1	8.58	3.1	6.65	
Gaya	Bodh Gaya			3.4	
Gaya	Chand Chowra Chowk	5.53	4.43	4.36	
Gaya	Dangra More	5.35	2.31	3.96	4.6
Gaya	Dobhi	5	2.6	3.7	5.16
Gaya	Fatehpur		3.2	4.3	5.21
Gaya	Guraru		2.15	2.35	
Gaya	Konch		6.5	5.81	
Gaya	Magra		0.6	2.52	3.52
Gaya	Manpur				
Gaya	Paligaon				
Gaya	Raghunath Khap		1.28	2.43	3.81
Gaya	Ram Kund	4.99	4.03	5.02	
Gaya	Sangat Gali	4.05	5.7	5.98	
Gaya	Tekari	5.18	4.74	4.55	
Gaya	Wazirganj		2	2.1	2.71
Gopalganj	Bangra		1.51	1.84	2.62
Gopalganj	Bangra Deoria			2.97	3.13
Gopalganj	Barauli			1.4	2.52
Gopalganj	Bhojpurwa	3.02	1.02	15	2.4
Gopalganj	Bhore			2.55	2.98
Gopalganj	Bishambarpur				3.16
Gopalganj	Hathua1	1.98	1.53	2.35	2.41
Gopalganj	Jalalpur2			2.28	2.44
Gopalganj	Jamunaha	3.59	2.11	3.58	4.06
Gopalganj	Katiya	3.98	1.92	3.04	3.79
Gopalganj	Kuchaikot	2.03	1.48	1.5	1.7
Gopalganj	Lachchwar		0.97	2.31	2.61
Gopalganj	Lala Pachmawa			2.74	3.02
Gopalganj	Manjhwa1			2.08	2.43
Gopalganj	Manjwalia	3.16	1.05	2.34	2.8
Gopalganj	Misirbatha1			3.35	3.41
Gopalganj	Nunachapra		1.17	1.81	1.73
Gopalganj	Phulwariya			2.51	2.51
Gopalganj	Rampur2	1.44	0.83	1.55	1.26
Gopalganj	Turkaha		0.26	0.8	1.02
Gopalganj	Yadavpur Dubeytola			2.12	1.47
Jamui	Aghara			5.53	6.75
Jamui	Ambedkar Nagar			7.25	5.7
Jamui	Batia1			12.03	12.25
Jamui	Chakai			4.07	5.55
Jamui	Chandramanita			3.76	4.35
Jamui	Chandwari			14.5	14.5
Jamui	Gidhaur O			8.6	3.25
Jamui	Harna				6.1
Jamui	Jamui			8.85	9.8
Jamui	Lalmatia			3.57	3.45
Jamui	Laxmipur			2.27	3.6
Jamui	Manjhwe			3.11	3.07
Jamui	Purna Khaira			2.68	3
Jamui	Sikandra			5.31	2.46
Jamui	Sono			4.95	4.66

Jamui	Tarakhakhar			9.82	9.95
Jehanabad	Alubikha	4.27	1.84		2.19
Arwal	Arwal1	5.575	3.61	5.58	5.85
Arwal	Bairbigha	5.67	3.32	4.8	4.99
Banka	Bansi Surajpur	2.29	1.15	3.36	1.92
Jehanabad	Dholakpur	5	2.29	4.22	2.78
Arwal	Dirpal Bigha	2.9	1.14	4.32	3.23
Jehanabad	Gaurakhini	7.53	4.51	5.6	5.25
Jehanabad	Ghoshi				3.81
Jehanabad	Hulasganj	5.48	2.29	4.57	4.06
Arwal	Imamganj	5.33	2.18	3.87	4.05
Jehanabad	Jahanabad hosp.				1.88
Arwal	Jhunathi	5.39	3.46	5.15	4.77
Jehanabad	Kako	7.3	3.86	4.13	4
Arwal	Kinjer	6.58	4.9	7.17	6.02
Arwal	Kurtha bdo	2.87	1.33	2.77	1.11
Jehanabad	Lakhwar	4.29	1.59	2.47	3.02
Arwal	Madhubani	4.77	2.46	4.45	3.7
Jehanabad	Makhdumpur	4.68	2.67	3.8	3.54
Jehanabad	Teni Bigha	1.83	1.05	2.04	2.47
Kaimur	Adhaura				4.02
Kaimur	Bandipur			3.85	
Kaimur	Bevnaliya			4.23	7.33
Kaimur	Bhabhua			12.3	12.3
Kaimur	Chainpur			4.54	9.33
Kaimur	Chand in p.s.			1.37	2.86
Kaimur	Karmanasa			3.34	5.64
Kaimur	Khariava			2.84	9.3
Kaimur	Mohania				6.83
Kaimur	Nuawan			5.62	11.2
Kaimur	Saraiya			8.5	9.8
Kaimur	Tori f.ck.post			6.52	7.44
Katihar	Barari-1				4.35
Katihar	Basantpur				3.48
Katihar	Bastaul1			3.58	3.35
Katihar	Dumaria				4.78
Katihar	Hafla1			3.32	2.73
Katihar	Kadwa			3.66	4.75
Katihar	Katihar			4.4	3.5
Katihar	Khiria			3.9	3.93
Katihar	Korha			3.82	3.65
Katihar	Kursela			4.7	6
Katihar	Mahendrapur			3.76	4
Katihar	Manihari			4.37	4.38
Katihar	Narahaiya				
Katihar	Paranpur			3.23	3.4
Katihar	Sonauli			3.3	3.25
Khagaria	Basantpur			1.73	4.5
Khagaria	Chautham			3.18	4.76
Khagaria	Dewri			1.18	1.33
Khagaria	Durgapur			5.47	7.27
Khagaria	Gandhinagar			2	3.53
Khagaria	Gangaut			5.27	6.8
Khagaria	Ismailpur			4.6	6.03
Khagaria	Jamalpur			1.31	1.95

Khagaria	Kasimpur			3.86	6.25
Khagaria	Khagaria			4.85	6.72
Khagaria	Labhgaon			5.4	7
Khagaria	Maheshkhunt _Lohiya Chowk			3.81	4.37
Khagaria	Maheshkhunt 1			2.2	5.53
Khagaria	Maheshkunt			3.33	4.09
Khagaria	Mohaddipur			4.41	5.8
Khagaria	Pirnasara			3.37	4.27
Khagaria	Ranko			4.35	5.9
Khagaria	Sabalpur			4.75	
Khagaria	Sonhauli			5.57	7.2
Kishanganj	Bahadurganj			2.62	8.72
Kishanganj	Bahadurganj B			3.1	3.25
Kishanganj	Gunsagar			4.11	2.7
Kishanganj	Kaswa Kaliganj			2.82	2.09
Kishanganj	Kishanganj			4.62	2.96
Kishanganj	Kochadhamin			3.8	3.2
Kishanganj	Teragachhi			3.82	3.42
Kishanganj	Thakurganj			9.62	9.98
Lakhisarai	Arma			2.1	3.16
Lakhisarai	Barhaiya			7.03	7.9
Lakhisarai	Dariyapur			5.14	8.11
Lakhisarai	Kajra			2.8	3.33
Lakhisarai	Kiul_1			2.15	2.15
Lakhisarai	Lakhisarai			9.42	9.6
Lakhisarai	Rishi Paharpur			5.12	7.02
Lakhisarai	Saidpur			3.57	4.06
Lakhisarai	Surajgarha1			2.6	3.71
Madhepura	Abhiyatola			3.51	4.65
Madhepura	Barahari			2.92	3.3
Madhepura	Bhimpura			2.53	3.24
Madhepura	Chausa1			2.88	3.79
Madhepura	Ganeshpur			1.75	2.28
Madhepura	Gaushala Chowk			3.8	6.4
Madhepura	Gwalpara			2.51	
Madhepura	Hatkora bazar			2.49	3.51
Madhepura	Jiwachhapur			3.47	3.26
Madhepura	Kusthan			3.01	3.68
Madhepura	Madhepura			3.65	4.82
Madhepura	Murliganj			2.01	2.46
Madhepura	Rajui Rajni			2.52	3.16
Madhepura	Rampur			3.26	3.76
Madhepura	Singeswar			4.05	4.16
Madhepura	Surajganj			1.86	2.42
Madhepura	Uda Kishanganj			3.5	4.04
Madhubani	Ambedkar Nagar			1.01	1.54
Madhubani	Babubarhi			0.6	0.78
Madhubani	Baurahar Chowk			2.42	2.9
Madhubani	Benipatti			0.78	0.95
Madhubani	Bentadih	2.87		1.63	2.32
Madhubani	Bhawanipur	3.95		3.46	4.63
Madhubani	Bideshwar Asthan	1.65		3.52	4.22
Madhubani	Dhakjari			1.93	2.31
Madhubani	Harlakhi			1.31	1.86
Madhubani	Harri	4.07		2.6	2.4

Madhubani	Jaynagar			1.42	2.08
Madhubani	Jhanjharpur			0.55	0.5
Madhubani	Jogiya			1.68	2.6
Madhubani	Kapasia	1.09		1.05	1.57
Madhubani	Kapileshwar	1.7		2.29	2.68
Madhubani	Karmauli	2.02		2.83	3.55
Madhubani	Karmnali	2.39		2.83	3.55
Madhubani	Khajauli			1.07	1.71
Madhubani	Madhubani			1.4	1.7
Madhubani	Narar	0.62		1.27	1.47
Madhubani	Pandaul	4.27		1.7	2.86
Madhubani	Pariharpur			2.44	2.98
Madhubani	Phulparas1			1.1	1.25
Madhubani	Shambhuar	4.75		2.15	2.83
Madhubani	Siswar			1.95	2.45
Madhubani	Thantola	1.76		2.08	2.71
Munger	Asarganj			3.54	4
Munger	Bariarpur			5.05	6.1
Munger	Gangta Morh			5.03	5.8
Munger	Gobadda			3.53	2.48
Munger	Havelikhargpur			3.58	2.92
Munger	Jamalpur1			7.37	7.3
Munger	Purabsarai			3.7	4.1
Munger	Rampur2			2.64	3
Munger	Sangrampur				4.12
Munger	Singhiya chawk			3.73	4.12
Munger	Tarapur			3.43	4.25
Muzaffarpur	Aurai		0.04	0.36	1.4
Muzaffarpur	Barkurwa		1.49		3.38
Muzaffarpur	Bhagwanpur Chowk		0.1	4.51	0.47
Muzaffarpur	Bochaha		2.82	3.19	4.3
Muzaffarpur	Daha Chhapra		1.42	1.71	3
Muzaffarpur	Dewaria	3.42	0.86	1.38	2.7
Muzaffarpur	Dholi		3.33	2.8	3.01
Muzaffarpur	Digra		1.04	1.34	2.95
Muzaffarpur	Gargaliya		0.44	1.69	2.95
Muzaffarpur	Jaffarpur	3.33	2.38	2.58	1.52
Muzaffarpur	Japaha		1.87	3.46	3.44
Muzaffarpur	Katra1		2.23	3.02	3.38
Muzaffarpur	Mahammadpur Balmi	4.21	1.27	1.92	2.45
Muzaffarpur	Mahantmanihari		1.19	1.51	
Muzaffarpur	Muzaffarpur		0.27	4.23	2.8
Muzaffarpur	Paro	2.58	1.11	2.09	2.66
Muzaffarpur	Parwalpatti Barauna	3.72	1.02	1.75	3.04
Muzaffarpur	Rajkhand		1.73	2.49	2.77
Muzaffarpur	Rajwara	4.08	1.44	2.59	3.03
Muzaffarpur	Ramnagar		1.51	2.41	3.14
Muzaffarpur	Sahebganj			7.2	2.9
Muzaffarpur	Sakri chatti		1.62	2.01	3
Muzaffarpur	Seho		0.99	2.14	2.76
Muzaffarpur	Shukrahat		1.49	2.5	3.9
Muzaffarpur	Surfuddinpur		1.39	1.96	2.9
Muzaffarpur	Wazitpur	3.12	1.31	2.41	2.57
Nalanda	Ankuri Bazar		6.5	5.56	
Nalanda	Asthwan	2.17	1.01	1.45	2.1

Nalanda	B Sharif Rly Stn		0.19	0.9	8.92
Nalanda	Bhathar	3.59	2.01	1.59	
Nalanda	Bhui		9.06	5.3	5.66
Nalanda	Biharsharif	0.6	2.21	2.05	2.61
Nalanda	Chandi	4.82	2.79	2.58	3.01
Nalanda	Daudpur		5.45	5.14	5.91
Nalanda	Doiya		4.35	4.3	4.86
Nalanda	Ekangarsarai	3.6	3.27	2.9	3.19
Nalanda	Giriak		5.5	4.9	5.5
Nalanda	Harnaut				
Nalanda	Harnaut1	0.9	0.65	1.11	2.31
Nalanda	Heganpura	8.2	9.1	6.72	7.84
Nalanda	Hilsa		2.27	2.36	3.2
Nalanda	Islampur		1.79	1.9	
Nalanda	Jakhaur		3.6	4.29	5.56
Nalanda	Jangipur	4.9	2.9	1.5	2.36
Nalanda	Karaiparsurai	2.51	0.85	1.67	1.96
Nalanda	Kundalpur		7.48	8.5	8.76
Nalanda	Maghra	3.78	2.9	3.11	3.68
Nalanda	Muraura	3.05	1.55	1.93	2.36
Nalanda	Nagarnausa	5.3	3.17	3.15	
Nalanda	Nalanda		7.5	7.5	7.5
Nalanda	Nirpur		9	5.82	6.59
Nalanda	Nischalganj		5.51	5.51	5.51
Nalanda	Paparnhosa		4.16	3.03	3.13
Nalanda	Parwalpur	4.8	4.12	4.08	4.65
Nalanda	Parwalpur 1	4.2	4.1	4.08	4.42
Nalanda	Pawapuri	3.96	3	3.22	3.7
Nalanda	Pilkhi			1.72	3.46
Nalanda	Pilkhi 1		2.04		
Nalanda	Rajgir	7.12	5.28	4.85	6.11
Nalanda	Ranabigha	8	5.2	4.68	5.48
Nalanda	Sare	8.52	4.85	3	4.06
Nalanda	Sarmera	6.53	4.57	3.73	5.61
Nawada	Shahpur Morh				
Nalanda	Sherpur		3.03	1.7	1.86
Nalanda	Silao	5.12	5	3.9	4.32
Nalanda	Sithaura	2	0.62	0.64	0.73
Nalanda	Sohdh		4	2.52	3.26
Nalanda	Vena	6.21	2.68	3.06	4.46
Nawada	Bishunpur			2.95	3.74
Nawada	Dopata				
Nawada	Garhpar		3.96	3.1	
Nawada	Gonama				3.27
Nawada	Hisua		5.25	4.3	5.33
Nawada	Kawakol ashram		11	6.55	6.72
Nawada	Khanwa		2.71	3.11	3.92
Nawada	Meskaur				
Nawada	Nawabganj		0.77	1.57	1.68
Nawada	Nawada2		7.98	5.9	7.12
Nawada	Pakribrawan Pond	7.47	6.1	5.5	6.7
Nawada	Roh1	3.2	2.2	2.46	3.58
Nawada	Rupau	6.7	3.87	3.1	6.1
Nawada	Shahpur Morh		1.3	1.7	2.13
Nawada	Tungi		2.19	4.55	5.2

Nawada	Warshaliganj	1.8	1.27	1.5	1.76
West Champaran	Bagaha			3.12	4.1
West Champaran	Banspur pipra			3.27	
West Champaran	Belwa			2.23	2.69
West Champaran	Chanpatia			3.55	4.5
West Champaran	Gurwalia			2.66	3.09
West Champaran	Harnatanr			2.69	3.29
West Champaran	Korigawa Chowk			1.52	
West Champaran	Lauria			3.04	3.68
West Champaran	Mangalpur			3.07	3.96
West Champaran	Naurangia			2.48	3.3
West Champaran	Shishwania			2.82	3.85
West Champaran	Taulaha			2.78	3.18
West Champaran	Valmikinagar			2.5	2.2
Patna	Agwanpur	2.72	0.24		
Patna	Amhara	1.15	0.94	1.82	1.42
Patna	Bakhtiarpur	8.78	2.76	11.47	
Patna	Bali Pakar	3.6	0.93		3.42
Patna	Barh1	1.7	0.12		
Patna	Bharatpura	1.69	0.87		0.96
Patna	Bishambharpur_NHS	1.97	0.5	1.84	1.55
Patna	Daniyawan	7.24	2.05	10.4	0.78
Patna	Darbeshpur_NHS	7.5	3.2		6.57
Patna	Deokali	7.94	1.01		5.73
Patna	Dina Bigha_nhs		3.62	3.3	4.25
Patna	Dulhin Bazar	5.15	0.84		3.59
Patna	Etwarpur	2.39			1.52
Patna	Faridpur_nhs	2.28	0.84		3.73
Patna	Fatuha	7.23	1.47	7.52	
Patna	GoptalNHS	2.3	0.46		1.82
Patna	Gyaspur(purvitola)	2.54	1.23	1.94	1.44
Patna	Hulas Chak				
Patna	Khaspur	7.64	2.98	5.57	6.61
Patna	Khazpura_nhs	6.75	4.83		7.99
Patna	Lalbegam		2.09	3.75	4.5
Patna	Maner	2.44	0.9	2.29	2.51
Patna	Maranchi	6.78	1.7	6.53	
Patna	Mariyawa	4.25	1.03	2.41	2.28
Patna	Mithapur_NHS	0.54	0.78		2.26
Patna	Mokama	3.81	1.25	2.67	
Patna	Nagwa_nhs	2.62	1.04	2.3	
Patna	Nima Halt	6.68	3.83	2.25	4.79
Patna	Noniatola	5.72	1.67		
Patna	Parsa Bazar_nhs	2.05	0.2		2.96
Patna	Patna-City	1.95	1.83		
Patna	Raghopur		5.03		3.99
Patna	Rajpura	8.92	2.28		
Patna	Shahri	3	0.8		
Patna	Snehitola	3.32	1.42		2.88
East Champaran	Bairiya Bazar			3.72	4.05
East Champaran	Belai			3.3	3.16
East Champaran	Bhakatiy Tola			3.37	3.95
East Champaran	Bishunpur Matiyarwan			1.42	3.2
East Champaran	Chakia1			0.38	2.15
East Champaran	Chatia		0.52	3.52	2.18

East Champaran	Chhapwa			6.27	
East Champaran	Chhauradanu		1.26	7.09	
East Champaran	Chiraiya		1.3	2.08	
East Champaran	Dharampur		1.34	1.96	3.4
East Champaran	Dipau		1.33	1.4	1.98
East Champaran	Dubey Tola		1.52	2.32	2.27
East Champaran	Dumaria		1.86	3.24	
East Champaran	Ghorashan		1.39	2.52	2.62
East Champaran	Gobindganj		1.66	0.79	1.85
East Champaran	Husaini		1.59	1.81	2.85
East Champaran	Kizerpura	3.56	1.32	3.1	3.6
East Champaran	Lakhwara			1.81	1.5
East Champaran	Lala Chapra	3.36	2.3	1.59	2.75
East Champaran	Mohabbatpur			2.41	
East Champaran	Motihari			2.9	3.6
East Champaran	Murarpur				3.2
East Champaran	Nawada1			2.57	8.92
East Champaran	Patahi			2.62	
East Champaran	Radia			1.35	2.15
East Champaran	Raghunathpur			1.56	3.55
East Champaran	Rajpur	2.71	0.9	1.92	3.25
East Champaran	Rampur Kajuria				3.21
East Champaran	Raxaul			3.29	3.52
East Champaran	Sheoraha			1.46	3.8
East Champaran	Shyampur			3.26	4.95
East Champaran	Uttari Gavandra			2.01	2.14
Purnia	Amour			5.03	5.05
Purnia	Amri Kukran E			3.09	3.49
Purnia	Amri Kukran W			4.46	3.8
Purnia	Baisi2			3.38	
Purnia	Banmankhi			3.6	3.07
Purnia	Bansbari				
Purnia	Barsoni			3.8	3.53
Purnia	Budhia Gola			3.6	3.27
Purnia	Chadia				
Purnia	Dargaha			2.64	2.93
Purnia	Dhamdaha				4.36
Purnia	Jalalgarh			3.13	3.63
Purnia	Kajha			2.62	2.43
Purnia	Kasba			5.85	3.95
Purnia	Khata Hat			3.34	2.85
Purnia	Mangujan			4.06	4.04
Purnia	Purnia			2.62	2.63
Purnia	Ranipatra				3.66
Purnia	Tikapatti Chowk				3.4
Rohta	Akbarpur in bdo			9.78	10.45
Rohta	Amawan				0.87
Rohta	Anikut			10.6	10.5
Rohta	Auraiya				2.88
Rohta	Bahaura			1.82	
Rohta	Belthari			2.38	5.46
Rohta	Bikramganj pp			4.76	9.9
Rohta	Chenari hospita			4.96	9.65
Rohta	Dinara1			1.38	5.11
Rohta	Jahanabad (kudra)			6.55	10.35

Rohta	Kochas			1.46	5.82
Rohta	Maliabagh			3.06	6.12
Rohta	Nasriganj			8.53	11.24
Rohta	Nokha in temple				3.55
Rohta	Rajandih			1.88	4.75
Rohta	Sirisiyan			2.5	5.86
Rohta	Sasaram p.o.				8.06
Rohta	Tilothu bustand				
Saharsa	Adrahch			2.63	3.36
Saharsa	Baidnathpur			2.98	3.3
Saharsa	Bangaon			1.67	2.17
Saharsa	Basudeva			1.29	1.78
Saharsa	Chainpur			1.6	1.9
Saharsa	Chandaur Purbi			1.93	2.91
Saharsa	Jamunia			2.49	1.74
Saharsa	Niralatola			2.98	3.42
Saharsa	Panchgachhi			2.36	2.94
Saharsa	Patodi Bazar			2.5	2.8
Saharsa	Patodibazar			2.18	3.24
Saharsa	Potwaha			2.21	2.35
Saharsa	Saharsa1			2.82	3.58
Saharsa	Semribaktiarpur			2.48	3.1
Saharsa	Simri Bakhtiyarpur			2.1	3.4
Saharsa	Sonbarsaraj1			3.84	4.58
Saharsa	Tulsiyahi			1.24	2.64
Samastipur	Bajidpur		4.45	2.93	3.5
Samastipur	Basudebpur	4.37		2.44	2.8
Samastipur	Dalsinghsarai	8.4	5.2	3.2	3.38
Samastipur	Dandia Asadpur	7.2	3.85	3.06	3.76
Samastipur	Harpur Aloth	7.4	3.3	5.39	4.01
Samastipur	Jakhra		4.62	2.32	2.7
Samastipur	Jathmalpur		3.85		
Samastipur	Kalyanpur	7.34		1.6	2.51
Samastipur	Kerian		6.2	3.96	4.15
Samastipur	Kishanpur2		5.02		4.5
Samastipur	Kuseya		5.45	4.2	4.85
Samastipur	Madudabad		5.62	3.38	4.03
Samastipur	Malipur	5.4	3.3	1.52	1.9
Samastipur	Motipur	7.8	4.95	3.66	4.05
Samastipur	Patapara	3.2	3.2	0.68	1.05
Samastipur	Raghunathpur		3.82	3.33	3.77
Samastipur	Raipur			4.85	5.45
Samastipur	Rosera	9.2	4.98	4.85	5.63
Samastipur	Sarai Ranjan	7.67	5.02		5.45
Samastipur	Singhia Ghat			3.19	3.8
Samastipur	Tajpur1	7.87	4.21	4.2	4.23
Samastipur	Ujiarpur	8.34		2.9	3.32
Samastipur	Vikrampur	5.88	4.62	4.1	4.27
Saran	Ammi	6.99	1.77	2.66	3.75
Saran	Baleshara		1.45	2.9	2.31
Saran	Bishunpur		0.82	2.08	2.33
Saran	Bisunpur		1.52	3.18	3.08
Saran	Breja		1.22	3.01	3.44
Saran	Chausia		1.23	4.41	5.26
Saran	Chhapra		1.76	2.58	2.34

Saran	Chirand	5.56	1.19	3.02	3.95
Saran	Daldali Bazar A			2.62	3.38
Saran	Ekma	2.61		1.88	2.21
Saran	Garkha	6.47		3.71	4.88
Saran	Madansath			3.35	3.37
Saran	Majhanpura			4.6	5.66
Saran	Majhanpura New			1.9	2.51
Saran	Manjhi			2.55	2.88
Saran	Manjhi 2			1.95	1.98
Saran	Manopali			2.12	2.85
Saran	Marhaura	3.65	0.3	1.52	2.04
Saran	Masrakh		0.31	1.98	1.28
Saran	Masrakh1	2.3		1.55	1.36
Saran	Minapur	3.5	0.64	1.41	2.14
Saran	Nagra	5.98	1.46	3.56	3.92
Saran	Nayagaon	5.11	1.37	3.58	4.62
Saran	Rampur Kala	4.14	0.4	2.22	2.23
Saran	Saguni		2.21	3.25	3.64
Saran	Sanghar Tola			2.49	3.32
Saran	Sonepur1			0.64	0.5
Saran	Taraiya	1.89	0.43	1.95	2.11
Sheikhpura	Ambari	3.5	2.05	3.05	3.2
Sheikhpura	Ariari		2.3	5.96	6.13
Sheikhpura	Barbigha	6.4	6.02	3.77	5.03
Sheikhpura	Chewara		2.88	4.3	11.5
Sheikhpura	Ghat Kusumba				4
Sheikhpura	Keoti1	5.35	1.47	2.1	3.42
Sheikhpura	Koeri Bigha	6.4	3.61	1.91	2.86
Sheikhpura	Nemdarganj	4.1	1	1.4	1.94
Sheikhpura	Seikhpura	7.02	4.81	3.12	
Sheikhpura	Sherpar		8.4	5.01	5.47
Sheohar	Belsand		0.45	1.1	1.84
Sheohar	Purnhaiya Bazar		1.1	1.5	2.44
Sheohar	Sarbarpur		0.55	1.37	1.74
Sheohar	Sasaula Khurd			2.13	3.01
Sitamarhi	Bangaon		0.82	1.9	2.57
Sitamarhi	Bhpbhana Khaptola		1.47	1.84	2.76
Sitamarhi	Bhutahi		0.47	0.88	1.04
Sitamarhi	Dastiya	2.35	0.27	1.66	2.23
Sitamarhi	Dheng		1.15	1.06	2.49
Sitamarhi	Jagwanabazar		0.97	1.43	2.22
Sitamarhi	Karahniya Chowk	3.04	0.62	1.36	1.82
Sitamarhi	Khairwa	2.4	0.69	1.29	2
Sitamarhi	Kodwara Tola	1.2	0.82	0.9	1.42
Sitamarhi	Kushmari	5.3	0.64	1.54	2.34
Sitamarhi	Nanpur		1.21	1.05	1.36
Sitamarhi	Panaura	1.6	0.46	1.06	1.4
Sitamarhi	Pupri	3.11	1.28	1.88	2.29
Sitamarhi	Sitamarhi	4.2	0.19	2.95	2.62
Sitamarhi	Sursand		0.36	2.13	2.49
Sitamarhi	Thumba	1.22	0.36	0.7	1.3
Siwan	Andar			5.25	5.98
Siwan	Bhagar			3.65	4.75
Siwan	Chimanpur		1.33	1.74	2.74
Siwan	Chitakhal			1.22	3.49

Siwan	Darauli			5.6	6.12
Siwan	Deoria			3.29	3.29
Siwan	Guthani More			2.84	3.32
Siwan	Hardia		1.28	1.55	2.65
Siwan	Jamanpura	3.83		2	2.57
Siwan	Maharajganj			1.44	1.61
Siwan	Malmalia Chowk	2.99	1.34	2.18	2.74
Siwan	Murarpatti			2.55	3.18
Siwan	Patrehi			2.28	3.15
Siwan	Sadikpur			2.68	3.59
Siwan	Sarripatti		0.95	2.24	2.54
Siwan	Tarwara			2.1	2.73
Supaul	Andauli			2.05	2.3
Supaul	Balua 1			2.7	2.7
Supaul	Balua Bazar			2.18	2.2
Supaul	Bhasanpatti			1.19	
Supaul	Bhawanipur1			2.48	2.55
Supaul	Bhimnagar			1.59	1.7
Supaul	Birpur			2.55	2.85
Supaul	Hardi			2.94	3.3
Supaul	Jadia			2.6	3
Supaul	Kaithtola			3.35	3.6
Supaul	Kario			2.32	2.95
Supaul	Malhani			2.82	2.7
Supaul	Malhani New			2.26	2.6
Supaul	Norha			1.7	2
Supaul	Parsarma			2.45	2.7
Supaul	Pipra chowk			4.38	2.7
Supaul	Pratapganj			2.75	2.9
Supaul	Ratanpura1			1.14	2.6
Supaul	Shyam Nagar			3.39	3.7
Supaul	Supaul			2.39	2.5
Supaul	Thumba			3.19	3.6
Supaul	Tribeniganj			3.42	3.25
Vaishali	Baksama	4.92	1.66	1.92	2.37
Vaishali	Chak Sikandar	5.7	3.08	2.86	3.17
Vaishali	Chakiyai	3.98	2.09	2.48	2.78
Vaishali	Chandpur Kala		2.37	1.12	2.41
Vaishali	Chintawanpur		1.33	2.41	2.82
Vaishali	Garaul		0.72	1.95	1.5
Vaishali	Garaul Rly Stn		2.09	2.59	3.11
Vaishali	Hajipur	6.75	3.33	1.8	5.97
Vaishali	Harpur		3.02	2.86	3.4
Vaishali	Kachanpur	7.09	3.6	4.68	5.26
Vaishali	Kumharkal	5.62	1.61	2.98	3.21
Vaishali	Mahnar	6.7	2.44	3.78	4.6
Vaishali	Mahua1	4.05	1.45	2.52	2.92
Vaishali	Mathura	4.55	2.05	4.08	4.96
Vaishali	Mushari tola	5.91	1.86	2.36	2.86
Vaishali	Namidh	4.59	0.85	2.22	2.52
Vaishali	Nonepur			1.78	
Vaishali	Sahdei Bujurg	5.53	1.32	2.29	2.92
Vaishali	Sahjadpur	5.97	3.9	2.79	4.65
Vaishali	Silautha Bisnupur			3.43	3.37
Vaishali	Tariya Supaul	5.82	2.36	3.26	3.46

Vaishali	Thukaiya	4.75	1.86	2.14	2.54
Vaishali	Vaishali High School	4.16	1.19	2.15	2.21

**During May 2020 and August 2020, only limited areas have been covered by NHS monitoring due to Covid-19 pandamic.*

Annexure II

Major chemical parameters of ground water samples of HNS collected during pre-monsoon 2020 in Bihar State

SN	District	BLOCK	LOCATION	pH	EC (µs@ 25°C)	TH as ($CaCO_3$)	Ca^{2+}	Mg^{2+}	Na^{+}	K^{+}	CO_3^{2-}	HCO_3^{-}	Cl^{-}	NO_3^{-}	SO_4^{2-}	F^{-}	PO_4^{3-}	TDS
						mg/l												
1	Arwal	Arwal	Arwal	8.2	275	70	24	2	32	1.28	0	85	18	15	30	0	0	179
2	Arwal	Karpi	Bairbigha	8.24	392	140	48	5	23	1.61	0	153	21	14	21	0.3	0	255
3	Arwal	Sonbhadra	Bansi Surajpur	8.3	453	165	50	10	27	1.39	0	195	21	9	21	0	0	294
4	Arwal	Arwal	Dirpal bigha	8.23	379	145	40	11	18	1.33	0	159	14	9	23	0.2	0	246
5	Arwal	Arwal	Imamganj	7.98	1842	515	82	75	160	39.4	0	500	302	16	50	0	0	1197
6	Arwal	Ratni Faridpura	Junathi	8.27	672	245	36	38	34	2.06	0	317	25	13	24	0	0	437
7	Arwal	Kurtha	Kinjer	8.28	448	170	42	16	22	1.64	0	159	25	35	20	0.2	0	291
8	Arwal	Kurtha	Kurtha	8.11	879	210	40	27	102	3.96	0	342	64	19	41	0	0	571
9	Arwal	Arwal	Madhunan	8.28	410	145	36	13	23	1.41	0	159	18	21	20	0	0	267
10	Beguasarai	Teghra	Teghra	8.03	657	215	58	17.01	40	4	0	232	35.5	40	29	0.11	0	427
11	Beguasarai	Maithani	Maithani	7.94	630	205	46	21.87	45	8	0	232	53.25	41	15	0	0	410
12	Beguasarai	Beguasarai	Haridia	7.82	490	160	38	15.8	37	6	0	165	63.9	22	9	0.24	0	319
13	Beguasarai	Beguasarai	Barauni	7.98	1311	480	124	41.31	71	15	0	519	113.6	81	5.2	0	0	852
14	Beguasarai	Sahebpur kamal	Heera Tola	8.16	674	215	62	14.58	55	1	0	238	49.7	55	28	0.33	0	438
15	Beguasarai	Beguasarai	Mohanpur Usrai	8.23	1037	340	84	31.59	74	14	0	372	53.25	89	66	0	0	674
16	Beguasarai	Tegra	Naya Nagar, Dularpur	8.04	1024	345	90	29.16	70	11	0	464	46.15	42	29	0.26	0	666
17	Beguasarai	Sahebpur kamal	New Jafar Nagar	8.09	701	270	82	15.8	34	5	0	293	35.5	45	25	0.31	0	456
18	Bhojpur	Barahara	Balua	6.2	404	180	64	5	7	1.28	0	92	11	43	68	0.03	0	263
19	Bhojpur	Barahara	Barahara	6.13	617	230	70	13	35	1.37	0	134	25	78	92	0.02	0	401
20	Bhojpur	Agion	Baruna	5.93	583	245	76	13	19	1.43	0	128	32	51	89	0.04	0.02	379
21	Bhojpur	Bihiyan	Bihiya	6.07	671	155	42	12	72	1.4	0	165	14	72	93	0.05	0	436
22	Bhojpur	Koilwar	Birampur	5.71	381	140	42	9	23	1.33	0	110	43	11	36	0.07	0	248
23	Bhojpur	Udwantnagar	Chandawa	5.9	1873	520	136	44	165	42	0	763	60	136	110	0.02	0	1217
24	Bhojpur	Barahara	Dhusaria	5.94	570	235	62	19	23	1.33	0	171	14	53	77	0.01	0	371

SN	District	BLOCK	LOCATION	pH	EC (µs@ 25°C)	TH as ($CaCO_3$)	Ca^{2+}	Mg^{2+}	Na^{+}	K^{+}	CO_3^{2-}	HCO_3^{-}	Cl^{-}	NO_3^{-}	SO_4^{2-}	F^{-}	PO_4^{3-}	TDS
						mg/l												
25	Bhojpur	Barahara	Ekauna	5.82	410	175	56	9	15	1.3	0	146	21	29	31	0.01	0	267
26	Bhojpur	Garhani	Garhani	6.05	730	260	76	17	49	1.44	0	287	11	55	72	0.1	0.08	475
27	Bhojpur	Koilwar	Giddha	5.87	488	180	50	13	19	1	0	177	25	23	18	0.03	0	317
28	Bhojpur	Sahar	Guljarpur	5.9	795	270	64	27	53	1.33	0	323	7	69	55	0.05	0	517
29	Bhojpur	Udwantnagar	Harnath Kundi	6.01	1068	300	92	17	95	3.65	0	372	60	76	59	0.02	0	694
30	Bhojpur	Koilwar	Inglishpur	6.16	894	280	70	26	63	1.63	0	342	11	43	85	0.01	0	581
31	Bhojpur	Jagdishpur	Jagadishpur1	6.01	701	320	76	32	15	0.34	0	281	50	25	29	0.04	0.05	456
32	Bhojpur	Udwantnagar	Kasap	5.88	1232	560	170	33	23	0.47	0	506	75	76	28	0.1	0.03	801
33	Bhojpur	Sandesh	Kori	6.01	504	225	64	16	13	0.08	0	55	21	115	86	0.07	0	328
34	Bhojpur	Koilwar	Kulharia	5.96	409	160	46	11	20	0.05	0	214	7	10	13	0.06	0	266
35	Bhojpur	Koilwar	Lodhipur	5.8	944	270	42	40	87	19	0	311	89	89	35	0.03	0	614
36	Bhojpur	Arrah	Milky(Milky Dera)	6.05	430	165	60	4	23	0.07	0	195	11	13	29	0.06	0	280
37	Bhojpur	Koilwar	Mokhlisa	5.9	594	220	62	16	26	1.6	0	256	14	21	31	0.03	0	386
38	Bhojpur	Koilwar	Muhammadpur	5.78	584	195	58	12	42	2.6	0	244	21	39	23	0.02	0	380
39	Bhojpur	Koilwar	Nasratpur	5.72	894	280	78	21	68	7.9	0	268	43	125	58	0.03	0	581
40	Bhojpur	Koilwar	Pachrukhiya	5.74	778	255	76	16	57	5.3	0	232	28	88	82	0.02	0.07	506
41	Bhojpur	Sandesh	Sandesh	5.71	1627	590	168	41	89	24	0	573	114	115	86	0.03	0.12	1058
42	Bhojpur	Udwantnagar	Sasaram Chota	5.66	1054	365	84	38	64	2.9	0	299	50	114	94	0.02	0.1	685
43	Bhojpur	Barahara	Simariya	5.64	552	240	70	16	14	0.03	0	165	60	37	21	0.01	0	359
44	Bhojpur	Koilwar	Songhata	5.81	583	240	64	19	10	0.06	0	183	53	33	6.3	0.05	0	379
45	Bhojpur	Udwantnagar	Udwantnagar	5.86	610	245	70	17	15	12	0	171	64	45	26	0.05	0.03	397
46	Bhojpur	Sandesh	Pauna	5.79	1508	595	162	46	82	14	0	488	142	159	59	0.04	0.03	980
47	Buxar	Brahampur	Bagen Bazar	6.22	414	135	42	7	25	6.1	0	104	14	35.3	65.4	0.05	0	269
48	Buxar	Brahampur	Barhampur	6.1	406	150	50	6	32	1.34	0	61	43	24	85	0.02	0	264
49	Buxar	Brahampur	Jugia Dera	5.86	549	210	82	1	27	1.13	0	214	36	34	17	0.05	0	357
50	Buxar	Brahampur	Maharazganj	5.89	846	315	96	18	42	13	0	201	110	88	29	0.05	0	550
51	Buxar	Brahampur	Raghunathpur	5.81	650	175	42	17	59	17	0	183	92	32	18	0.05	0	423

SN	District	BLOCK	LOCATION	pH	EC (µs@ 25°C)	TH as ($CaCO_3$)	Ca^{2+}	Mg^{2+}	Na^{+}	K^{+}	CO_3^{2-}	HCO_3^{-}	Cl^{-}	NO_3^{-}	SO_4^{2-}	F^{-}	PO_4^{3-}	TDS
						mg/l												
52	Darbhanga	Darbhanga	Darbhanga	8.23	410	84	24	5.9	51.82	0.97	0	215	15.1	0	2.3	0.11	0	267
53	Darbhanga	Keoti	Keoti	8.2	379	108	30	8.14	33.94	2.45	0	234	3.5	2.1	2.5	0	0	246
54	Darbhanga	Sakri	Sakri	7.95	515	105	30	7.3	70.62	6.44	0	283	5.3	4.80	0	0.41	0	335
55	Darbhanga	Baheri	Bithauli	8.18	380	76	20	6.38	45.3	1.43	0	215	3.1	0	4.1	0.15	0	247
56	Darbhanga	Darbhanga	Darbhanga	8.23	410	84	24	5.9	51.82	0.97	0	215	15.1	0	2.3	0.11	0	267
57	Darbhanga	Keoti	Keoti	8.2	379	108	30	8.14	33.94	2.45	0	234	3.5	2.1	2.5	0	0	246
58	Darbhanga	Sakri	Sakri	7.95	515	105	30	7.3	70.62	6.44	0	283	5.3	4.803	0	0.41	0	335
59	Darbhanga	Baheri	Bithauli	8.18	380	76	20	6.38	45.3	1.43	0	215	3.1	0	4.1	0.15	0	247
60	E. Champaran	Kesaria	Kizerpura	7.91	505	175	22	29	33	2.44	0	238	11	18.33	19	0	0	328
61	E. Champaran	Kesaria	Lala Chapra	7.56	3120	830	44	175	314	33	0	885	412	48.93	180	0.03	0	2028
62	E. Champaran	Kalyanpur	Rajpur	7.72	1577	375	38	68	170	15	0	470	224	5.67	74	0.02	0	1025
63	Gaya	Gaya	Bithosharif	7.97	1340	415	52	63	94	13	0	384	174	45	61	0	0	871
64	Gaya	Bella	Paligaon	8.14	677	155	30	19	81	1.68	0	195	43	51	62	0.2	0	440
65	Gaya	Manpur	Manpur	8.24	900	220	30	35	102	5.31	0	262	89	59.14	48	0.31	0	585
66	Gaya	Gaya Sadar	Ram Kund	8.29	1526	435	68	64	128	18	0	519	170	52.1	42	3.12	0	992
67	Gaya	Gaya Sadar	Sangat Gali	8.23	740	115	18	17	100	21.3	0	214	89	47.3	28	0	0	481
68	Gaya	Tekari	Tekari	8.29	992	355	64	47	52	2.64	0	220	163	51.3	33	0.92	0	645
69	Gaya	Barchatti	Bhadeya	8.31	1804	590	92	98	103	11	0	397	330	57.8	55	0.12	0	1173
70	Gaya	Bodhgaya	Bodhgaya	8.27	491	115	40	4	54	2.58	0	159	36	54.7	17	0.32	0	319
71	Gaya	Gaya Sadar	Chand Chowra Chowk	8.23	765	125	30	12	101	12	0	207	85	48.5	41	0.74	0	497
72	Gaya	Mohanpur	Dangre More	8.28	623	140	18	23	70	5.8	0	214	50	51.11	21	0.52	0	405
73	Gaya	Dobhi	Dobhi	8.24	899	225	34	34	94	3.14	0	256	107	37.1	29	0.98	0	584
74	Gopalganj	Sidhwalia	Bhojpurwa	7.78	624	220	48	24	35	2.46	0	262	43	1.67	29	0	0	406
75	Gopalganj	Hathua	Hathua 1	7.79	719	285	44	43	31	3.1	0	287	71	0.98	14	0	0	467
76	Gopalganj	Katiya	Jamunaha	7.81	843	310	26	60	41	2.34	0	238	135	1.29	29	0.2	0	548
77	Gopalganj	Katiya	Katiya	8.05	354	160	32	19	6	1.76	0	171	7	1.68	14	0	0	230
78	Gopalganj	Kuchai kote	Kuchaikot	7.96	432	135	36	11	35	1.95	0	226	7	1.34	11	0	0	281

SN	District	BLOCK	LOCATION	pH	EC (µs@ 25°C)	TH as ($CaCO_3$)	Ca^{2+}	Mg^{2+}	Na^{+}	K^{+}	CO_3^{2-}	HCO_3^{-}	Cl^{-}	NO_3^{-}	SO_4^{2-}	F^{-}	PO_4^{3-}	TDS
						mg/l												
79	Gopalganj	Baikunthpur	Manjawalia	7.9	707	270	28	49	37	1.88	0	244	67	3.1	41	0.1	0	460
80	Gopalganj	Barauli	Rampur 2	7.95	447	170	24	27	22	1.82	0	232	11	2.49	9	0	0	291
81	Jehanabad	Makhdumpur	Aluabigha	8.16	336	55	10	7	50	1.5	0	31	50	13	54	0	0	218
82	Jehanabad	Hulasganj	Bholakpur_Golakpur	8.26	431	100	22	11	53	1.39	0	183	21	11	21	0	0	280
83	Jehanabad	Jehanabad	Gaurakshini	8.09	1215	305	24	60	103	40	0	360	142	46	58	0	0	790
84	Jehanabad	Ghoshi	Ghoshi	8.29	564	165	50	10	53	1.43	0	275	18	10	18	0	0	367
85	Jehanabad	Hulasganj	Hulasganj	8.12	978	235	48	28	109	9.65	0	311	82	49	60	0	0	636
86	Jehanabad	Jehanabad	Jehanabad	8.11	1809	505	34	74	154	46	0	561	213	66	65	0.3	0	1176
87	Jehanabad	Kako	Kako	7.71	403	130	30	13	31	1.36	0	67	36	39	56	0	0	262
88	Jehanabad	Ghoshi	Lakhwar	8.15	787	230	42	30	71	2.45	0	207	78	41	61	0.3	0	512
89	Jehanabad	Makhdumpur	Makhdumpur	8.03	1616	450	24	95	130	45	0	506	188	55	72	0	0	1050
90	Jehanabad	Jehanabad	Tenibigha	7.89	2840	730	34	126	268	49	0	726	454	79	97	0	0	1846
91	Katihar	Samoli	Barari-1	5.7	295	140	50	4	3	0.03	0	116	11	36	3.2	0.11	0.05	218
92	Katihar	Korha	Khiria	5.45	1256	420	126	26	85	16	0	317	78	185	99	0.05	0	280
93	Katihar	Korha	Korha	5.49	1083	390	86	43	59	8.5	0	366	82	78	53	0.01	0	790
94	Katihar	Falka	Barandi dhar	5.66	297	135	44	6	7	0.3	0	73	18	49	22	0.05	0	367
95	Katihar	Barari	Uchhla	5.63	220	90	22	9	7	0.06	0	31	32	38	0.03	0.04	0	636
96	Katihar	Korha	Tinpinia belai chowk	4.8	526	200	56	15	27	2.5	0	201	18	53	28	0.08	0	1176
97	Katihar	Barai	Dumer	4.97	793	250	64	22	63	3.3	0	275	53	85	26	0.13	0	262
98	Madhubani	Khajauli	Bentadih	7.74	612	179	30.79	24.75	50.14	4.85	0	301	45.3	1.21	7.6	0.56	0	398
99	Madhubani	Pandaul	Bhawanipur	7.16	550	213	43.91	25.15	28.4	15.69	0	271	38.4	0.47	6.9	1.28	0	358
100	Madhubani	Jhanjharpur	Bideshwar Asthan	7.02	1176	334	54	48.47	83.48	38.53	0	424	110.3	48.93	49.1	0.01	0.12	764
101	Madhubani	Andhrathari	Harri	7.65	487	110	20	14.65	56.23	1.55	0	283	10.5	0.37	2.7	1.05	0	317
102	Madhubani	Rajnagar	Kapasia	8.19	394	99	30	5.91	41.28	0.99	0	246	1.8	1.3	0	0.74	0	256
103	Madhubani	Phulparas	Kapileshwar	7.85	1065	260	30	44.9	106.37	50.7	0	498	83.7	5.77	55.8	0.81	0	692
104	Madhubani	Khajauli	Karmnali	6.51	780	112	14.6	18.42	65.38	87.6	0	246	89.4	7.44	66	2.1	0	507
105	Madhubani	Khajauli	Narar	8.37	1590	294	24.53	56.47	168.5	104	6	394	237.3	11.13	185	0.23	0	1034

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						mg/l												
106	Madhubani	Phulparas	Phulparas	8.28	352	120	26	13.37	20.83	0.44	0	203	3.4	0	0.3	0.96	0	229
107	Madhubani	Pandaul	Shambhuar	7.87	1281	310	65.16	35.71	57.28	141.62	0	664	48.5	5.32	41.4	0.01	2.1	833
108	Madhubani	Khajauli	Thantola	8.18	395	83	18	9.12	49.65	1.41	0	240	3.7	1.31	3.9	0.8	0	257
109	Muzaffarpur	Paroo	Dewaria	7.95	970	405	78	51	31	2.68	0	323	110	2.26	43	0.1	0	631
110	Muzaffarpur	Paroo	Jaffarpur (Bichala Tola)	8.06	527	190	34	26	31	2.29	0	244	21	1.5	21	0	0	343
111	Muzaffarpur	Baruraj (Motipur)	Muhammadpur Balmi	8.05	475	150	30	18	39	2.24	0	238	11	1.54	20	0	0	309
112	Muzaffarpur	Paroo	Paroo	7.85	1744	590	98	84	116	11	0	561	199	11.6	89	0	0	1134
113	Muzaffarpur	Sahebganj	Parwal Patti Baraun	8.11	648	240	6	55	37	2.32	0	317	11	14.6	28	0.05	0	421
114	Muzaffarpur	Sahebganj	Rajwara	8.01	537	185	22	32	35	2.09	0	281	7	1.95	17	0	0	349
115	Muzaffarpur	Paroo	Wazitpur/Bajidpur	7.94	468	185	40	21	18	2.54	0	195	21	1.81	39	0	0	304
116	Muzaffarpur	Dholi (Muraul)	Barkurwa	7.75	1669	457	62.28	73.13	133.41	46.43	0	424	215.2	83.27	101.6	0.15	0	1085
117	Muzaffarpur	Mushhari	Baghwanpur Chowk	7.61	960	370	76	43.74	33.28	22.99	0	381	45.5	25.21	57.4	0.02	0	624
118	Muzaffarpur	Bochaha	Bochaha (new well)	7.71	580	221	38.45	30.38	19.5	14.24	0	308	21.5	4.77	17	0.08	0.17	377
119	Muzaffarpur	Dholi	Dholi	7.58	653	215	26.69	36.09	35.71	3.3	0	332	28.4	0	21.7	0	0	424
120	Muzaffarpur	Dholi (Muraul)	Digra	7.53	597	229	32.37	35.89	24.36	1.34	0	344	3.4	6.78	15.6	0.39	0	388
121	Muzaffarpur	Minapur	Gargalia (Minapur)	7.37	397	170	28	24.3	5.84	5.63	0	234	2.7	0.33	0.9	0.06	0	258
122	Muzaffarpur	Mushari	Japaha	8.24	1240	315	42	51	141.26	11.7	0	240	244.6	32	27	0.14	0	806
123	Muzaffarpur	Turki	Mahant Manihari	7.29	727	211	26.85	34.93	56.14	3.32	0	332	50.8	1.5	23.2	0.3	0	473
124	Muzaffarpur	Mushahri	Patahi	8.2	561	230	24	41.27	21.99	4.77	0	252	35.5	4.7	16.7	0.29	0	365
125	Muzaffarpur	Sakra	Seho	7.24	921	390	74	49.85	21.74	3.7	0	412	44	1.69	47.5	0.40	0	599
126	Muzaffarpur	Bochaha	Shukrahat (Maidapur)	7.54	617	217	42.84	26.75	31.8	5.63	0	357	9.8	1.33	8.6	0.07	0	401
127	Muzaffarpur	Bochaha	Sarfuddin-pur	7.4	535	170	38.25	18	34.78	5.6	0	314	8	1.66	1	0.10	0	348
128	Nalanda	Neemchak	Ankuri Bazar	7.7	733	249	57	26	61	4.56	0	275	64	41.52	24	0	0	476
129	Nalanda	Asthawan	Asthawan	7.79	880	160	49	9	108	26.1	0	220	117	58.36	42	0.19	0	572
130	Nalanda	Tharthari	Bhathar	8.1	556	106	26	10	77	2.54	0	244	32	4.58	32	0.88	0	361
131	Nalanda	Bihar Sharif	Bihar Sharif (Rly Stn)	8.1	851	122	24	15	138	1.41	0	226	103	65.65	47	0.37	0	553
132	Nalanda	Chandi	Chandi	8.29	754	152	30	19	107	2.67	0	275	75	7.24	41	0.14	0	490

SN	District	BLOCK	LOCATION	pH	EC (µs@ 25°C)	TH as ($CaCO_3$)	Ca^{2+}	Mg^{2+}	Na^{+}	K^{+}	CO_3^{2-}	HCO_3^{-}	Cl^{-}	NO_3^{-}	SO_4^{2-}	F^{-}	PO_4^{3-}	TDS
						mg/l												
133	Nalanda	Ekangarsarai	Ekangarsarai	8.3	1272	154	26	22	190	37.1	0	451	103	58.32	62	0.13	0	827
134	Nalanda	Giriak	Giriak	8.27	746	216	52	21	74	1.86	0	238	67	62.63	28	0.65	0	485
135	Nalanda	Harnaut	Harnaut 1	8.25	735	205	46	22	67	1.76	0	226	92	8	35	0.94	0	478
136	Nalanda	Noorsarai	Heganpura	8.3	1367	295	60	35	146	31.9	0	305	202	54.12	80	0.85	0	889
137	Nalanda	Hilsa	Hilsa	8.26	577	130	36	10	66	1.62	0	171	78	13.25	24	0.15	0	375
138	Nalanda	Islampur	Islampur	8.25	1094	295	44	45	97	1.56	0	299	131	41.23	58	0.21	0	711
139	Nalanda	Asthawan	Jangipur	8.27	569	155	34	17	45	1.61	0	195	39	21.36	27	0.85	0	370
140	Nalanda	Hilsa	Karaiparsurai	8.23	424	105	38	2	43	1.67	0	183	28	5.12	13	0.8	0	276
141	Nalanda	Bihar Sharif	Maghra	8.3	1091	160	24	24	150	29.4	0	305	124	45.69	64	0.82	0	709
142	Nalanda	Bihar Sharif	Muraura	8.31	1148	160	38	16	166	22	0	372	128	41.63	39	0.35	0	746
143	Nalanda	Nagarnausa	Nagarnausa	8.28	604	225	36	33	33	1.66	0	183	82	5.35	22	0.15	0	393
144	Nalanda	Rajgir	Nalanda	8.29	1286	265	50	34	158	13	0	427	138	36.12	58	0.41	0	836
145	Nalanda	Ekangarsarai	Nishchalganj	8.27	758	165	40	16	89	4.39	0	305	60	8.88	30	0.54	0	493
146	Nalanda	Prawalpur	Prawalpur	8.26	997	135	20	21	135	36.1	0	384	71	41.12	40	0.23	0	648
147	Nalanda	Ekangarsarai	Prawalpur 1	8.24	2200	430	92	49	261	31	0	616	312	68.65	81	0	0	1430
148	Nalanda	Giriak	Pawapuri	8.26	868	215	36	30	87	2.48	0	342	57	47.21	23	0.87	0	564
149	Nalanda	Rajgir	Rajgir	8.25	680	260	58	28	34	1.83	0	195	71	54.36	24	0.13	0	442
150	Nalanda	Bihar Sharif	Ranabigha	8.23	1023	305	42	49	87	1.95	0	336	92	57.12	50	0.17	0	665
151	Nalanda	Asthawan	Sare	8.24	429	105	20	13	45	1.7	0	183	21	14.12	18	0	0	279
152	Nalanda	Sarmera	Sarmera	8.3	1492	450	104	46	119	14	0	439	188	55.68	65	0	0	970
153	Nalanda	Silao	Silao	8.27	2960	630	163.9	53	351	41	0	903	444	62.36	59	0.94	0	1924
154	Nalanda	Rajgir	Sithuara	8.3	4170	735	146	90	573	43	0	958	820	66.05	92	0.61	0	2711
155	Nalanda	Rahui	Vena	8.26	1429	295	50	41	161	35	0	329	245	61.23	45	0	0	929
156	Nawada	Nawada	Garhpar	8.27	449	80	30	1	65	1.57	0	128	46	25.61	24	0	0	292
157	Nawada	Kawakol	Kawakol Ashram	8.26	323	50	18	1	50	1.21	0	159	11	5.71	7	0.15	0	210
158	Nawada	Nawada	Nawada 2	8.29	506	180	58	9	28	1.46	0	256	18	5.31	10	0.23	0	329
159	Nawada	Pakribarwan	Pakribarwan	8.31	1137	185	22	32	148	19	0	256	192	54.36	31	0.25	0	739

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						mg/l												
160	Nawada	Pakribarwan	Roh	8.26	401	130	40	7	26	1.55	0	171	25	11.98	10	0	0	261
161	Nawada	Kauakol	Rupau	8.29	1628	355	80	38	185	38	0	573	167	58.34	41	0	0	1058
162	Nawada	Warshaliganj	Warshaliganj	8.27	402	110	16	17	38	2.31	0	171	18	29.14	11	0	0	261
163	Patna	Bihta	Baliapakar	7.38	1649	420	130	23	150	60	0	622	142	51	49	0	0	1072
164	Patna	Palihanj	Bharatpura	8.23	908	170	24	27	103	35.6	0	476	18	14	21	0.3	0	590
165	Patna	Dulhin bazar	Dulhin bazar	8.29	841	355	80	38	30	1.49	0	238	89	48	45	0	0	547
166	Patna	Bikram	Noniatola	8.1	980	245	58	24	104	15.1	0	348	60	51	61	0.2	0	637
167	Patna	Bikram	Andrachowki	7.5	463	205	24	35.2	13	0.49	0	234	11	1	5.2	0.112	0	301
168	Patna	Abarh	Agwanpur	7.91	518	175	42	17	33	2.91	0	252	15	0	7.5	0.257	0	337
169	Patna	Bihta	Amraha	8.05	327	135	26	17	10	1.58	0	166	9	0	3.9	0.211	0	213
170	Patna	Phulwari	Anisabad	7.82	578	215	40	27.9	22	2.07	0	301	25	0	6.1	0.27	0	376
171	Patna	Bakhtiyarpur	Bakhtiyarpur	8.23	621	155	10	31.6	57	2.94	0	332	23	0	16.6	0.09	0	404
172	Patna	Bihta	Baliapakar	8.07	654	170	36	19.4	40	37.12	0	228	48	41.3	18.1	0.17	0	425
173	Patna	barh	Barh	8.19	946	220	8	48.6	94	0.09	0	572	8	0.2	4.6	0.78	0	615
174	Patna	Bihta	Bishambharpur	8.06	560	200	38	25.5	23	2.61	0	289	10	1.4	9.9	0.28	0	364
175	Patna	Daniyawan	Daniyawan	7.95	515	190	36	24.3	20	1.19	0	295	4	0	3.1	0.36	0	335
176	Patna	Danapur	Darbeshpur	8.02	376	150	28	19.4	15	1.57	0	221	2	0	2.5	0.37	0	244
177	Patna	Punpun	Deokoli	8	464	165	32	20.7	17	1.62	0	271	6	0	4.3	0.16	0	302
178	Patna	Bikram	Dinbigha	8.1	497	205	32	30.4	9	1.07	0	320	3	0	2.2	0.3	0	323
179	Patna	Dulhinbazar	Dulhin bazar	8.16	398	160	34	18.2	12	1.02	0	197	9	3	4.4	0.14	0	259
180	Patna	Phulwari	Etwarpur	7.87	839	300	58	37.7	43	10.21	0	443	26	2.7	13.6	0.38	0	545
181	Patna	Naubatpur	Faridpur	8.05	504	200	26	32.8	19	2.09	0	283	10	0	3.3	0.40	0	328
182	Patna	Fatuha	Fatuha	8.07	655	260	16	53.5	49	2.81	0	301	39	12.8	10.1	0.11	0	426
183	Patna	Danapur	Goptal Danapur	7.99	664	255	42	36.5	22	1.95	0	381	13	5.4	6.8	0.30	0	432
184	Patna	Maner	Gyaspur	7.9	729	250	48	31.6	36	4.75	0	264	80	14.7	27.8	0.3	0	474
185	Patna	Danapur	Khaspur	8.15	416	190	34	25.5	5	1.82	0	228	3	0	2.6	0.4	0	270
186	Patna	patna sadar	Khajpura	8.08	554	205	40	25.5	19	2.87	0	338	10	0	6.7	0.33	0	360

SN	District	BLOCK	LOCATION	pH	EC (µs@ 25°C)	TH as ($CaCO_3$)	Ca^{2+}	Mg^{2+}	Na^{+}	K^{+}	CO_3^{2-}	HCO_3^{-}	Cl^{-}	NO_3^{-}	SO_4^{2-}	F^{-}	PO_4^{3-}	TDS
						mg/l												
187	Patna	Maner	Maner	8.18	1033	435	52	74.1	30	8.21	0	480	104	5	24.5	0.43	0	671
188	Patna	Maner	Maner New	7.98	986	380	54	59.5	28	6.4	0	449	52	18.5	21.5	0.49	0	641
189	Patna	Mokama	Maranchi	8.03	736	265	38	41.3	48	2.66	0	351	41	0.2	24.3	0.25	0	478
190	Patna	Bikram	Mariyawan	8.07	511	185	34	24.3	22	1.84	0	197	67	0	3.9	0.33	0	332
191	Patna	Patna Sadar	Mithapur	7.94	819	280	50	37.7	42	1.89	0	264	110	0	16.6	0.19	0	532
192	Patna	Mokama	Mokama	8.18	474	150	28	19.4	34	2.43	0	221	16	0	11.3	0.48	0	308
193	Patna	Maner	Nagwa	8.32	401	175	30	24.3	13	1.86	3	209	15	0	4.4	0.26	0	261
194	Patna	Bikram	Nonoatola	8.2	400	150	20	24.3	15	1.3	0	240	5	0	3.1	0.39	0	260
195	Patna	Phulwari	Parsa Bazar	8.11	418	140	22	20.7	25	1.93	0	252	6	0	3.4	0.35	0	272
196	Patna	Patna City	Patna City	8.06	439	190	22	32.8	22	2.82	0	240	12	0	6.6	0.14	0	285
197	Patna	Barh	Rajpura	8	509	200	36	26.7	20	1.74	0	308	9	4.5	4.9	0.50	0	331
198	Patna	Barh	Sahri	7.96	538	194	28	30.2	23	4.4	0	308	0	0	0	0	0	350
199	Patna	Naubatpur	Snehitola	8.06	590	235	40	32.8	24	1.14	0	308	13	0	0	0	0	384
200	Samastipur	Warisnagar	Basudebpur	7.71	568	198	27.09	31.63	35.12	2.26	0	277	10.1	9.56	37.8	0.25	0	369
201	Samastipur	Kalyanpur	Jakhra	7.84	335	145	38	12.15	11.78	2.09	0	166	16.9	0	15.7	0.21	0	218
202	Samastipur	Jitwarpur	Jatmalpur	7.88	1236	305	48	44.95	76.11	108.54	0	547	71.8	32.4	24.9	0.31	0	803
203	Samastipur	samastipur	Motipur	7.9	812	298	20	60.3	39.1	4.7	0	397	53.2	3.6	9.6	0.13	0	528
204	Samastipur	Warisnagar	Raghunathpur	7.18	747	180	12	36.46	69.2	8.15	0	287	39.4	45.3	41	0	0	486
205	Samastipur	Sarai Ranjan	Sarai Ranjan	7.61	416	174	30	24	31.5	2	0	224	14.9	32	2	0	0	270
206	Samastipur	Tajpur	Vikrampur	7.13	1164	435	78.43	58.02	65.23	5.2	0	289	107.5	0	161.2	0.27	0	757
207	Saran	Dighwara	Aami	7.57	839	185	14	36	94	7.1	0	323	82	2.84	24	0	0	545
208	Saran	Chapra	Chirand	7.56	858	190	50	16	96	8.3	0	360	75	1.3	19	0.3	0	558
209	Saran	Ekma	Ekma	7.69	505	150	28	19	43	1.84	0	226	11	53	7	0	0	328
210	Saran	Garkha	Garkha	7.81	330	65	22	2	41	1.73	0	159	11	1.03	14	0	0	215
211	Saran	Marhaura	Marhaura	7.71	587	195	30	29	36	1.7	0	281	14	1.3	33	0	0	382
212	Saran	Mashrakh	Mashrakh	7.79	548	150	16	27	48	2.14	0	250	28	1.1	19	0.3	0	356
213	Saran	Garkha	Minapur	7.49	3120	900	160	122	255	45	0	939	447	65.74	97	0	0	2028

SN	District	BLOCK	LOCATION	pH	EC (µs@ 25°C)	TH as ($CaCO_3$)	Ca^{2+}	Mg^{2+}	Na^{+}	K^{+}	CO_3^{2-}	HCO_3^{-}	Cl^{-}	NO_3^{-}	SO_4^{2-}	F^{-}	PO_4^{3-}	TDS
						mg/l												
214	Saran	Jalalpur	Nagra	7.84	882	345	36	62	38	1.62	0	433	21	8.91	46	0	0	573
215	Saran	Sonepur	Nayagaon	7.88	633	220	42	28	37	1.88	0	250	43	6	42	0	0	411
216	Saran	Jalalpur	Rampur Kala	7.93	496	145	26	19	41	2.13	0	220	14	15.63	30	0.2	0	322
217	Saran	Chhapra	Taraiya	7.92	522	185	18	34	28	1.75	0	281	7	2.06	15	0	0	339
218	Seikhpura	Barbigha	Ambari	8.23	634	160	40	15	70	1.33	0	250	46	21.4	20	0	0	412
219	Seikhpura	Barbigha	Barbigha	8.26	778	195	38	24	78	5.67	0	287	85	2.15	27	0.75	0	506
220	Seikhpura	Barbigha	Keoti	8.21	583	160	40	15	56	1.65	0	214	57	1.75	30	0.81	0	379
221	Seikhpura	Seikhpura	Koeri Bigha	8.22	772	170	32	22	84	8.63	0	262	71	47.81	23	0.75	0	502
222	Seikhpura	Seikhpura	Nemdarganj	8.26	719	155	12	30	81	11	0	366	28	3.78	10	0.78	0	467
223	Seikhpura	Seikhpura	Kosra (Seikhpura)	8.21	2310	465	48	84	284	43	0	854	199	69.27	71	0.35	0	1502
224	Sheohar	Tariani Chowk	Sarbarpur	8.17	370	155	20	25.52	10.89	1.4	0	203	8.3	0	3.1	0.27	0	241
225	Sheohar	Sheohar	Sasaula khurd	7.84	836	245	30	41.31	65.26	4.24	0	166	119.2	38.6	74.4	0	0	543
226	Sitamarhi	Bargania	Dheng	8.26	298	107	34	5.29	16.82	1.44	0	166	5.3	0	5	0.17	0	194
227	Sitamarhi	Sitamarhi	Karahniya	8.21	305	101	32	5	19.41	2.37	0	172	3.5	2.14	0	0.42	0	198
228	Sitamarhi	Bargania	Khairwa	8.18	318	110	30.88	7.99	26.35	3.08	0	209	1.4	0	2.1	0.22	0	207
229	Sitamarhi	Parsauni	Kodwara Tola	8.27	351	120	38.17	5.9	21.67	1.67	0	215	1.5	0	4.8	0.16	0	228
230	Sitamarhi	Riga	Kushmari	8.2	288	104	34	4.64	13.18	1.78	0	172	0.5	0	1.6	0.29	0	187
231	Sitamarhi	Sitamarhi	Panaura	8.34	323	113	35.27	6.07	18.21	1.9	6	185	1.4	1.37	3.5	0.12	0	210
232	Sitamarhi	Pupri	Pupri	8.04	355	51	14	3.89	43.2	17.1	0	215	3.1	0	1.6	0.09	0	231
233	Sitamarhi	Runni Saidpur	Sitamarhi	8.28	306	110	33.69	6.24	20.38	2.08	0	197	2.6	0	3	0.29	0	199
234	Sitamarhi	Sitamarhi	Thumba	7.68	303	105	14	17	21	1.8	0	129	17.6	9.7	10.3	0.14	0	197
235	Siwan	Basantpura	Hardia	7.87	660	280	62	30	18	1.83	0	287	43	1.44	29	0	0	429
236	Siwan	Bhagwanpur	Malmalia Chowk	7.96	409	190	32	27	4	1.8	0	201	7	1.36	19	0.1	0	266
237	Vaishali	Goraul	Baksama	7.93	481	180	20	32	26	1.69	0	238	11	1.29	22	0	0	313
238	Vaishali	Bidupur	Chak Sikandar	7.9	450	185	38	22	15	1.77	0	220	14	1.16	14	0	0	293
239	Vaishali	Mahnar (Sahdei)	Chakiyai	7.8	1056	490	58	84	16	1.59	0	384	75	34.07	61	0.2	0	686
240	Vaishali	Vaishali	Hajipur	7.95	445	175	30	24	15	1.66	0	165	18	3.97	56	0.3	0	289

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						mg/l												
241	Vaishali	Bidupur	Kachanpur	7.85	1114	255	63.91	23	129	14	0	409	75	45.13	64	0	0	724
242	Vaishali	Mahnar	Kumharkal	7.87	1175	410	82	50	56	12	0	433	89	9.41	75	0	0	764
243	Vaishali	Mahua	Mahua 1	8.03	753	210	60	15	67	3.1	0	305	43	1.88	59	0	0	489
244	Vaishali	Bidupur	Mathura	8.07	482	125	16	21	46	2.1	0	238	7	2.41	28	0.1	0	313
245	Vaishali	Patepur	Mushari Tola	7.83	757	250	48	32	56	2.06	0	366	14	1.58	41	0	0	492
246	Vaishali	Lalganj	Namidh	7.85	904	325	42	53	51	7.91	0	329	64	32.41	49	0	0	588
247	Vaishali	Sahdei Bujurg	Sahdei Bujurg	7.76	1322	320	58	43	139	16	0	451	82	71.2	107	0	0	859
248	Vaishali	Mahua	Tariya Supaul	8.04	417	145	46	7	27	2.17	0	195	11	7.92	16	0.2	0	271
249	Vaishali	Vaishali	Thukaiya	8.04	369	120	36	7	27	2.18	0	159	7	1.98	40	0.2	0	240
250	Vaishali	Vaishali	Vaishali	7.98	604	175	18	32	51	2.64	0	299	11	2.36	33	0.3	0	393
251	Vaishali	Goraul	Bhaluhia	7.3	1218	396	65.3	56.51	86.34	2.87	0	234	256.4	14.2	51.2	0.28	0	792
252	Vaishali	Goraul	Goroul	7.44	1081	358	70.87	43.96	71.02	2.78	0	357	138.6	5.04	53	0.2	0	703

Annexure III

District wise percentage of well showing Rise, fall or no significant decline trend (2011-2020) during Pre-Monsoon and Post-Monsoon Season

SN	District	Pre-monsoon (in percent)			Post-monsoon (in percent)		
		Rise	*Fall*	*No Significant trend*	*Rise*	*Fall*	*No Significant trend*
1	Araria	43	0	29	29	71	0
2	Aurangabad	20	47	33	27	73	60
3	Banka	25	67	67	33	58	67
4	Begusarai	39	17	48	83	17	65
5	Bhagalpur	43	43	36	50	43	64
6	Bhojpur	26	3	19	84	16	48
7	Buxar	25	5	20	75	25	40
8	Darbhanga	11	56	56	78	22	100
9	Gaya	23	31	31	46	38	62
10	Gopalganj	28	39	61	78	22	89
11	Jamui	20	33	47	40	60	67
12	Jehanabad & Arwal	58	25	67	42	58	75
13	Kaimur	30	50	60	50	50	70
14	Katihar	81	6	69	81	13	94
15	Khagaria	33	27	47	87	13	87
16	Kishanganj	2	1	3	0	6	5
17	Lakhisarai	14	29	14	57	43	57
18	Madhepura	46	15	62	46	46	92
19	Madhubani	58	8	46	79	21	88
20	Munger	40	30	40	40	60	70
21	Muzaffarpur	22	57	52	48	48	65
22	Nalanda	32	58	61	32	68	61
23	Nawada	20	50	40	20	80	50
24	Pashchim	25	25	42	42	58	92
25	Patna	24	59	34	28	55	45
26	Purba	33	29	54	46	54	83
27	Purnia	29	18	29	29	59	88
28	Rohtas	0	67	44	56	44	83
29	Saharsa	27	33	47	47	53	100
30	Samastipur	35	35	65	65	29	59
31	Saran	23	31	42	62	38	69
32	Seikhpura	43	43	57	71	29	71
33	Sheohar		100	100		100	100
34	Sitamarhi	50	13	38	94	6	63
35	Siwan	0	61	39	39	56	94
36	Supaul	24	43	67	33	62	95
37	Vaishali	35	0	12	12	29	0