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GOVERNMENT OF INDIA
Ministry of Jal Shakti
Department of Water Resources RD&GR
CENTRAL GROUND WATER BOARD

GROUND WATER YEAR BOOK
Annual Action Plan: 2023-24
JAMMU & KASHMIR

North Western Himalayan Region
Jammu
October 2024

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2023 – 24
JAMMU & KASHMIR

CONTRIBUTOR

Rayees Ahmad Pir Sc – B

FOREWORD

WATER is one of the essential natural resources for sustaining life on the blue planet "**Earth**". The demand for fresh/usable water has increased manifold globally due to rapid population growth, which in turn caused a change in agricultural patterns and an increase in industrial activities. To meet the demand for fresh water in various sectors, there is enormous stress on groundwater resources. This has resulted in the water level decline in many parts of the country.

Central Ground Water Board, the apex organization under the Ministry of Water Resources River Development & Ganga Rejuvenation, Government of India, monitors the behaviour of the groundwater regime through a network of 401 **Ground Water Monitoring Wells** (315 Dug wells and 86 Piezometers) spread across the country. The water level data collected from such observation wells in each state are compiled and processed, analysed present in form of a report as "Ground Water Year Book" every year.

Central Groundwater Board, North Western Himalayan Region, Jammu is monitoring the groundwater regime under various hydrogeological settings through Dug wells and Piezometers in all parts of Union Teriterry of Jammu and Kashmir four times a year (May, August, November and January). Since Kashmir valley is covered with snow during winter, hence Water level regime monitoring in month of January is not taken up. The impact of rainfall/snowfall on the groundwater regime is studied through the seasonal, annual and Decadal mean water level fluctuations and depicted with help of maps and tables besides the elaborate description.

The efforts of **Sh. Rayees Ahmad Pir Scientist – B** and other officers in bringing out this report (Groundwater Year Book- 2023- 2024) are highly appreciated I am sure that present report "Ground Water Year Book 2024" depicting the picture of behaviour of ground water regime will be of immense for all stake holders, groundwater planners and all those engaged in sustainable development and management water resources.

(M L Angurala)
Head of Office

Place: Jammu
Date: 18.10.2024

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EXECUTIVE SUMMARY

The present report discusses the regional behaviour of water levels of groundwater in the phreatic aquifers of the outer plains of the Jammu region, extending between River Ravi in the east to Munawar Tawi in the west covering parts of Jammu, Samba, and Kathua districts J&K, India. Dun Belt covers alluvium areas of Kathua Samba and Udhampur including parts of the Rajouri district. In this area, the water supply is mainly dependant on groundwater either from the springs, or shallow/ or deep aquifer systems. The groundwater also forms the main source of the surface water bodies through base flow. In this study, monitoring of groundwater levels was carried out during May, August, November 2023, and January 2024. To analyse water levels and to study fluctuation of water levels both spatially and temporally in response to groundwater recharge and/or discharge, 401 Hydrograph Network Stations (315 dug wells and 86 piezometers) are being monitored during pre-monsoon and post-monsoon periods. Further, to understand the spatiotemporal behaviour of groundwater, the groundwater level contour maps were generated using Natural Neighbourhood Interpolation methods in the GIS platform. The groundwater level maps showed that the water levels in the Kandi formation are deeper than areas in the Sirowal formation and are significantly controlled by the monsoons. In general, the groundwater levels in Jammu Region are deeper in the month of May. However, in Kashmir region may month is having shallowest water levels as compared to August and November due to non-monsoon rainfall, glacier melt and paddy cultivation. In certain places, particularly in urban and industrial areas, the groundwater levels are showing a declining trend in response to over-exploitation.

1. INTRODUCTION

Jammu and Kashmir is the northern most UT of India after Ladakh. It lies within latitudes of 32°17’ and 36°08’ N and longitudes of 73°23’ and 76°47' E. The UT has a total geographical area of 42,241 Sq. Km. The Union Territory has an international border with Pakistan in the west. The States of Punjab and Himachal Pradesh forms its southern border and the UT of Ladakh form the northern and north eastern border. Major parts of the J&K State represent high and rugged mountainous terrain. Jammu & Kashmir is divided into two administrative divisions’ viz. Kashmir Division and Jammu division. NHS monitoring is being carried out for valley parts (Alluvium area) of 7 districts in the Jammu region (Jammu, Samba, Kathua, Rajouri, Reasi, Poonch and Udhampur) and 6 districts of the Kashmir Region (Kupwara, Baramulla, Pulwama, Bandipora, Ganderbal and Srinagar). There is a total of 20 districts in J&K UT. The administrative map of the state is shown in figure 1.

The Central Ground Water Board started monitoring of groundwater regime through the All-India network of hydrograph stations from 1969 onwards. The density of observation wells increased year after year. Earlier groundwater monitoring was carried out through a network of open wells, generally dug wells for drinking purposes tapping shallow aquifers. Keeping in view the importance of future groundwater development, the network was subsequently strengthened by the construction of purpose-built piezometers. Presently in Jammu and Kashmir, a total of 315 dug wells and 86 Piezometers are being monitored for this purpose. The Central Groundwater Board, North Western Himalayan Region Jammu is monitoring water levels in observation wells in Jammu and Kashmir State four times a year viz. May (between 20th and 31st), August (between 20th and 31st), November (1st and 10th), and January (1st and 10th). Water samples from observation wells are collected once a year during May for quality testing. The water level and chemical analysis data thus collected is analysed and interpreted by GEMS and Map Info software and Groundwater Regime Monitoring Bulletin is prepared and issued seasonally with interpreted data and thematic maps depicting the groundwater scenario of J&K UT.

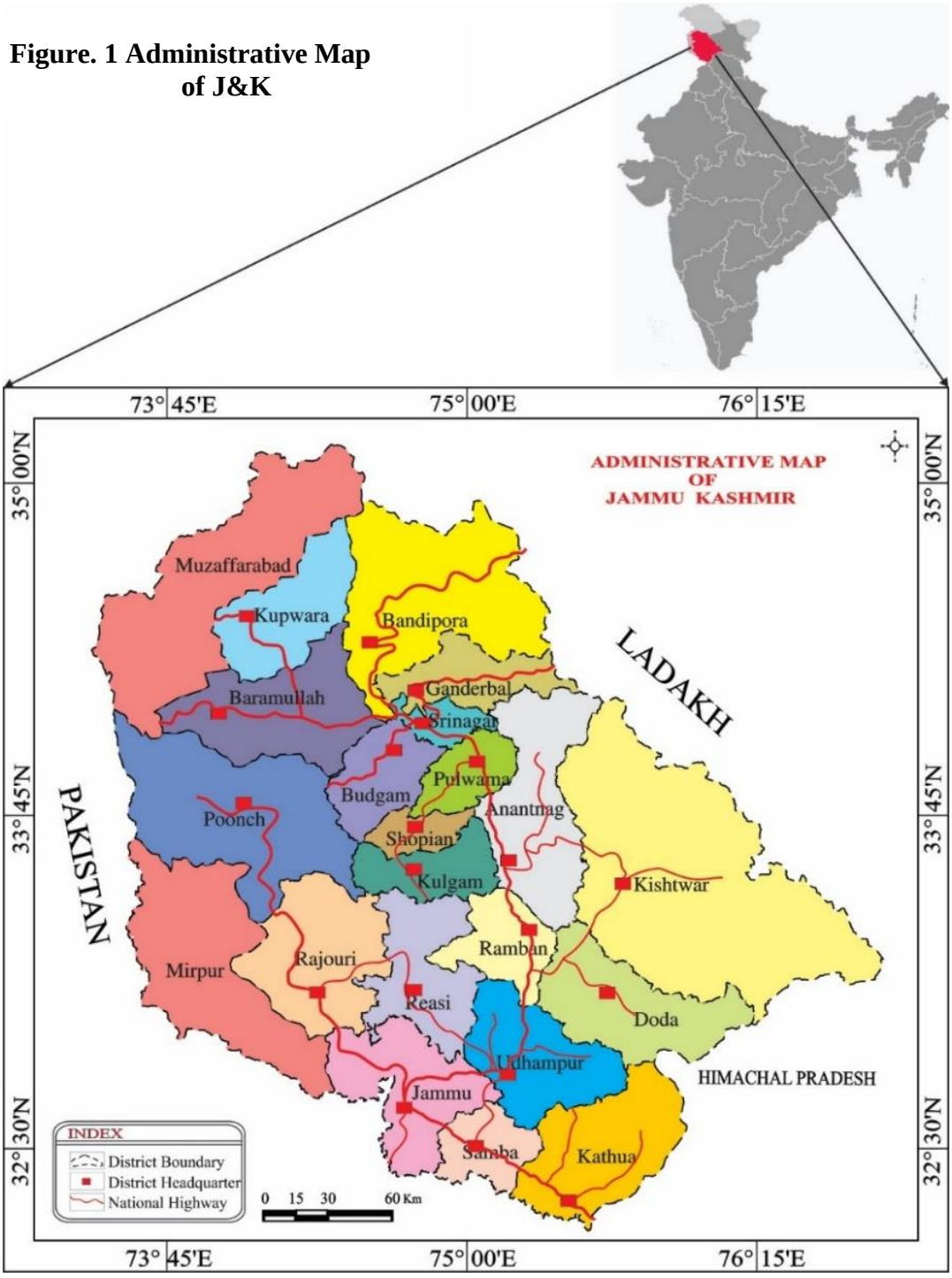
The total number of active groundwater monitoring wells is 401 (Dug Wells 315 and Piezometers 86) as on March 2024 which are located in 13 districts of J&K. Most monitoring stations fall in valley areas of these districts.

The present report discusses the regional behaviour of water levels in phreatic aquifers for the period May, August, November 2023, and January 2024 which will enable user agencies to plan development strategies. The results of chemical analysis of water samples collected in May 2023 from observation wells established by Central Groundwater Board, North Western Himalayan Region are also discussed.

The main objectives of groundwater regime monitoring in Jammu and Kashmir may be summarised as follows:

1. To study the fluctuation of water levels both spatially and temporally in response to groundwater recharge and/or discharge.
2. To evaluate changes in groundwater level with respect to the preceding year for the same period.
3. To evaluate changes in groundwater levels with respect to a long-term average water level such as the decadal mean.
4. To study the fluctuation of water level during different seasons.

Figure. 1 Administrative Map of J&K

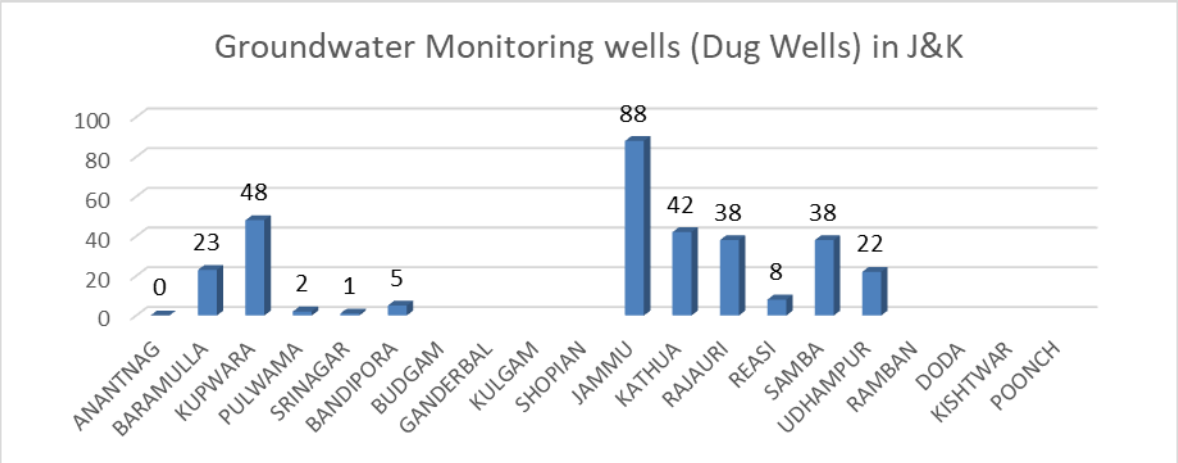


Status of Hydrograph Network Stations

In Jammu & Kashmir at present, 401 (315 dug wells and 86 piezometers) Hydrograph Network Stations are being monitored during pre-monsoon and post-monsoon periods. Out of 401 NHS 236 dug wells and 83 piezometers exist in Jammu Region and 79 dug wells and 3 piezometers are in Kashmir Region. District-wise number of hydrograph network stations as of 31.03.2024 is given in table 1A and 1B and their locations are shown in Figure 2.

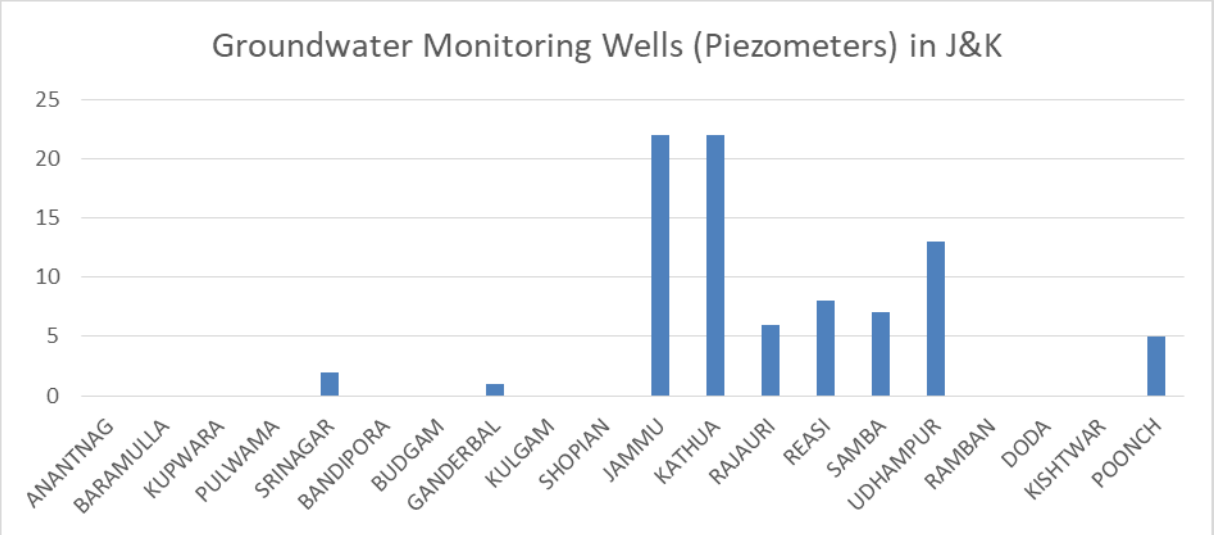
Table 1A. District-wise break-up of active Ground Water Monitoring Wells (DUG WELLS) in J&K (as on 31 March 2024)

Sl. No.	REGION	DISTRICT	Total No of Monitoring wells	Number of Active Ground Water Monitoring Wells			
				May-23	Aug-23	Nov-23	Jan-24
1	KASHMIR REGION	ANANTNAG	0	0	0	0	Monitoring not carried out due to snowfall
2		BARAMULLA	23	23	23	23	
3		KUPWARA	48	48	47	48	
4		PULWAMA	2	2	2	2	
5		SRINAGAR	1	1	1	1	
6		BANDIPORA	5	5	5	5	
7		BUDGAM	0	0	0	0	
8		GANDERBAL	0	0	0	0	
9		KULGAM	0	0	0	0	
10		SHOPIAN	0	0	0	0	
	Total		**79**	**79**	**78**	**79**	**0**
11	JAMMU REGION	JAMMU	88	85	82	84	87
12		KATHUA	42	41	41	41	34
13		RAJAURI	38	35	36	36	37
14		REASI	8	8	8	8	8
15		SAMBA	38	36	36	38	35
16		UDHAMPUR	22	22	22	22	22
17		DODA	0	0	0	0	Hilly Areas
18		KISHTWAR	0	0	0	0	
19		RAMBAN	0	0	0	0	
20		POONCH	0	0	0	0	
	Total		**236**	**227**	**225**	**229**	**223**
	TOTAL J&K		**315**	**306**	**303**	**308**	**223**



Graph 1. District-wise Groundwater Monitoring Wells (Dug wells) in Alluvial Aquifers of J&K UT (As on March 2024)

Table 1B. District-wise break-up of active Ground Water Monitoring Wells (PIEZOMETERS) in J&K (as on 31 March 2024)							
Sl. No.	**REGION**	**DISTRICT**	**Total No of Monitoring wells**	**Number of Active Ground Water Monitoring Wells**			
				May-23	**Aug-23**	**Nov-23**	**Jan-24**
1	KASHMIR REGION	ANANTNAG	0	0	0	0	Monitoring not carried out due to snowfall
2		BARAMULLA	0	0	0	0	
3		KUPWARA	0	0	0	0	
4		PULWAMA	0	0	0	0	
5		SRINAGAR	2	2	2	2	
6		BANDIPORA	0	0	0	0	
7		BUDGAM	0	0	0	0	
8		GANDERBAL	1	1	1	1	
9		KULGAM	0	0	0	0	
10		SHOPIAN	0	0	0	0	
	Total		**3**	**3**	**3**	**3**	**0**
11	JAMMU REGION	JAMMU	22	18	22	22	22
12		KATHUA	22	21	18	19	22
13		RAJAURI	6	5	6	5	6
14		REASI	8	3	6	8	7
15		SAMBA	7	6	6	6	7
16		UDHAMPUR	13	12	12	10	12
17		DODA	0	0	0	0	0
18		KISHTWAR	0	0	0	0	0
19		RAMBAN	0	0	0	0	0
20		POONCH	5	5	5	5	5
	Total		**83**	**70**	**75**	**75**	**81**
	TOTAL J&K		**86**	**73**	**78**	**78**	**81**



Graph 2. District-wise Groundwater Monitoring Wells (Piezometers) in Alluvial Aquifers of J&K UT (As on March 2024)

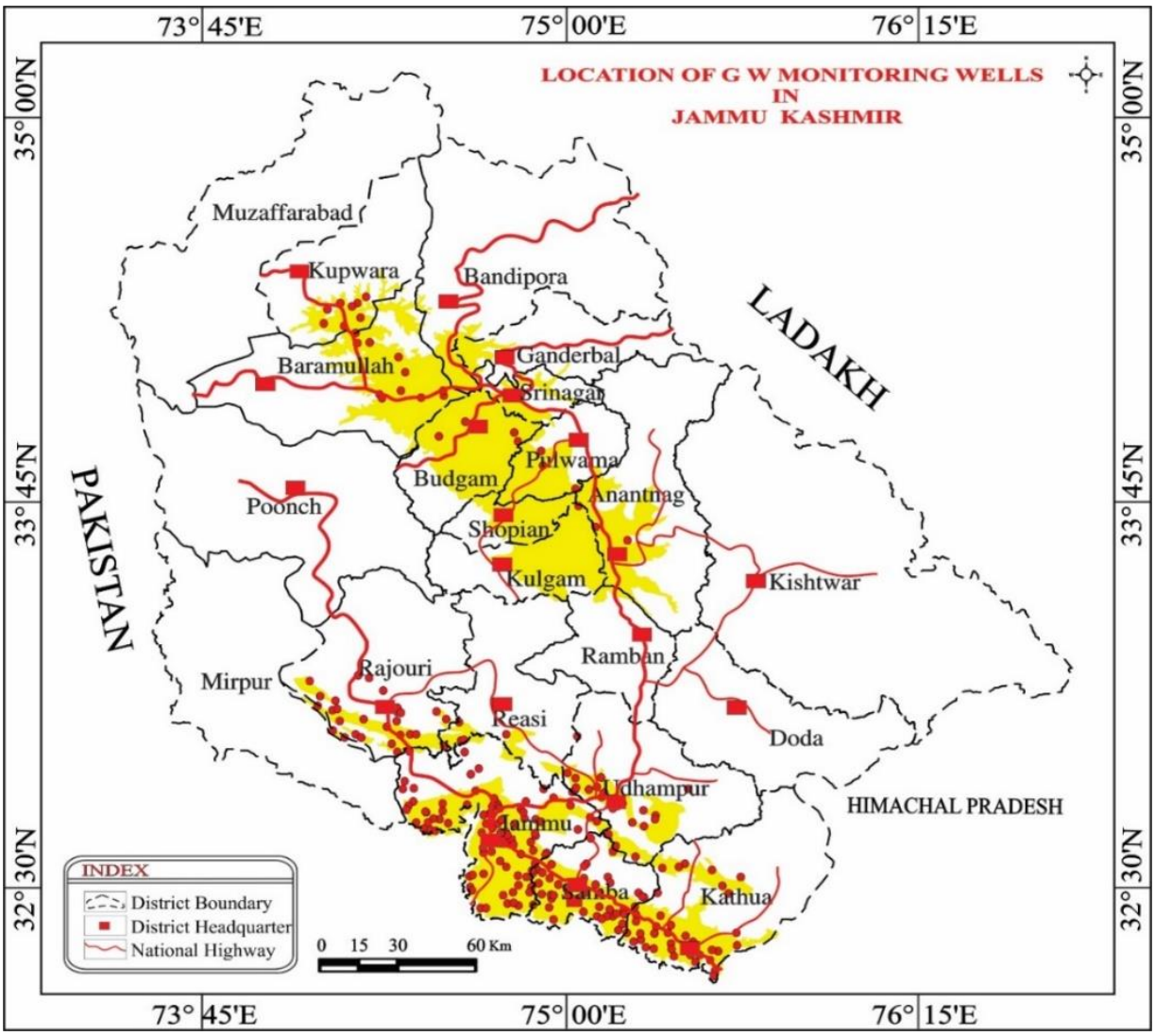


Figure 2. Location Map of Groundwater monitoring wells in Alluvial Aquifers in J&K

1.1 PHYSIOGRAPHY

Physiography of the Jammu & Kashmir State is highly varied with the highest mountain ranges in the world, extensive plateau, enormous valleys, deep gorges, and large canyons in the Middle and Trans-Himalayan Regions. The individual ranges have characteristic steep slopes towards the south and a much gentle slope towards the north. The northern slopes are covered with a thick and dense growth of vegetation. While the southern slopes are mostly bare, with thin sparse forest cover. The Zanskar range separates Ladakh Region from Kashmir Valley while the Pir Panjal range divides Jammu Region and Kashmir Valley (Figure 3). The state can be divided into five distinct physiographic units as discussed below.

Sirowal Belt: The Sirowal belt covers an area of about 1000 km^2 and has an average topographic gradient of 1:250 to 1:300 in the southwest direction. The land elevation of the Sirowal belt above the mean sea level is normally within 320 m. Southern parts of Jammu and Kathua Districts fall in this belt.

Kandi Belt: The elevation of the Kandi belt ranges between 320 m and 400 m above mean sea level (m AMSL). The average topographic gradient varies between 1:60 and 1:100. Kandi belt covers an area of about 1500 km^2 and occupies parts of Jammu and Kathua Districts imperceptibly north of the Sirowal belt. Kandi belt in Jammu & Kashmir state runs in a northwest-southeast direction as a narrow strip between rivers Munawar Tawi in the west and Ravi in the east. The belt is occupied by reworked Siwalik debris, which has a master slope towards the southwest.

Siwalik Region: The land elevation of the Siwalik region ranges between 400 m and 750 m above mean sea level. Ridges and small independent valleys are the prominent features of the Siwalik region which covers parts of Kathua, Jammu, Udhampur, and Rajouri Districts.

Kashmir Valley: The elevation of the valley floor above the mean sea level ranges between 1500 m and 2000 m. Kashmir valley covers an area of 5600 km and comprises parts of Budgam, Pulwama, Srinagar, Anantnag, Baramulla, and Kupwara Districts.

Hilly Mountains: The high mountain ranges have an elevation between 2000 m and 5000 m above MSL and form parts of Udhampur, Anantnag, Baramulla, Srinagar, and Kupwara Districts.

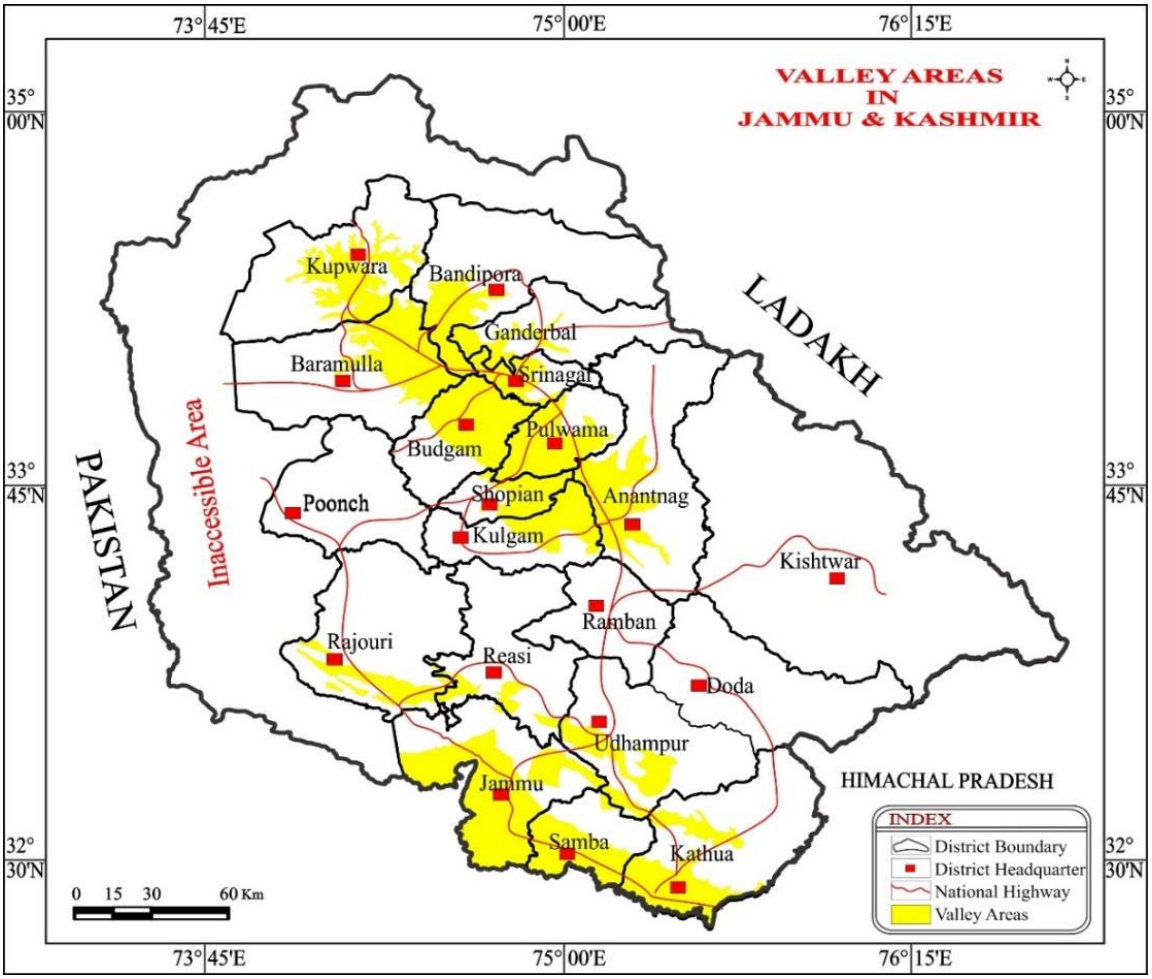


Figure 3. Map showing Valley areas in J&K

1.2. GEOLOGY

Geological formations ranging in age from Pre-Cambrian to Recent are found in the State. These formations can broadly be classified into three categories. Hard or consolidated- rocks comprising granites, slates, quartzite, Panjal traps, limestone, etc. Semi-consolidated rocks comprising claystone, siltstone, sandstone, etc. Unconsolidated formations from Quaternary to Recent age are comprised of Clay, Silt, Sand, Gravel, pebbles, boulders, etc. The brief geological setting of the state is given in Table 2.

Table 2 Geological Setting in J&K State

Age	**Formation**
Recent to Sub-recent	Alluvium
Pleistocene	Karewas
Middle Pliocene to Pleistocene	Siwaliks
Miocene	Murees
Unconformity	
Eocene	Subathu Formation
Cretaceous/ Eocene	Volcanics/ Basic Intrusives
Cretaceous	Flysch Beds
Jurassic	Punch-Mandi Formations
Triassic	Mandi& Infra-Triassic Formations
Paleozoic	Panjal Traps/ Tanwal
Carboniferous / Permian	Agglomeratic Slates Fenestella Shales Gondwana Formations Zewan Beds
Silurian-Devonian	MuthQuartzites
Upper Pre-Cambrian to Lower Cambrian	Dogra Slates
Lower Pre-Cambrian	Salkhala Series
Pre-Cambrian	Granite & Basic Intrusives

The Salkhala outcrops have been traced in the form of hairpin bend around the northwestern end of the Kashmir Valley. The salkhala group comprises a succession of Carbonaceous Shales, Schists, graphitic phyllites, carbonaceous limestones, dolomites, marbles, and quartzites. The Salkhala group is stratigraphically overlain by Dogra Salates, which conformably grades into the lower paleozoic succession. In the southern part of Kashmir, the Dogra Slates are conformably overlain by a succession of phyllites, sandstones, massive quartzites, grits, and conglomerates known as Tanawals and suggesting that the succession bridges the gap between Dogra Slate and upper Paleozoic rocks in the south and southwestern Kashmir.

The Paleozoic formations of Kashmir exposed along the pir-panjal range and great Himalayan ranges rest either over Dogra slates or pre-Cambrian crystalline rocks of the Salkhal group. A succession of white quartzites, Shales, siltstones, and dolomitic limestones exposed around Kashmir synclinorium has been referred to as Muth formation. In the Northern part of Kashmir, the Muth Quartzites are conformably overlain by Syringothris limestone, a succession of Grey and dark

blue limestone with a few interbedded shales, quartzites, and traps. The formation is exposed along the southern slopes of Pirpanjal near Banihal.

Agglomeratic slate series is well exposed in the Pir Panjal range Baramulla district, Liddar valley, Anantnag District, and Kistwar in Doda district. The polymioctites consists of rock fragments derived from glacial erosion as well as from volcanic outburst. It is a succession of slates, sandstone, quartzite, and a few bands of conglomerates. The Agglomeratic slate series is overlain and often intermixed with a thick succession of Andesitic and basaltic traps known as Panjal volcanic. The volcanic occupy the steep slopes and high peaks of the pir panjal ranges and higher reaches of liddar valley. The volcanic activity seems to have persisted in Kashmir from the late carboniferous to late Triassic epochs.

Permian rocks of Kashmir are conformably overlain by a thick succession of limestones and shales known as zeewan formation.

The outcrops of Jurassic rock have restricted distribution in Kashmir. A major part of the rock is buried beneath the quarternary sediments and reported in the northern slopes of Pir Panjal range Baltal and Joji-la areas. The cretaceous rocks have not been reported from the Kashmir Himalayas.

The Murres extensively exposed on the Jammu-Srinagar highway around batote consists of basal conglomerate bed overlain by intercalations of bright red-purple clay and green sandstones and is overlain by Siwalik group rock formations.

Most of the Kashmir valley is occupied by this gravel-sand and mud succession known in Indian Stratigraphy as the ‘Karewa formation’. There are different opinions about the deposition of Karewa formations. But based on detailed geological mapping Bhatt (1978, 1982) proposed that sedimentation of karewa deposits took place in a lake basin but suggested that during deposition of Lower Karewa lake occupied the whole Kashmir valley floor, but during Upper Karewa time the lake was localized only in the north-eastern flank of the basin.

Karewas cover an area of about 5600 sq.Km in Kashmir Valley. Karewa group is defined to include the more or less unconsolidated layered sedimentary succession deposited in fluvio-lacustrine environments in the Kashmir valley, overlying the Precambrian-Mesozoic basement and overlain by Holocene alluvium of modern rivers, etc. Karewa group is divided into two formations viz., Lower Karewa and Upper Karewa. The Lower Karewa formation is characterized by plastic grey to bluish grey clay, light grey sandy clay, lignite, and lignitic-clay, coarse to medium-grained sand, and conglomerates. It is about 1200-mt thick formations.

The Upper Karewa formation is characterized by brown, grey sandy clay, medium to coarse-grained sand, cream-colored marl, conglomerate, and loam (loess) sediments. In this upper Karewas lignitic shale and grey bluish shale are absent. The thickness of this formation is about 50 to 200 mt. The loamy sediments are present throughout the valley making the top of the Karewa Plateau. The Upper Karewa formation sediments are exposed extensively on the Pir Panjal flank due to the uplift of the Pir Panjal range along with its Karewa sediments.

The top of Karewa terraces is capped by a fine-grained mostly silty succession without any bedding structures. These are mainly loam or loess formations. The formation is in some places extremely muddy, silty, or rather sandy. In some cases, sand layers are intercalated.

1.3. DRAINAGE

The entire state of Jammu and Kashmir falls in the Indus River Basin and the only exception is the small area in the extreme northeast which is part of the Quraqush River Basin.

1.3.1. Indus Basin

The total drainage area of the Indus Basin is 11,78,440 km^2 out of which an area of 453,250 km^2 falls in the high Himalayan mountains and the remaining 725,190 km^2 falls in the plains drainage area in plains. A total of 321,290 km^2 area of the Indus basin falls in India whereas only 131,960 km^2 area falls in Pakistan.

The Indus River (Sanskrit-Sindhu, Greek-Sinthos, Latin-Sindhus) originates from lofty mountains near Mansarovar Lake at an elevation of 5182 m and traverses for several hundred km through Tibet and India before reaching Suleiman mountains in Pakistan. A part of the Indus Basin is above the permanent snow line, which varies in altitude from 4268 m in the eastern part to 5792 m in the western part. In Ladakh Region, the snow line is at 5488 m above mean sea level, which recedes during summer.

The hydrographic system of the Indus Basin is very extensive. The river initially runs along the strike of the mountains and then suddenly makes an acute bend to the south and flows directly across the mountain. The Gilgit River joins the Indus at its great bend to the south. The Indus flows initially under the name of Singee Khabab until it is joined by the Ghar River at about 257 km from its source. After a short distance downstream it enters The State of Jammu &Kashmir at an elevation of 4206 m. It skirts Leh at 3200 m and is joined by the Zanskar River while still flowing north but more westerly. The Indus passes near Skardu and reaches Haramosh Mountain (7407 m). Here it takes a turn southwards at an acute angle and passing near Hattu Pir, enters Kohistan. After flowing through the wilds of Kohistan and at about 1450 km from its source, the Indus is joined by Kabul and Swat Rivers from Afghanistan. At this point, the elevation of the Indus falls to about 610 m. After leaving Attock in Pakistan the river flows southwards, parallel to the Suleiman Range. At about 805 km. from the Arabian Sea and at an elevation of 79 mamsl, the Indus receives waters from all of its five major tributaries viz. Jhelum, Chenab, Ravi, Beas, and Satluj, and here, it is known as Panjnad (five rivers). The river finally joins the Arabian Sea through its mouth, which forms a big delta covering 7770 km^2 and a vast coastline of about 201 km.

Major sub-basins of the Indus System in Jammu & Kashmir State are the Jhelum Sub-basin, the Chenab Sub-basin, and the Ravi Sub-basin. A brief account of these three sub-basins is given as: -

Jhelum Sub-Basin

The Jhelum is known in Kashmir as the Veth River. Most parts of Kashmir valley are drained by the Jhelum River, which flows in a northwesterly direction. The Jhelum River (Sanskrit-Vitasta, Greek-Hydaspes, Latin-Bipaspes) originates from Verinag Spring. The River has various tributaries in the valley, several of which come from the everlasting snows of the Liddar valley. Near Srinagar, it is received by the Sind River, and then forms the Wular Lake in Baramulla District which is a delta of the Jhelum River. Below Baramulla, the river leaves the fertile banks of the valley and rushes headlong down a deep gorge at Khadnayar, and joins the Chenab River at Trimmu in Pakistan.

Chenab Sub-Basin

The Chenab River or Asikin, as it was known in Vedic times, is formed by two important tributaries, the Chandra and the Bhaga, which join near Keylong in Himachal Pradesh to form Chandra-Bhaga or the Chenab River in Himachal Pradesh.

The River then flows through the Kashmir Himalayas to emerge into the plains at Akhnoor in Jammu District, about 250 km from its source. Ranbir canal takes off from its left bank in Akhnoor tehsil.

Ravi Sub-Basin

Very small parts of the state, mainly the extreme south-eastern parts, fall in the RaviSub-basin. The Ravi River rises from the northern face of Rohtang Pass in Himachal Pradesh at an elevation of 4116 m. After passing through the Dhaula Dhar hill ranges, the river emerges from the foothills near Madhopur where the head works of the Upper Bari Doab Canal exist. It has the smallest catchment area among the rivers of the Indus System. An important tributary of the Ravi River, the Ujh River Which originates from the Basohli hills of Kathua District joins the mainstream to its right at Lassian.

1.4. HYDROMETEOROLOGY

The State of Jammu and Kashmir has great diversity in its temperature and precipitation. Excepting the plain, south of the Siwaliks of the Jammu Division, the climate over the greater parts of the state resembles that of the mountainous and continental parts of the temperate latitudes. The average rainfall and Annual rainfall in all districts of Jammu & Kashmir is shown in Bar and Pie Chart (Graph 3-5)

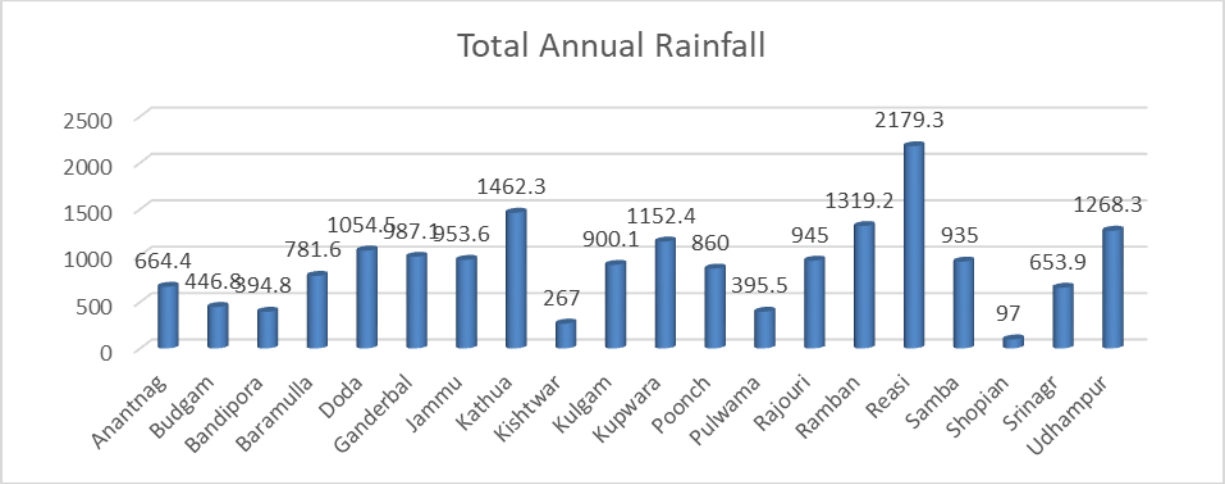
1.4.1. The climate of the Jammu Division

The climate of the Jammu division is sub-humid to sub-tropical. It is divisible into two parts namely (i) the plain region, lying to the south of the Siwaliks, and (ii) the mountainous region, stretching over the Middle and the Greater Himalayas in the districts of Doda, Rajouri, Poonch, and Udhampur. The climate of the plain region and Middle Himalayas including the Pir Panjal is characterized by a rhythm of seasons which is caused by the reversal of winds in the form of southwest and north-east monsoons. The reversal of pressure takes place regularly twice a year. This region has a sub-tropical climate with a hot and dry climate in summer and a cold climate in winter. It lies in the northern hemisphere above the tropic of Cancer. The Minimum and Maximum temperature of the district varies between 4°C to 47°C and the monsoon starts from the beginning of July to the first week of September. From October to June the precipitation and temperature patterns resemble closely the valley temperature zones. However, the summer rainfall and temperature resemble the precipitation pattern in the sub-tropical zone. The region receives an average annual precipitation of 1070 mm mainly in the form of rainfall. Snowfall occurs in high mountainous parts of the Jammu region due to the southwest monsoon from July to September and contributes about 80% of the total rainfall. The temperature in plain areas of the Jammu region goes up to 45ºC during summer and drops to as low as 3º C during the winter season. The average number of Annual rainy days in the Jammu region is 59.

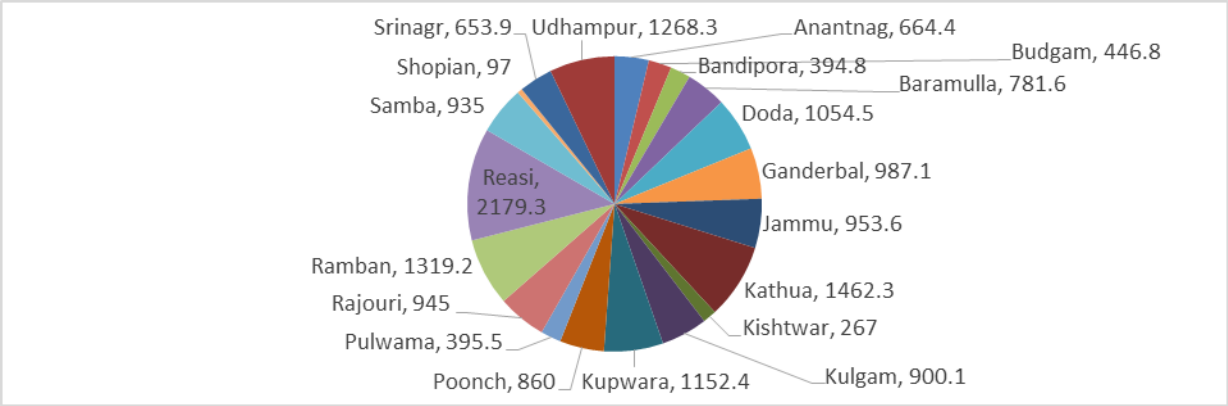
1.4.2. The climate of the Kashmir Division

The weather and climate of the Kashmir Division are intrinsically linked with the weather mechanism of the subcontinent in general. The location of the Kashmir Valley at a high altitude (about 1600m AMSL) in the north-western corner of the subcontinent, surrounded by high mountains on all sides, gives it a unique geographical character with distinctive climatic characteristics. It experiences Temperate-cum-Mediterranean type of climate. The average annual precipitation is 660 mm. In winter, rainfall occurs from the western disturbances (temperate cyclones). These disturbances have their origin in the Mediterranean Sea. The rainfall generated by these cyclones is fairly widespread locally known as *Alamgir*. About 65% of the precipitation occurs in the form of snow during the winter season, i.e. December to February. March and April are the months of rainfall. May to September is relatively dry months. The mercury drops between -8ºC and 12ºC during winter and attains a moderate temperature of around 35ºC during summer.

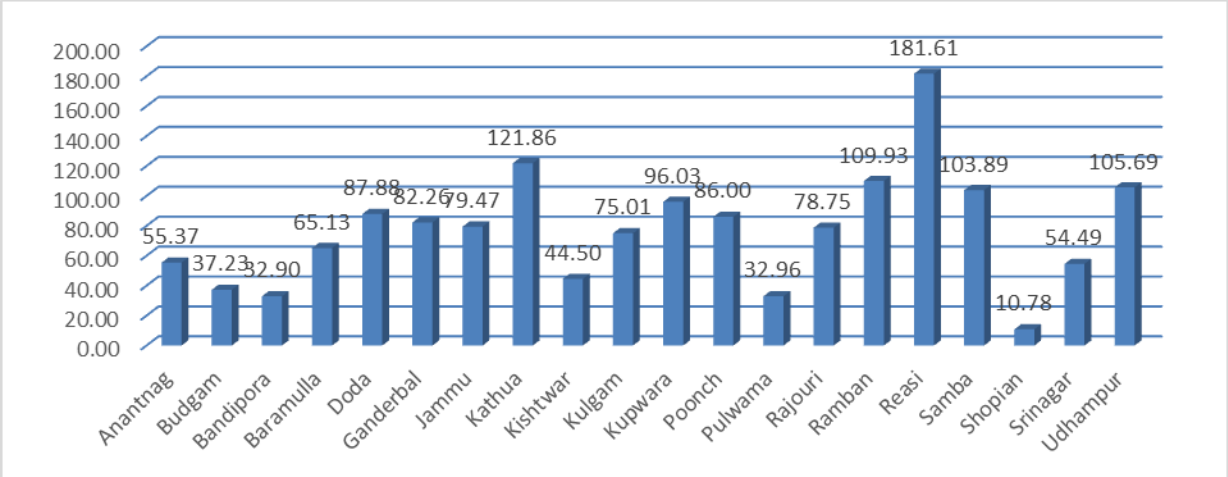
Graph 3. Bar Chart showing Total Annual Rainfall in J&K in 2021



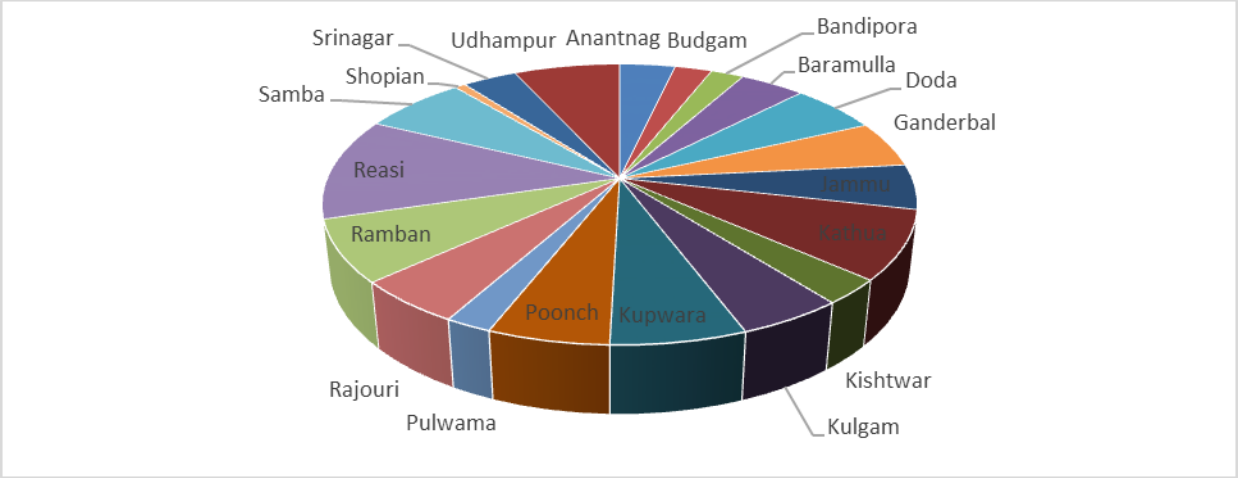
Graph 4. Pie Chart showing Total Annual Rainfall in J&K in 2021



Graph 5. Bar Chart showing Monthly Average Rainfall in J&K in 2021



Graph 5. Pie Chart showing Monthly Average Rainfall in J&K in 2021



1.5. SOILS

The soils of J&K UT have been classified into the undermentioned 8 groups:

1. **Brown Earth/Brown Forest Soils:** These soils have been spotted in parts of Kathua, Udhampur, Doda, Poonch, Rajouri, Anantnag, and Baramulla District. Their water holding capacity exceeds 40%. They belong to groups Haplustalfs, Ochraualfs, Eustrochrepts, Hapludolls, Udorthrents, Cryothrents, and Udifluvents.

2. Degraded or Grey Brown Podzolic Soils: These soils occur in parts of Baderwah, Ramnagar, Poonch, Gulmarg, and Pahalgam and are of loam to clay texture at their surface and clay loam to clay texture at their sub-surface and of fine granular well developed angular block structure. They belong to great groups Hapludalfs, Hapludolls, Eutrochrepts, and Haplumbrepts.

3. Red and Yellow Podzolic Soils: These soils occur in parts of Udhampur, Kathua, Rajouri, and Poonch. They are of coarse texture, Water holding capacity is 40%. They belong to a great group hapludalfs, haplustalfs.

4. Hill or Mountain Forest Soils: These are sandy loam to loamy, fine to weakly granular soils. They occur at lower elevations and have 32-41% water holding capacity. They belong to a great group cryoboralfs and hapludolls.

5. Mountain Meadow Soils: Sandy loam to clay loam fine to coarse granular mountain meadow soils occur in Gulmarg, Pahalgam, Sonamarg, Lolab, Gurez, and Changthang. Water holding capacity of (51-61%) They belong to great groups Cryoboralfs and Argiudolls.

6. Lithosols: Gravelly loam to gravelly silty loam, coarse to weak granular soils. Lithosols occur on steep slopes in the forest hills of 400 to 600 meters above sea level in Jammu, Udhampur, Kathua, Rajouri, and Poonch Districts. They contain 33 to 38% water holding capacity. They belong to a great group Ustorthrents.

7. Saline Alkali Soils: These soils occur in alluvial belt of Jammu (RS Pura/Bishna), Kathua (Ramkol/Challain). They belong to Ustifluvents, Hapluaquents, and Ustorthents great groups.

8. Alluvial Soils: These soils cover the plains of Kathua, Jammu Rajouri, Poonch, Udhampur in Jammu, and the Valleys in Kashmir. They are situated in the flood plains of Ravi, Chenab, and Jhelum and their tributaries. They are old and new alluvial soils. They belong to a great group Ustifluvents and Udifluvents

Based on the Kashmiri Nomenclature

Nambal (Peaty Soils): Near the banks of the Jhelum River and in the vicinity of the Wular, Manasbal, and Anchar lakes is found the rich peaty soil, locally known as Nambal.

Tand (Mountainous Soils): The land on the slopes of mountains, reclaimed from the forests is called Tand soil. After reclamation, the land gives good productivity, but declines by accelerated soil erosion as land loses its natural strength and after many years the land acquires the shape of a pasture and culturable waste.

Zabelzamin (Alkaline Soils): Patches of irrigated land if excessively irrigated lose their fertility and develop alkaline formations. Such adversely affected patches of saline and alkaline formations are known as zabelzamin. These soils are unproductive from the agricultural point of view unless specially treated with gypsum, water, and manures. There are numerous other types of soils recognized by the Kashmiri farmers, such soils are Kharzamin, Tresh, Limb, Ront, Shath, and Tats.

Karewa Soil (Wudur): Karewas are fresh-water (fluviatile and lacustrine) deposits found as low flat mounds or elevated plateaus in the Valley of Kashmir and the Kishtwar and Bhadarwah tracts of the Jammu Division. The important Karewas are found in Kulgam, Shopian, Budgam, Qazigund, Tangmarg, Gulmarg, Baramulla, Laithpora, Chandhara, Pampore, Bijbehara, Awantipora, Islamabad (Anantnag), Mattan, Tral and Ganderbal. The Karewa soils are composed of fine, silty clays with

sand boulder gravel, the coarse detritus being, as a rule, restricted to the peripheral parts of the valley, while the finer variety prevails towards the central parts.

Clayey Soil (Gurti): This soil is found in the flood plains of Jhelum in the southern parts of Srinagar city and is subjected to annual fresh silt deposition. Gurti soil contains a large proportion of clay. Its water retaining capacity is high.

Loamy Soil (Bahil): This soil is found above the level of the flood plain, on the right bank of Jhelum, and is highly fertile and suitable for paddy cultivation. The humus content is high which enriches the soil fertility.

Sandy Loam (Sekil): It has usually been found in the Sind valley in the northwest of the city. In the Sekil soil, if the field is artificially irrigated, good crops of rice are harvested in the summer season.

Sandy Silt (Dazanlad): This soil is a mixture of sand and clay. A peculiar characteristic of Dazanlad is that the field turns red when irrigation water stands in the fields. This soil is generally found in the low-lying areas in the west of the city and also occurs in the hilly areas in the north (Husain, 2000).

2. HYDROGEOLOGY

The hydrogeological setup in the state is very complicated owing to varied geological settings and groundwater conditions. All three regions of Jammu & Kashmir state represent entirely different groundwater regimes. Based on geology and aquifer characteristics, the area of the state can be divided into two broad hydrogeological units. These are Porous and Fissured formations.

Porous Formation

Porous formations are best suitable for exploration and development. Potential zones are encountered in these formations. Region-wise porous formations are described hereunder: -

Jammu Region

In the Outer Plains of the Jammu Region, extending between River Ravi in the east to Munawar Tawi in the west, the groundwater occurs in piedmont deposits belonging to the upper Pleistocene to the Recent age. The deposits comprise unconsolidated sediments in the form of terraces and coalescent alluvial fans developed by the streams debauching out of Siwalik Hills. The sediments consist of coarse clastic ranging in size from boulder to gravel in the loose clay matrix and occasionally alternating bands of clay of varying thickness. Kankar is also intercalated with these sediments at different intervals and in variable quantities.

These deposits are graded into finer sediments from north to south in that order. Down south it comprises alternate bands of sands of all grades and clay with subordinate pecks of gravel and pebbles.

- ***Kandi Formation***

Kandi formation comprises very coarse material with little clay but in the Outer Plain of Jammu & Kashmir State, the typical Kandi formations are not seen. Instead, they comprise boulders, gravels, pebbles, and coarse sand with a substantial amount of clay sometimes hard and sticky of varying thickness. The clay proportion increases towards the southwest. The occurrence of perched water bodies is a common phenomenon in the Kandi belt of Jammu & Kashmir state. Groundwater generally occurs under unconfined conditions in the Kandi formation.

- ***Sirowal Formation***

The Kandi formation coalesces into Sirowal formation in the south, finer outwash of Siwalik debris, brought by streams. Groundwater occurs under both confined as well as unconfined conditions in Sirowal formation. A spring line demarcates the contact between Kandi and Sirowal formations because the groundwater oozes out along this line causing marshy conditions. The spring line has undergone deformation due to the decline of water level resulting from the development of

groundwater in the Sirowal area. However, the base flow could be seen in streams south of this line, which also in the Sirowal formation is the existence of auto-flow conditions in the deeper aquifer system.

The Dun Belt separates the Siwalik hills from the middle Himalayas and runs as a series of river terraces between Basohli (32°30', 76°49'30") in the east to Riasi (33°05', 74°50') and beyond in the west. The sediments are in the form of isolated Sub-Recent to Recent valley fill deposits ranging in thickness between a few metres to a few tens of metres. These deposits are often dissected as a result of the present-day drainage pattern. The deposits comprise coarse clastics such as boulders, cobbles, pebbles, etc. inter-bedded with lenticular clays.

- ***Isolated Valley Fills in Middle Himalayas***

There exist several isolated valleys in the middle Himalayas where groundwater occurs in valley fill deposits comprising lacustrine to fluvioglacial sediments. A few meter-thick layers of loess overlie these deposits, which is windblown.

Groundwater in such valleys generally occurs under confined conditions. One of the prominent isolated valleys in the middle Himalayas is Kishtwar valley in the Kishtwar district of the Jammu Region.

Kashmir Region

Kashmir valley covers an area of 5600 km and is occupied by Karewas which consist of a huge pile of alternating bands of sand, silt, and clay interspersed by glacial boulder beds. The sands are mostly fine to very fine-grained and they are rarely medium to coarse-grained. There is considerable lateral facies variation like sediments. The aggregate thickness of these sediments is of the order of 2500-3000 m. Groundwater in the Karewas of Kashmir valley occurs under both confined as well as unconfined conditions.

Fissured Formation

About 15000 sq. km. area in Jammu Region is occupied by hilly terrain. It comprises rocks ranging in age from Precambrian (Salkhala series) to Miocene or even Pliocene (Murees and upper-middle Siwaliks). The rock types range from soft or friable sandstones, Clays, Shales, and Conglomerates to hard traps and metamorphics such as quartzite and crystalline limestone. In the Siwalik terrain, where groundwater is tapped, it comes mainly either from the weathered mantle or from the joints or cracks of these rocks. Friable Siwalik sandstones do possess primary porosity but are not very potential.

2.1. BEHAVIOUR OF WATER LEVELS IN SHALLOW AQUIFERS

2.1.1. DEPTH TO WATER LEVEL

The water levels in Groundwater Monitoring Wells of Jammu and Kashmir State were measured four times during the period 2023–2024 (May 2023, August 2023, November 2023, and January 2024). The groundwater levels in different seasons were analysed to evaluate the temporal behaviour of water levels. The behaviour of water levels during the period May 2023 to January 2024 has been compared with the previous water levels as well as with the average water level for the last decade (decadal behaviour) to ascertain the changes in the groundwater regime. All the data has been put in the GIS format and the data has been analysed. After analysis, the contours of water levels below the ground surface have been created by joining the areas with the same water levels and the areas have been demarcated with uniform contour intervals. The contouring has been done by IDW Interpolation method. District-wise water levels observed during May, August, November 2023, and January 2024 is given in Annexure-I & II

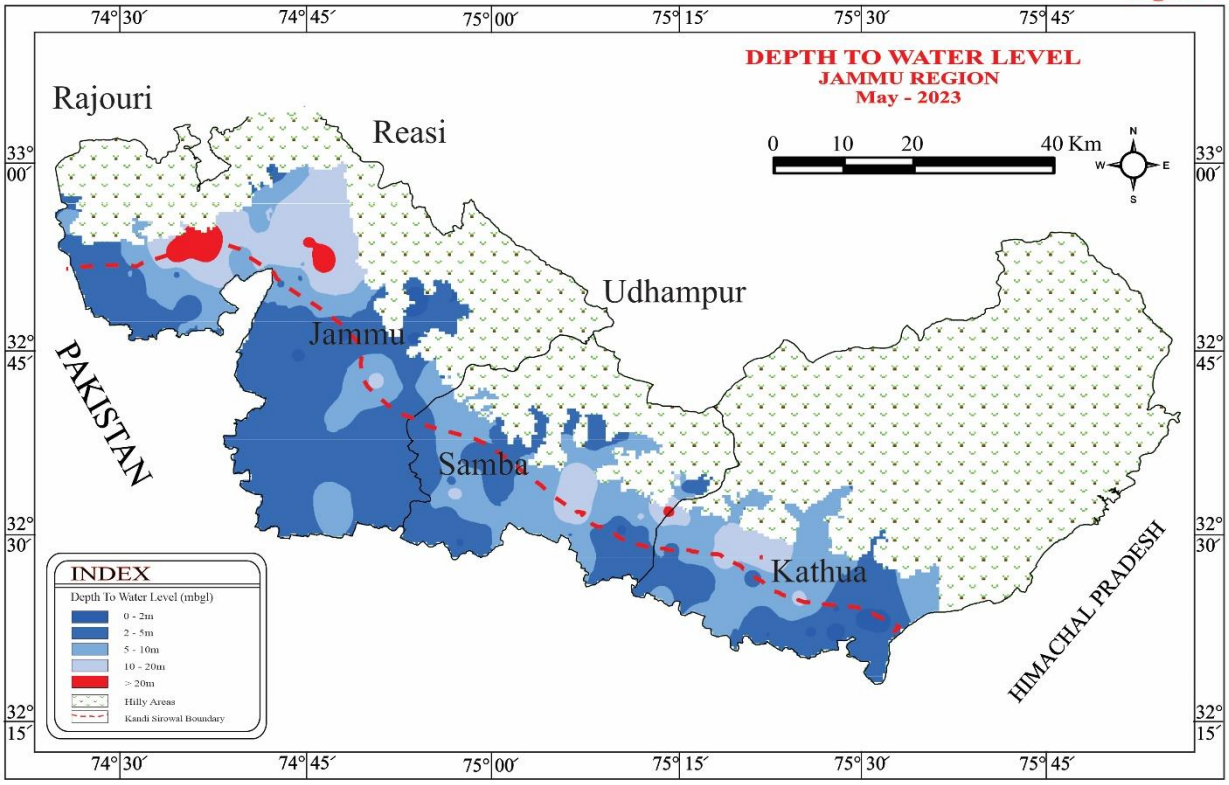
Depth to Water Level -May 2023

Jammu Region: The water level data in respect of 210 wells for May 2023 were analysed. The depth to water level varied from 0.30 m bgl to 38.46 m bgl. The categorization of depth to the water level in May 2023 is given in table 3.

18 wells (8.6%) have recorded a water level of less than 2.0 m bgl. About 110 (52.4%) of the total wells analysed have shown depth to water level in the range 2-5 m bgl. Whereas 59 wells (28.1%) have shown water levels in the range of 5-10 m bgl. 12 (5.7%) wells have registered deeper water levels, in the range of 10-20 m bgl. Another 11 wells (5.2%) of the total wells analysed have shown water levels in the range of >20 m bgl.

Valley areas of the Jammu outer plains below the contact of Kandi Sirowal show water level between 2-5 m bgl except few patches that show water levels between 0-2m bgl. In Sirowal area of Outer Plains, most of the water levels have been recorded between 2 - 10 m bgl except a few small patches that show water levels from 0 to 2 m & above 10 m bgl. In Kandi Belt, the water levels are deeper ranging between 10-20 m bgl and a few patches northern and north western Jammu, water levels are more than 20 m bgl (Figure 4).

Figure 4



Kashmir Region: The water level data in respect of 80 wells for the month of May 2023 were analysed. The depth to water level varied from 0.17 m bgl to 14.46 m bgl. 50 wells (62.5%) have recorded the water level less than 2.0 m bgl. About 27 wells 33.8% of the total wells analysed have shown depth to water level in the range 2-5 m bgl. Whereas 2 wells (2.5%) have shown water levels in the range of 5-10 m bgl. 1 (1.3%) wells have registered deeper water levels, in the range of 10-20 m bgl. No well (0%) has shown water levels in the range of >20 m bgl

Valley areas of Kashmir Region have shown water levels in all ranges. Major portion has shown within 2m bgl in Kupwara and Baramulla districts. Water levels above 2 but under 5 m have been shown in the northern parts of Baramulla few patches in Kupwara and Srinagar and Pulwama districts. The water level is deeper towards northern and north-eastern parts of Pulwama & Anantnag district (Figure 5).

Figure 5

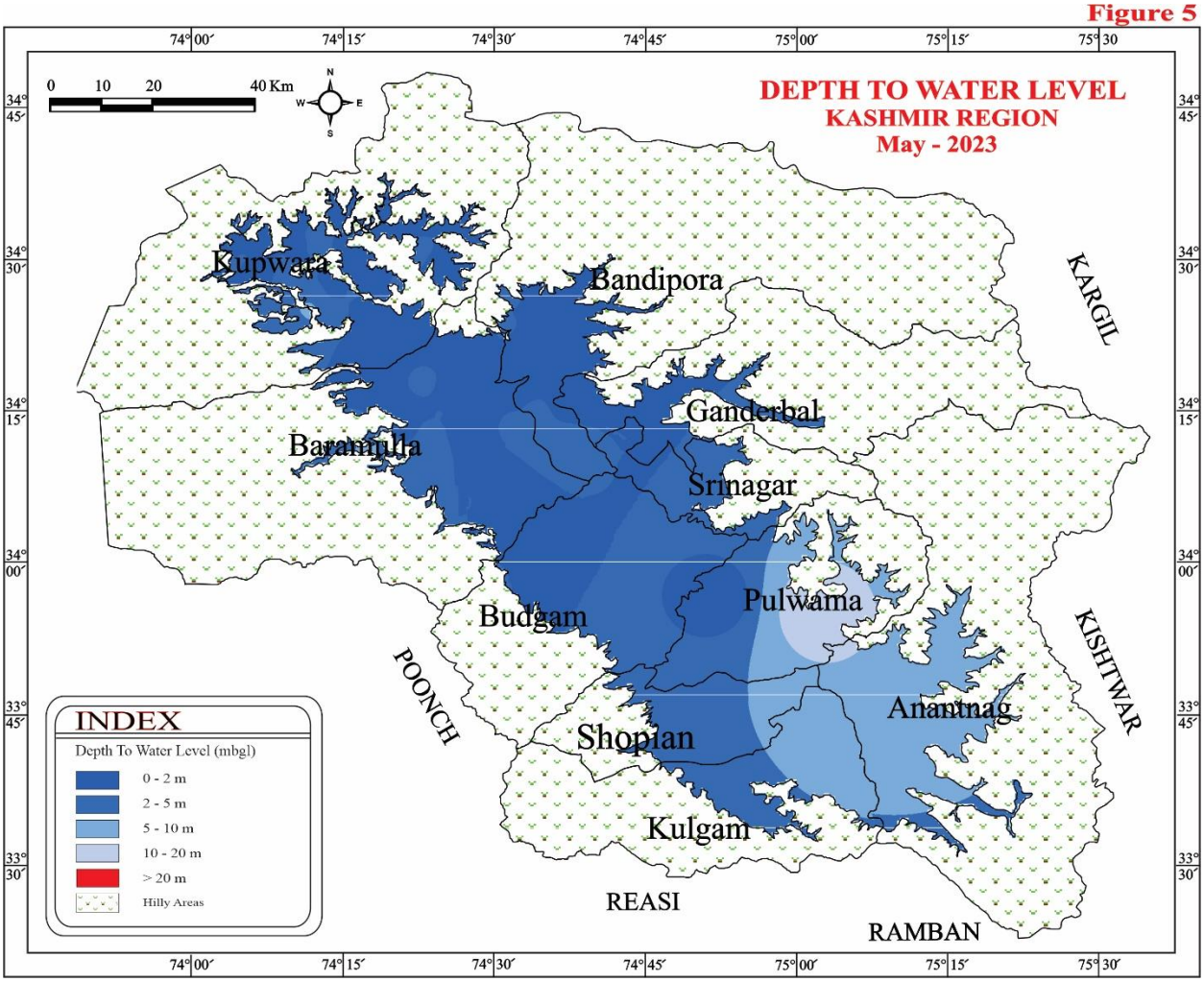


Table 3. CATEGORIZATION OF DEPTH TO WATER LEVEL- MAY 2023

REGION	District	No. Of wells Analyzed	Depth to Water Level (mbgl)		Number of Wells Showing Depth to Water Level (mbgl) in the Range of					Percentage of Wells Showing Depth to Water Level (mbgl) in the Range of				
			Min	Max	0–2	2–5	5–10	10–20	> 20	0–2	2–5	5–10	10–20	> 20
KASHMIR REGION	Bandipora	**5**	**0.50**	**2.35**	**2**	**3**	**0**	**0**	**0**	**40**	**60**	**0**	**0**	**0**
	Baramulla	26	0.20	6.65	15	10	1	0	0	57.7	38.5	3.8	0.0	0.0
	Kupwara	46	0.18	6.68	31	14	1	0	0	67.4	30.4	2.2	0.0	0.0
	Pulwama	2	0.17	14.46	1	0	0	1	0	50.0	0.0	0.0	50.0	0.0
	Srinagar	1			1	0	0	0		100.0	0.0	0.0	0.0	0.0
	Total	**80**	**0.17**	**14.46**	**50**	**27**	**2**	**1**	**0**	**62.5**	**33.8**	**2.5**	**1.3**	**0.0**
JAMMU REGION	Jammu	74	0.60	38.46	3	40	22	4	5	4.1	54.1	29.7	5.4	6.8
	Kathua	33	0.65	29.74	4	12	11	3	3	12.1	36.4	33.3	9.1	9.1
	Rajauri	37	0.30	8.70	4	26	7	0	0	10.8	70.3	18.9	0.0	0.0
	Reasi	8	1.90	25.03	1	5	1	0	1	12.5	62.5	12.5	0.0	12.5
	Samba	36	1.20	22.67	3	13	13	5	2	8.3	36.1	36.1	13.9	5.6
	Udhampur	22	0.95	8.80	3	14	5	0	0	13.6	63.6	22.7	0.0	0.0
	Total	**210**	**0.30**	**38.46**	**18**	**110**	**59**	**12**	**11**	**8.6**	**52.4**	**28.1**	**5.7**	**5.2**
	TOTAL J&K	**290**			**68**	**137**	**61**	**13**	**11**	**23.4**	**47.2**	**21.0**	**4.5**	**3.8**

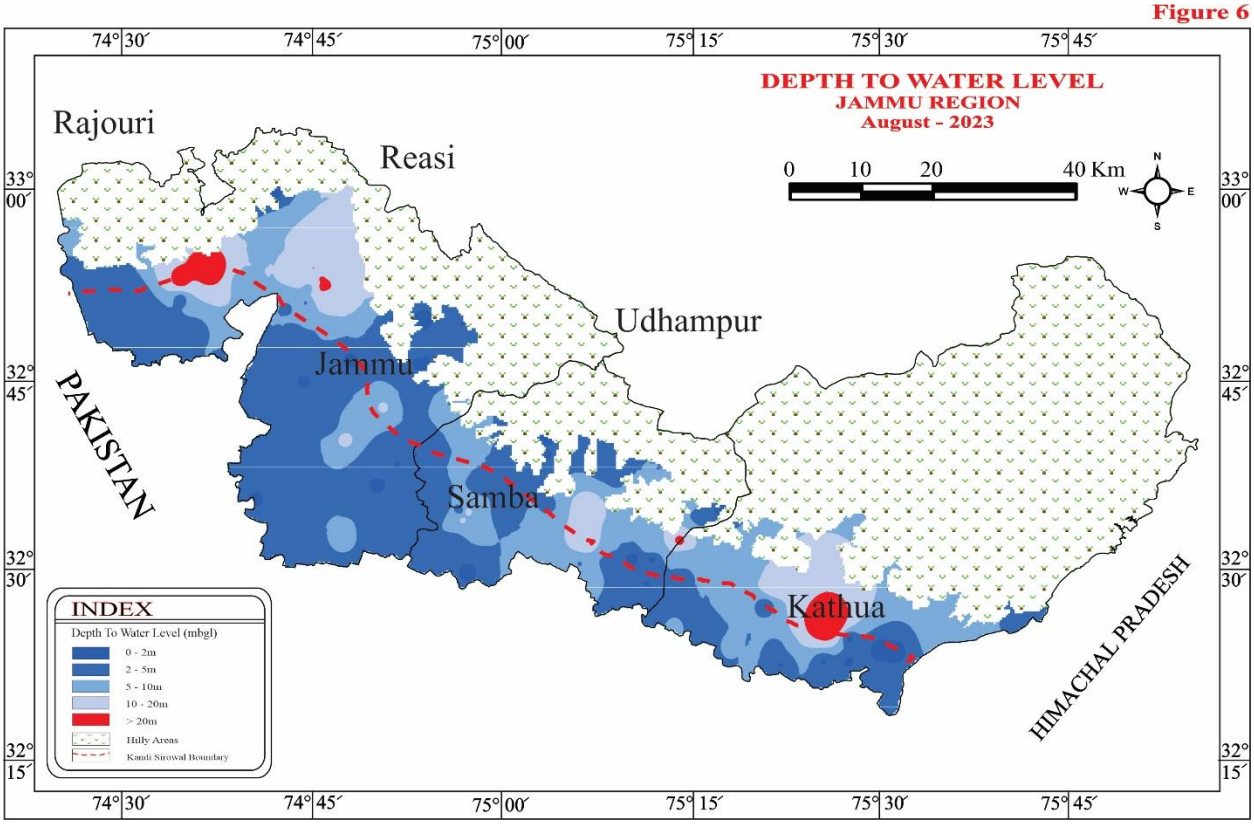
Depth to Water Level -August 2023

Jammu Region: The water level data in respect of 221 wells for the month of August 2023 were analysed. The depth to water levels varied from 0.01 m bgl to a maximum of 35.46 m bgl. Categorization of DTWL is given in table 4.

The water level less than 2 meters below ground level was recorded in 92 wells (41.6%). 90 wells (40.7%) have shown water level in the range of 2 to 5 m bgl, whereas 24 wells (10.9%) have shown water level in the range of 5 to 10 m bgl. 10 wells (4.5%) have shown deeper water levels i.e. in the range of 10 to 20 m bgl. 5 wells (2.3%) have shown very deep-water level of >20 m bgl.

In Sirowal formation, water levels varied between 0 to 5 in major portion and 5-10 m bgl at a few places. The transition part of Sirowal belt and Kandi belt of both Jammu and Kathua Districts shows varied water levels. Water levels deeper than 20m bgl were observed in the extreme north-western portion of Jammu district in Kandi belt and central areas in Kathua district (Figure 6).

Figure 6



Kashmir Region: The water level data in respect of 79 wells for the month of August 2023 were analysed. The depth to water level varied from 0.53 m bgl to 15.34 m bgl. 21 wells (26.6%) have recorded the water level less than 2.0 m bgl. About 48 wells (60.8%) have shown depth to water level in the range 2-5 m bgl. Whereas 9 wells (11.4%) have shown water levels in the range of 5-10 m bgl.

01 well (1.3%) have registered deeper water levels, in the range of 10-20 m bgl. No well has shown water levels in the range of >20 m bgl.

Valley areas of Kashmir Region have shown water levels in all ranges. Major portion has shown within 2m bgl. In Kupwara and Baramulla districts water levels above 2 but under 5 m have been shown in the northern parts of Baramulla few patches in Kupwara and Srinagar and Pulwama districts. The water level is deeper towards northern and north-eastern parts of Anantnag & Pulwama district (figure 7).

Figure 7

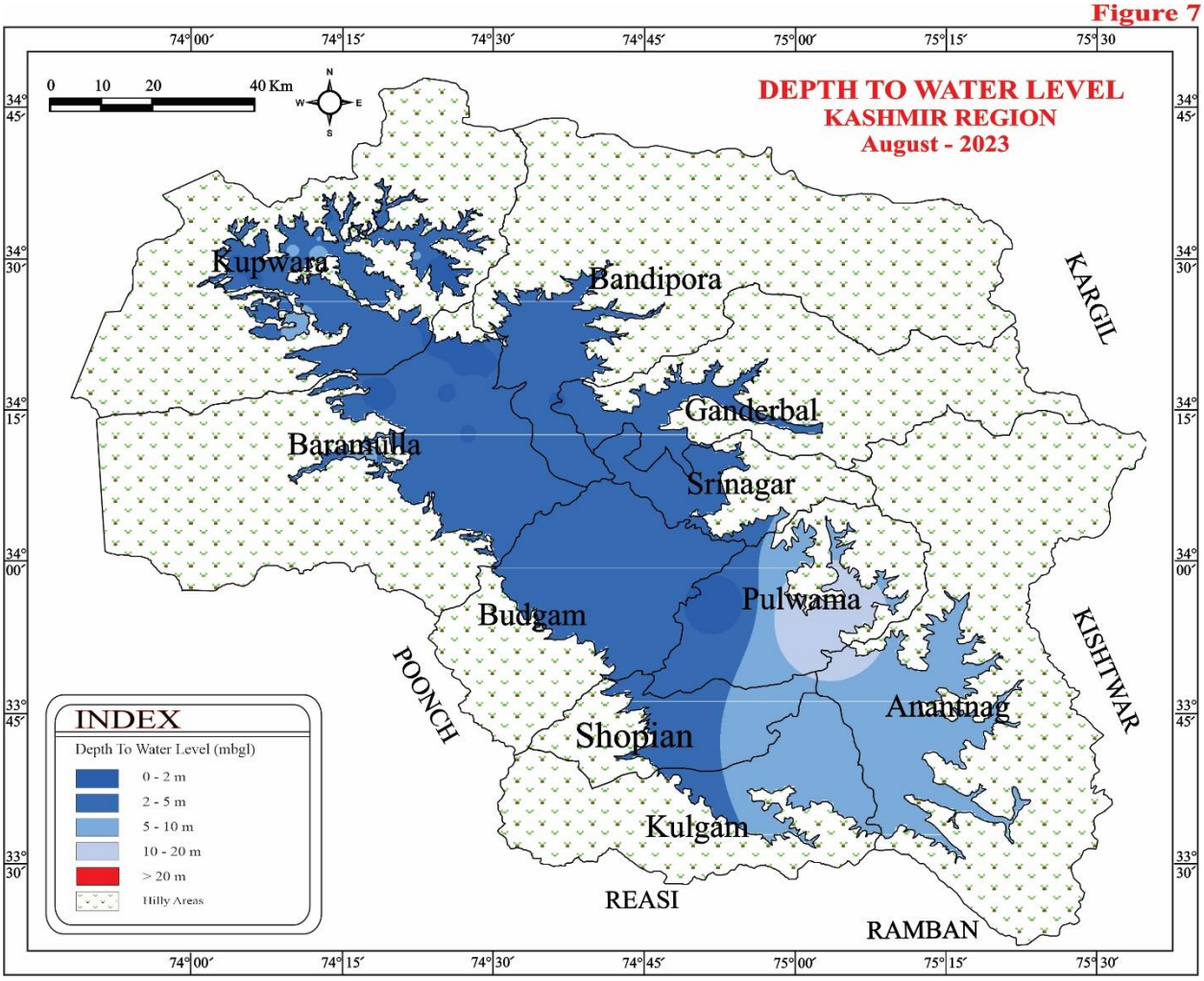


Table 4. CATEGORIZATION OF DEPTH TO WATER LEVEL- AUGUST 2023														
REGION	**District**	**No. Of wells Analyzed**	**Depth to Water Level (mbgl)**		**Number of Wells Showing Depth to Water Level (mbgl) in the Range of**					**Percentage of Wells Showing Depth to Water Level (mbgl) in the Range of**				
			Min	**Max**	**0–2**	**2–5**	**5–10**	**10–20**	**> 20**	**0–2**	**2–5**	**5–10**	**10–20**	**> 20**
KASHMIR REGION	Bandipora	4	1.70	2.73	1	3	0	0	0	25	75	0	0	0
	Baramulla	25	1.29	6.90	8	16	1	0	0	32.0	64.0	4.0	0.0	0.0
	Kupwara	47	0.55	7.6	11	28	8	0	0	23.4	59.6	17.0	0.0	0.0
	Pulwama	2	0.53	15.34	1	0	0	1	0	50.0	0.0	0.0	50.0	0.0
	Srinagar	1				1					100.0			
	Total	**79**	**0.53**	**15.34**	**21**	**48**	**9**	**1**	**0**	**26.6**	**60.8**	**11.4**	**1.3**	**0.0**
JAMMU REGION	Jammu	81	0.35	35.46	27	38	8	6	2	33.3	46.9	9.9	7.4	2.5
	Kathua	41	0.03	22.30	19	14	7	0	1	46.3	34.1	17.1	0.0	2.4
	Rajauri	36	0.38	5.63	17	18	1	0	0	47.2	50.0	2.8	0.0	0.0
	Reasi	8	0.51	24.90	4	3	0	0	1	50.0	37.5	0.0	0.0	12.5
	Samba	35	0.01	23.73	12	10	8	4	1	34.3	28.6	22.9	11.4	2.9
	Udhampur	20	0.50	4.85	13	7	0	0	0	65.0	35.0	0.0	0.0	0.0
	Total	**221**	**0.01**	**35.46**	**92**	**90**	**24**	**10**	**5**	**41.6**	**40.7**	**10.9**	**4.5**	**2.3**
	TOTAL J&K	**300**			**113**	**138**	**33**	**11**	**5**	**37.7**	**46.0**	**11.0**	**3.7**	**1.7**

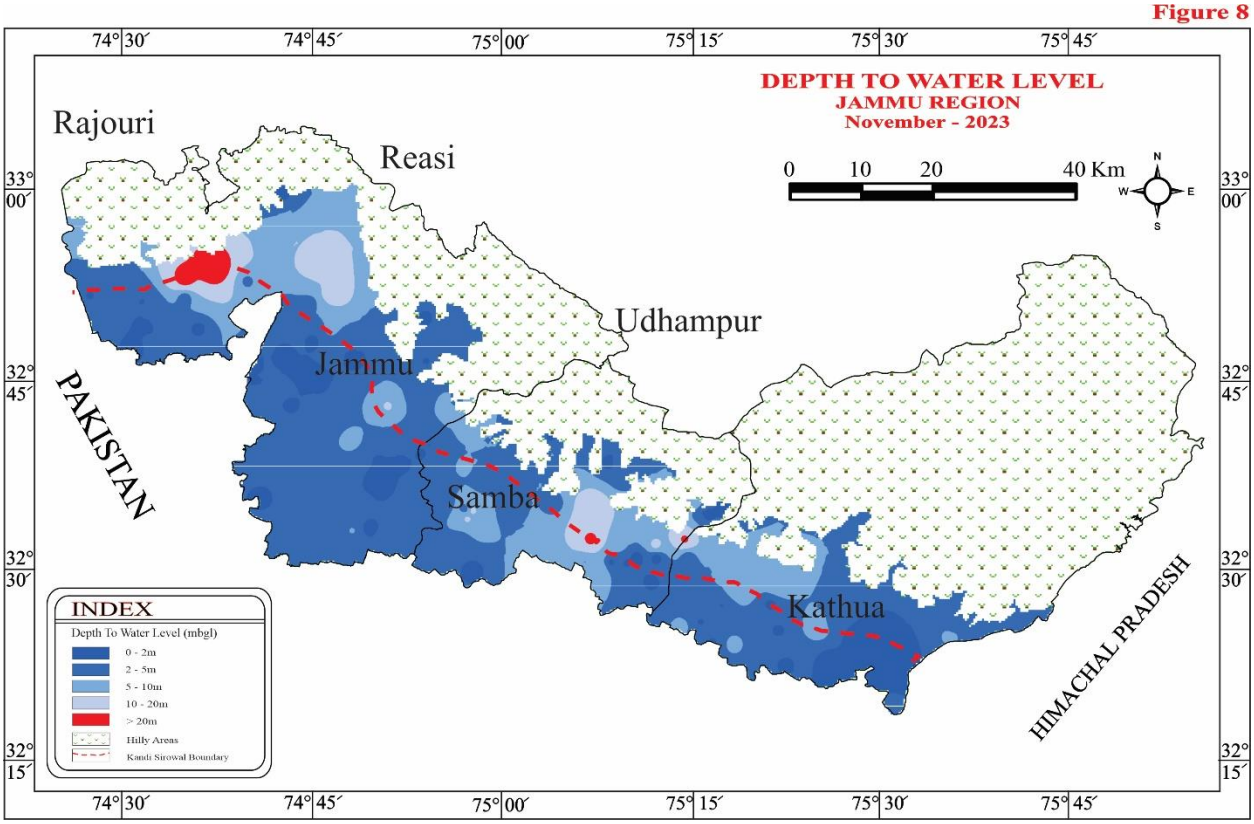
Depth to Water Level -November 2023

Jammu Region: The water level data in respect of 228 wells for the month of November 2023 were analysed. The depth to water level ranges from 0.1 m bgl to 35.46 m bgl. Categorization of DTWL Nov. 2022 is given in table 5.

A total of 67 numbers of wells (29.4%) have recorded the water level less than 2.0 m bgl. Majority of the wells 111 wells (48.7%) analysed have shown depth to water level in the range of 2-5 m bgl. Whereas 31 wells (13.6%) have shown water levels in the range of 5-10 m bgl. 10 wells (4.4%) have registered deeper water levels, in the range of 10-20 m bgl. Another 9 wells (3.9%) of the total wells analysed have shown water levels in the range of >20 m bgl.

In Sirowal formation of Jammu, Samba and Kathua, water levels varied between 0 to 5 in major parts and 0-2 m bgl at a few parts. Major part of Sirowal belt in all the three districts shows water levels between 2 and 5 m bgl and water levels in the range of 2-5 m & 5 – 10 m bgl have been observed at a few patches. In Kandi belt, the water levels generally found are within the range of 5 - 20 mbgl. Water levels deeper than 20m bgl were observed in the extreme north & north-western portion of Jammu district in Kandi belt and central parts in Samba district (Figure 8).

Figure 8



Kashmir Region: The water level data in respect of 78 wells for the month of November 2023 were analysed. The depth to water level varied from 0.35 m bgl to 15.29 m bgl. 18 wells (23.1%) have recorded the water level less than 2.0 m bgl. About 50 wells (64.1%) have shown depth to water level in the range 2-5 m bgl. Whereas 9 wells (11.5%) have shown water levels in the range of 5-10 m bgl. 01 well (1.3%) has registered deeper water levels, in the range of 10-20 m bgl. No well has shown water levels in the range of >20 m bgl.

Valley areas of Kashmir Region have shown water levels in all ranges. Major portion has shown within 2m to 5 m bgl. In Baramulla and pulwama districts water levels above 2 but under 5 m have been shown in the northern parts of Baramulla few patches in Kupwara and Srinagar and Pulwama districts. The water level is deeper towards northern and north-eastern parts of Anantnag & Pulwama district (figure 9).

Figure 9

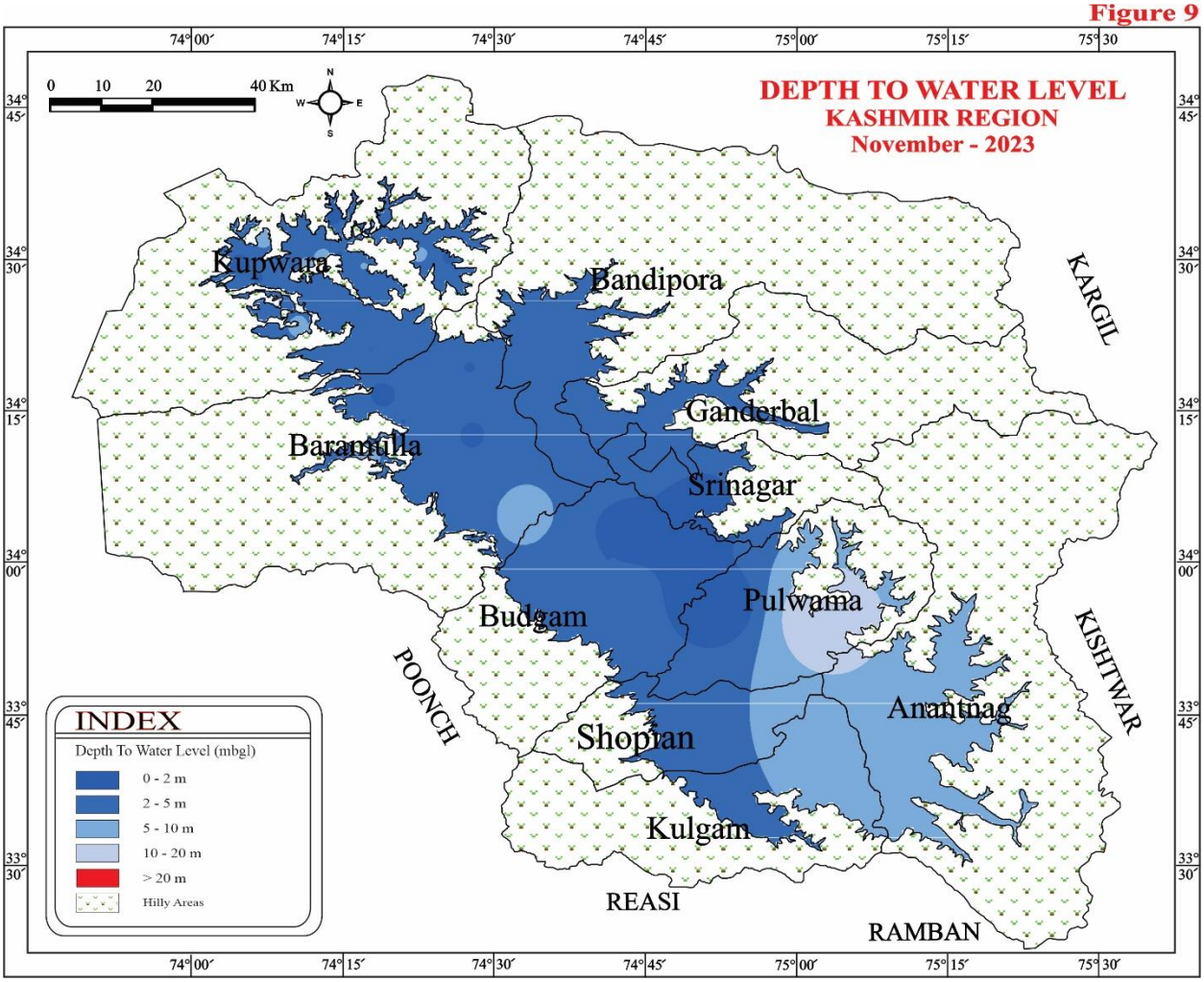


Table 5. CATEGORIZATION OF DEPTH TO WATER LEVEL- NOVEMBER 2023														
REGION	**District**	**No. Of wells Analyzed**	**Depth to Water Level (mbgl)**		**Number of Wells Showing Depth to Water Level (mbgl) in the Range of**					**Percentage of Wells Showing Depth to Water Level (mbgl) in the Range of**				
			Min	**Max**	**0–2**	**2–5**	**5–10**	**10–20**	**>20**	**0–2**	**2–5**	**5–10**	**10–20**	**>20**
KASHMIR REGION	Bandipora	5	2.10	2.75	0	5	0	0	0	0	100	0	0	0
	Baramulla	24	1.05	7.20	5	16	3	0	0	20.8	66.7	12.5	0.0	0.0
	Budgam	1			1					100.0				
	Kupwara	45	0.65	7.8	10	29	6	0	0	22.2	64.4	13.3	0.0	0.0
	Pulwama	2	0.35	15.29	1	0	0	1	0	50.0	0.0	0.0	50.0	0.0
	Srinagar	1			1	0	0	0	0	100.0	0.0	0.0	0.0	0.0
	Total	**78**	**0.35**	**15.29**	**18**	**50**	**9**	**1**	**0**	**23.1**	**64.1**	**11.5**	**1.3**	**0.0**
JAMMU REGION	Jammu	85	0.21	34.17	16	49	9	6	5	18.8	57.6	10.6	7.1	5.9
	Kathua	41	0.38	55.75	12	16	9	2	2	29.3	39.0	22.0	4.9	4.9
	Rajauri	36	0.93	6.40	14	18	4	0	0	38.9	50.0	11.1	0.0	0.0
	Reasi	8	1.61	24.99	3	4	0	0	1	37.5	50.0	0.0	0.0	12.5
	Samba	36	0.35	20.15	10	15	8	2	1	27.8	41.7	22.2	5.6	2.8
	Udhampur	22	0.10	5.63	12	9	1	0	0	54.5	40.9	4.5	0.0	0.0
	Total	**228**	**0.10**	**55.75**	**67**	**111**	**31**	**10**	**9**	**29.4**	**48.7**	**13.6**	**4.4**	**3.9**
	TOTAL J&K	**306**			**85**	**161**	**40**	**11**	**9**	**27.8**	**52.6**	**13.1**	**3.6**	**2.9**

Depth to Water Level – January 2024

Jammu Region: The water level data in respect of 223 wells for the month of January 2024 were analysed. The depth to water levels varied from 0.15 to 34.61 m bgl. Categorization of depth to water level January 2022 is given in table 6.

A total of 45 of the total wells (20.2%) analysed have recorded the water level less than 2.0 m bgl. 115 wells (51.6%) have shown depth to water level in the range 2-5 m bgl, whereas 41 wells (18.4%) have shown water levels in the range of 5-10 m bgl, 12 wells (5.4%) have shown the deeper water levels i.e. 10-20 m bgl and 10 wells (4.5%) have shown water level > 15 m bgl.

In entire Sirowal area, the water levels varied between 2 to 5 m bgl with few small patches of 0-2 and 5-10 m. Besides, small portions of all the three districts recorded water level in the range of 5 to 10 mbgl. The Kandi belt shows deeper water levels between 5 to 20 m bgl. of all the three districts, the deeper water levels deeper i.e. more than 20 m bgl were also observed in north & north western part of Jammu, central parts of Kathua districts (Figure 10).

Figure 10

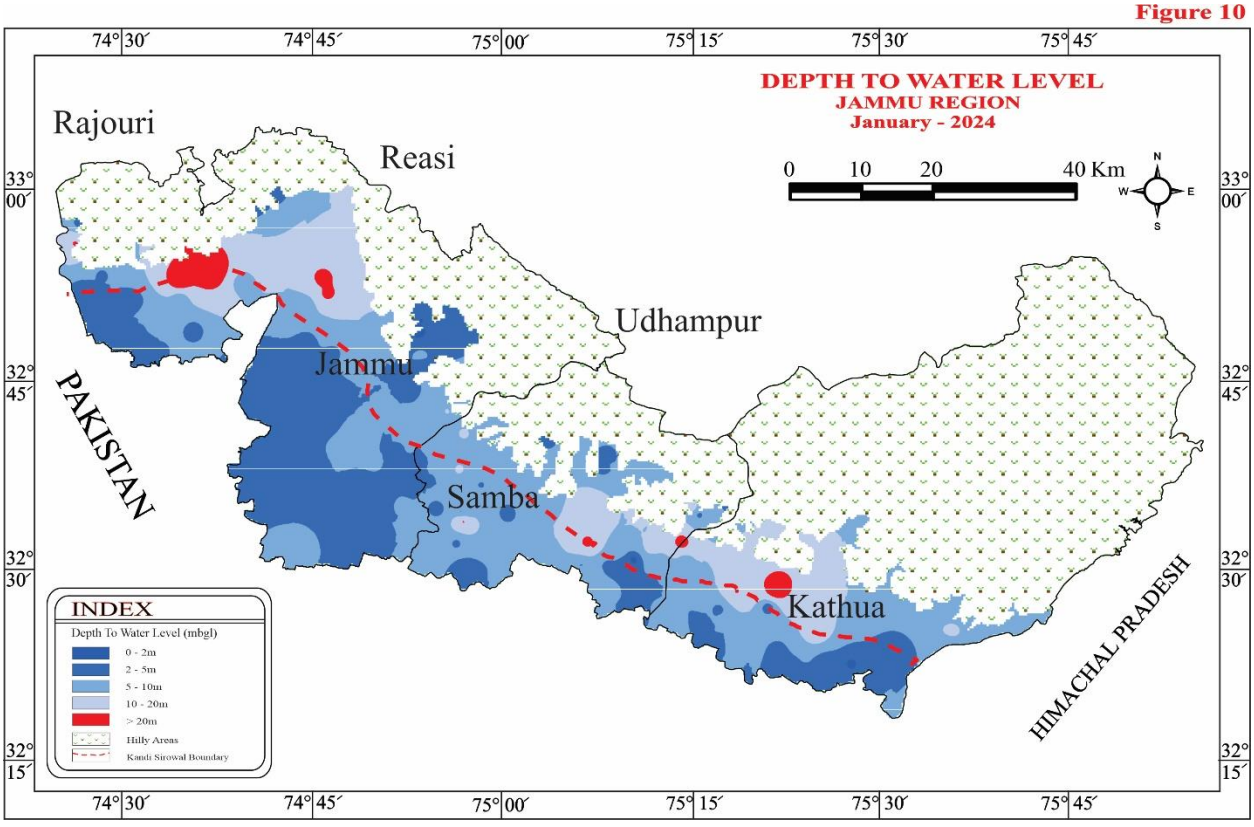


Table 6. CATEGORIZATION OF DEPTH TO WATER LEVEL- JANUARY 2024														
REGION	**District**	**No. Of wells Analyzed**	**Depth to Water Level (mbgl)**		**Number of Wells Showing Depth to Water Level (mbgl) in the Range of**					**Percentage of Wells Showing Depth to Water Level (mbgl) in the Range of**				
			Min	**Max**	**0–2**	**2–5**	**5–10**	**10–20**	**> 20**	**0–2**	**2–5**	**5–10**	**10–20**	**> 20**
JAMMU REGION	Jammu	83	0.15	34.61	11	51	10	5	6	13.3	61.4	12.0	6.0	7.2
	Kathua	40	0.63	24.35	9	15	11	3	2	22.5	37.5	27.5	7.5	5.0
	Rajauri	35	1.32	6.78	8	22	5	0	0	22.9	62.9	14.3	0.0	0.0
	Reasi	8	1.73	25.00	2	5	0	0	1	25.0	62.5	0.0	0.0	12.5
	Samba	36	0.80	20.72	5	16	10	4	1	13.9	44.4	27.8	11.1	2.8
	Udhampur	21	0.50	8.60	10	6	5	0	0	47.6	28.6	23.8	0.0	0.0
	Total	**223**	**0.15**	**34.61**	**45**	**115**	**41**	**12**	**10**	**20.2**	**51.6**	**18.4**	**5.4**	**4.5**

2.2. SEASONAL FLUCTUATION OF WATER LEVEL

November 2023 with respect to May 2023

Jammu Region: The seasonal water level fluctuation between November 2023 & May 2023 in respect of 204 National Hydrograph Stations are analysed. It is observed that 186 stations have shown rise in water level where as only 18 stations have shown fall in water levels in the range of 0-2 m, 2-4 m and >4 m. The minimum rise 0.01 m and maximum rise of 6.98 m. Whereas minimum decline of 0.09 m is recorded and maximum of 1.85 m is shown. Categorization of fluctuations in water levels is given in Table 7.

Out of 186 stations showing rise in water levels, 124 wells have shown rise less than 2 m. 45 wells and 17 wells have shown rise in the range of 2-4 m and >4 m respectively. 16 wells have shown decline between 0-2 m and 0 well have shown fall between 2-4 and 2 wells have shown decline of>4 m.

Effect of rainfall is directly reflected in all parts of the area monitored during November 2023. Almost all the valley areas are showing rise in the water levels except for small patches in all districts. Some locations of each district have registered fall within 0-5 m bgl and in Jammu central areas decline above 4 m is also observed (Figure 11).

Figure 11

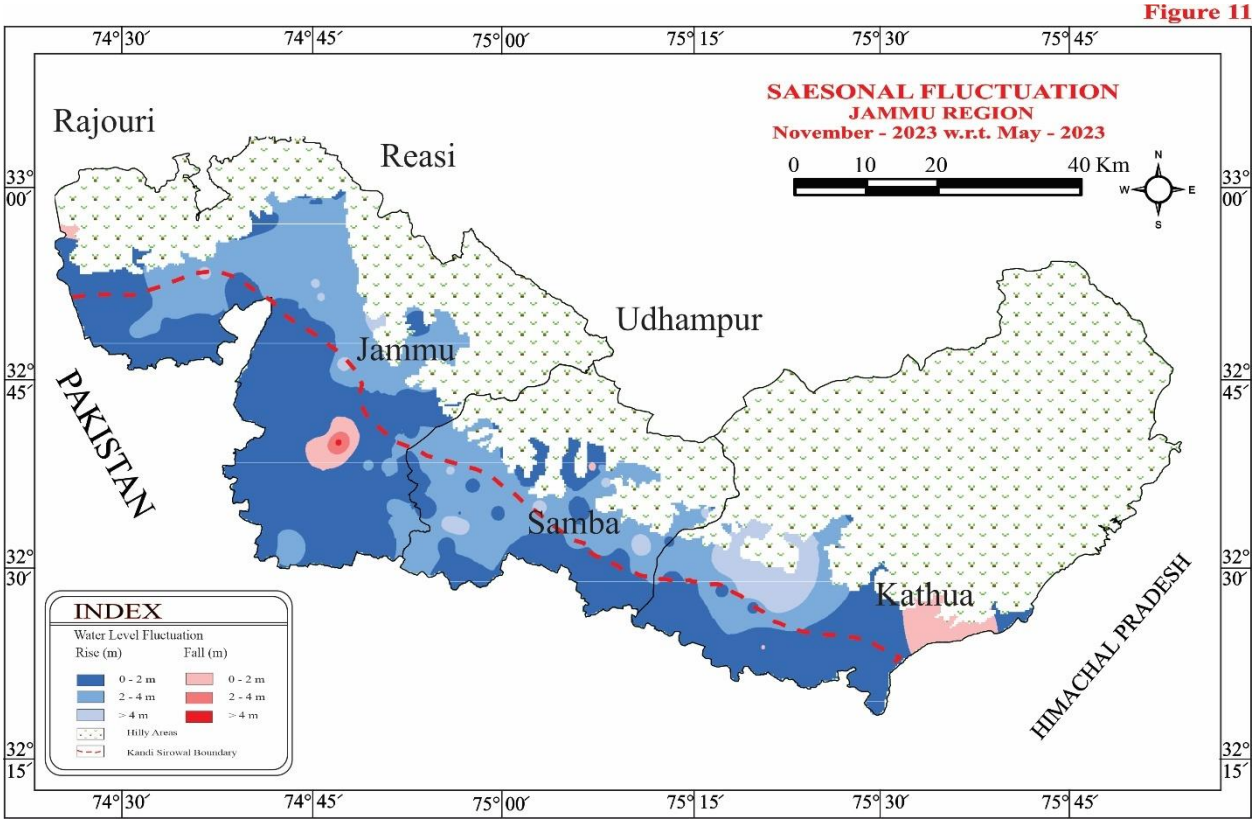


Table 7. CATEGORIZATION OF CHANGES IN WATER LEVEL BETWEEN MAY 2023-NOVEMBER 23 - JAMMU DIVISION

Region	District	No. Of wells Analyzed	Range of Fluctuation (m)				No. of Wells Showing Fluctuation (m)						Percentage of wells Showing Fluctuation						Total No. Of Wells	
			Rise		Fall		Rise			Fall			Rise			Fall				
			Min	Max	Min	Max	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	Rise	Fall
Jammu Region	Jammu	73	0.05	6.92	0.05	6.50	42	20	7	2	0	2	57.5	27.4	9.6	2.7	0.0	2.7	69	4
	Kathua	32	0.2	6.98	0.05	1.78	20	4	3	5	0	0	62.5	12.5	9.4	15.6	0.0	0.0	27	5
	Rajouri	35	0.01	6.86	0.05	1.87	24	2	2	7	0	0	68.6	5.7	5.7	20.0	0.0	0.0	28	7
	Reasi	8	0.43	1.94			8	0	0	0	0	0	100.0	0.0	0.0	0.0	0.0	0.0	8	0
	Samba	34	0.01	6.20			18	11	4	1	0	0	52.9	32.4	11.8	2.9	0.0	0.0	33	1
	Udhampur	22	0.35	4.07			12	8	1	1	0	0	54.5	36.4	4.5	4.5	0.0	0.0	21	1
	TOTAL	**204**	**0.01**	**6.98**	**0.05**	**6.50**	**124**	**45**	**17**	**16**	**0**	**2**	**60.8**	**22.1**	**8.3**	**7.8**	**0.0**	**1.0**	**186**	**18**

Kashmir Region: The seasonal water level fluctuation between November 2023 & May 2023 in respect of 75 National Hydrograph Stations are analysed. It is observed that 8 stations have shown rise in water level where as 68 other stations have shown fall in water levels in the range of 0-2 m, 2-4 m and >4 m. The minimum rise 0.07 m and maximum rise of 1.24 m. Whereas minimum decline of 0.07 m is recorded and maximum of 6.65 m is shown. Categorization of fluctuations in water levels is given in Table 8.

Out of 8 stations showing rise in water levels, 7 wells have shown rise less than 2 m. 0 well and 1 well have shown rise in the range of 2-4 m and >4 m respectively. 51 wells have shown decline between 0-2 m and 16 well have shown fall between 2-4 and 2 wells have shown decline of>4 m.

Figure 12

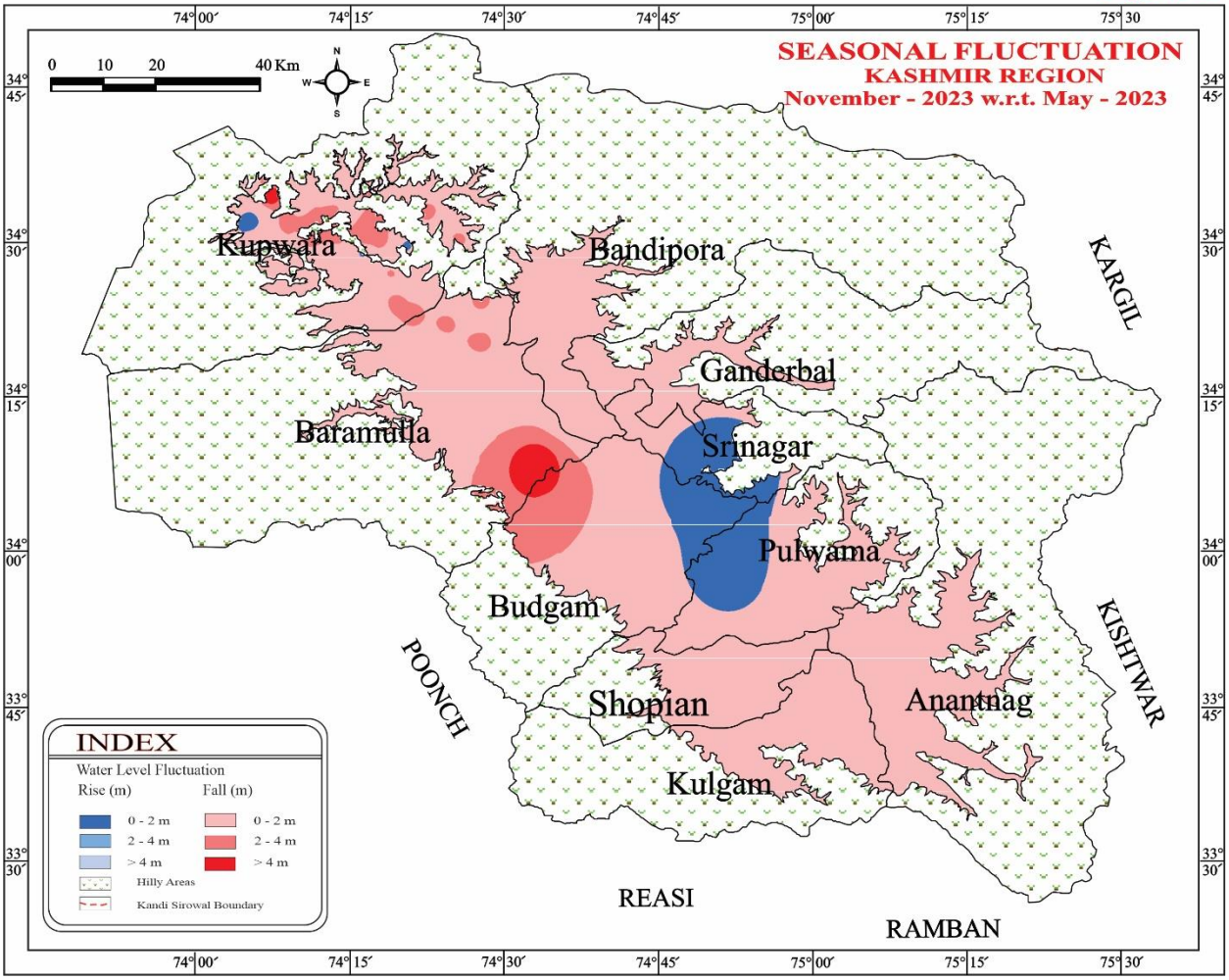


Table 8. CATEGORIZATION OF CHANGES IN WATER LEVEL BETWEEN MAY 2023-NOVEMBER 2023 - KASHMIR DIVISION

Region	District	No. Of wells Analyzed	Range of Fluctuation (m)				No. of Wells Showing Fluctuation (m)						Percentage of wells Showing Fluctuation						Total No. Of Wells	
			Rise		Fall		Rise			Fall			Rise			Fall				
			Min	Max	Min	Max	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	Rise	Fall
Kashmir Region	Baramulla	24			0.15	6.48	1	0	0	19	3	1	4.2	0.0	0.0	79.2	12.5	4.2	1	23
	Kupwara	44	0.07	1.24	0.10	6.65	4	0	1	26	13	1	9.1	0.0	2.3	59.1	29.5	2.3	5	40
	Pulwama	2					1	0	0	1	0	0	50.0	0.0	0.0	50.0	0.0	0.0	1	1
	Bandipora	4			0.07	1.25	0	0	0	4	0	0	0.0	0.0	0.0	100.0	0.0		0	4
	Srinagar	1					1	0	0	1	0	0	100.0	0.0	0.0	100.0	0.0	0.0	1	0
	TOTAL	**75**	**0.07**	**1.24**	**0.07**	**6.65**	**7**	**0**	**1**	**51**	**16**	**2**	**9.3**	**0.0**	**1.3**	**68.0**	**21.3**	**2.7**	**8**	**68**

2.3. ANNUAL FLUCTUATION OF WATER LEVEL

May 2023 with respect to May 2022

Jammu Region: The water level data in respect of 196 National Hydrograph Stations for the month of May 2023 was analysed. It was compared with May 2022. Majority of the wells have shown rise in water levels. A total of 127 wells have shown rise and 69 wells have shown fall in water levels in the range of 0-2 m, 2-4 m and >4 m. The minimum rise 0.01 m to maximum rise of 5.5 m is shown.

Whereas minimum decline of 0.02 m is recorded to a maximum of 4.62 m. Categorization of fluctuations in water levels is given in table 9.

Rise is shown by 115 wells in the range of 0-2 m. 9 wells have registered rise from 2-4 m bgl and 3 wells are showing rise of >4 m. Among 69 wells showing fall, 61 wells have shown fall in water level in the range 0-2 m, 6 wells have shown fall between 2-4 m, and 2 well have shown fall of >4 m.

All the districts have shown rise in water levels where as a significant portion have shown decline in water level. The decline in water levels in the range of 0-2 m is observed in sufficient portions in all the districts. Major parts of Jammu district, entire Samba and most of Kathua districts shown decline. South Jammu, northern western parts of Kathua shows >4m decline in water levels (Figure 13).

Figure 13

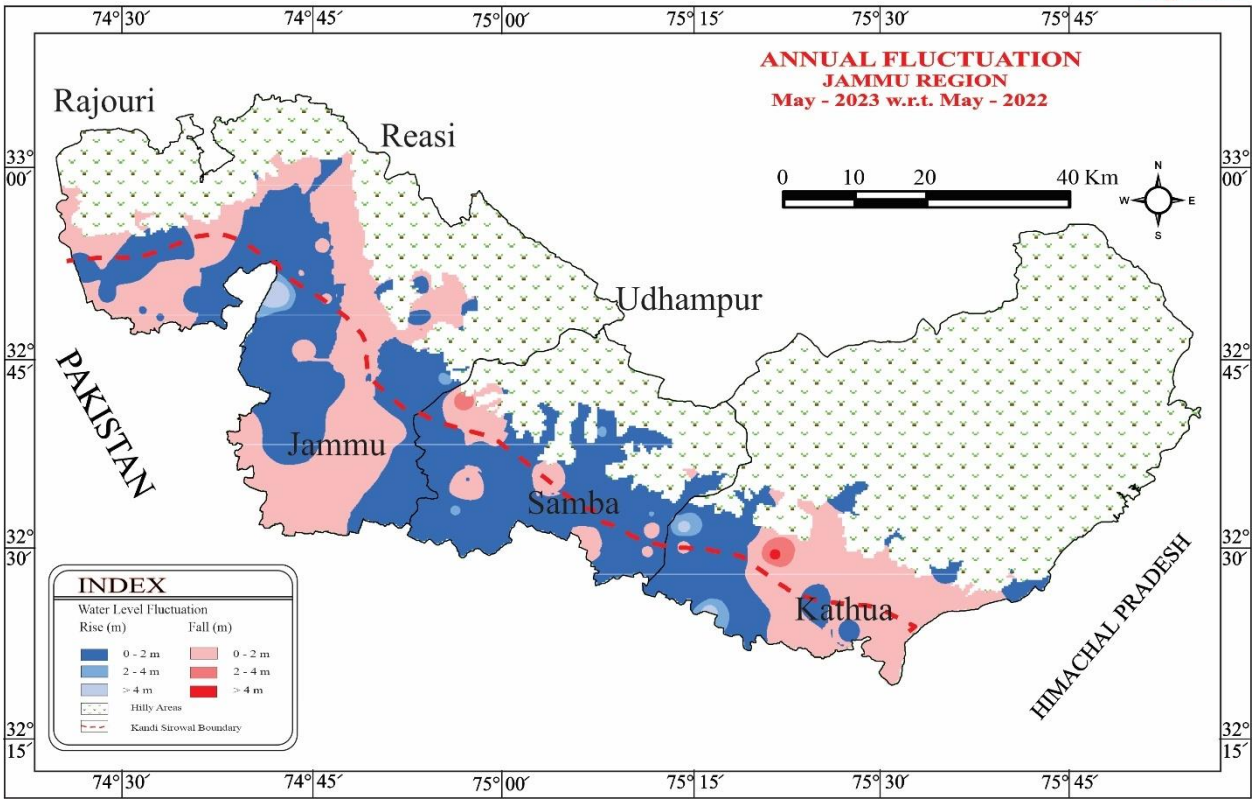


Table 9. CATEGORIZATION OF CHANGES IN WATER LEVEL BETWEEN MAY 2022 AND MAY 2023

District	No. Of wells Analyzed	Range of Fluctuation (m)				No. of Wells Showing Fluctuation (m)						Percentage of wells Showing Fluctuation						Total No. Of Wells	
		Rise		Fall		Rise			Fall			Rise			Fall			Rise	Fall
		Min	Max	Min	Max	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4		
Jammu	72	0.01	5.50	0.05	3.25	39	1	1	28	3	0	54.2	1.4	1.4	38.9	4.2	0.0	41	31
Kathua	31	0.07	5.50	0.07	4.62	19	1	2	8	0	1	61.3	3.2	6.5	25.8	0.0	3.2	22	9
Rajouri	33	0.10	2.90	0.10	4.54	20	2	0	9	1	1	60.6	6.1	0.0	27.3	3.0	3.0	22	11
Reasi	5	0.23	2.92			3	1	0	1	0	0	60.0	20.0	0.0	20.0	0.0	0.0	4	1
Samba	33	0.05	2.65	0.02	3.70	21	3	0	8	1	0	63.6	9.1	0.0	24.2	3.0	0.0	24	9
Udhampur	22	0.04	2.68	0.15	2.39	13	1	0	7	1	0	59.1	4.5	0.0	31.8	4.5	0.0	14	8
Total	**196**	**0.01**	**5.50**	**0.02**	**4.62**	**115**	**9**	**3**	**61**	**6**	**2**	**58.7**	**4.6**	**1.5**	**31.1**	**3.1**	**1.0**	127	69

Kashmir Region: The water level data in respect of 49 National Hydrograph Stations for the month of May 2023 was analysed. It was compared with May 2022. Majority of the wells have shown rise in water levels. A total of 47 wells have shown rise and 2 wells have shown fall in water levels. The minimum rise 0.08 m to maximum rise of 2.97 m is shown. Whereas minimum decline of 0.15 m is recorded to a maximum of 0.25 m. Categorization of fluctuations in water levels is given in table 10. Rise is shown by 44 wells in the range of 0-2 m. 3 wells have registered rise from 2-4 m bgl and 9 wells are showing rise of >4 m. Among 2 wells showing fall, all 2 wells have shown fall in water level in the range 0-2 m, whereas no well has shown decline below 2m.

Due to insufficient No of wells mapping not possible

Table 10. CATEGORIZATION OF CHANGES IN WATER LEVEL BETWEEN May 2022 AND May 2023

District	No. Of wells Analyzed	Range of Fluctuation (m)				No. of Wells Showing Fluctuation (m)						Percentage of wells Showing Fluctuation						Total No. Of Wells	
		Rise		Fall		Rise			Fall			Rise			Fall			Rise	Fall
		Min	Max	Min	Max	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4		
Baramulla	16	0.14	1.40			16	0	0	0	0	0	100.0	0.0	0.0	0.0	0.0	0.0	16	0
Kupwara	30	0.08	2.97	0.15	0.25	25	3	0	2	0	0	83.3	10.0	0.0	6.7	0.0	0.0	28	2
Pulwama	2	0.18	0.58			2	0	0	0	0	0	100.0	0.0	0.0	0.0	0.0	0.0	2	0
Srinagar	1					1	0	0	0	0	0	100.0	0.0	0.0	0.0	0.0	0.0	1	0
Total	**49**	**0.08**	**2.97**	**0.15**	**0.25**	**44**	**3**	**0**	**2**	**0**	**0**	**89.8**	**6.1**	**0.0**	**4.1**	**0.0**	**0.0**	**47**	**2**

August 2023 with respect to August 2022

Jammu Region: For analysing the annual fluctuation, the water level data in respect of 211 National Hydrograph Network Stations for the month of August 2023 were analysed and compared with the water levels of August 2022. The minimum rise 0.01 m to maximum rise of 10.13 m. Whereas minimum decline of 0.01 m to a maximum of 4.78 m. Categorization of fluctuations in water levels is given in table 11.

A total of 118 wells have shown rise and 93 wells have shown fall in water levels. Rise is shown by 114 wells in the range of 0-2 m, 2 wells in the range of 2-4 m bgl and 2 wells have

registered rise of>4 m. Among 93 wells showing decline, a total of 85 wells have registered fall in the range of 0-2 m, 6 well have shown fall between 2-4 m and 2 wells have shown fall of >4 m.

Jammu Region is showing rise in water levels in all districts. The decline in the range of 0 – 2 m has been observed in minor portions in each district. Major portions of all the districts have shown rise in water levels. The Kandi areas show rise of >4 m in major portions, Decline is shown in the north and north eastern parts of Jammu district, southern parts of samba district, northern parts of Kathua district (Figure 14).

Figure 14

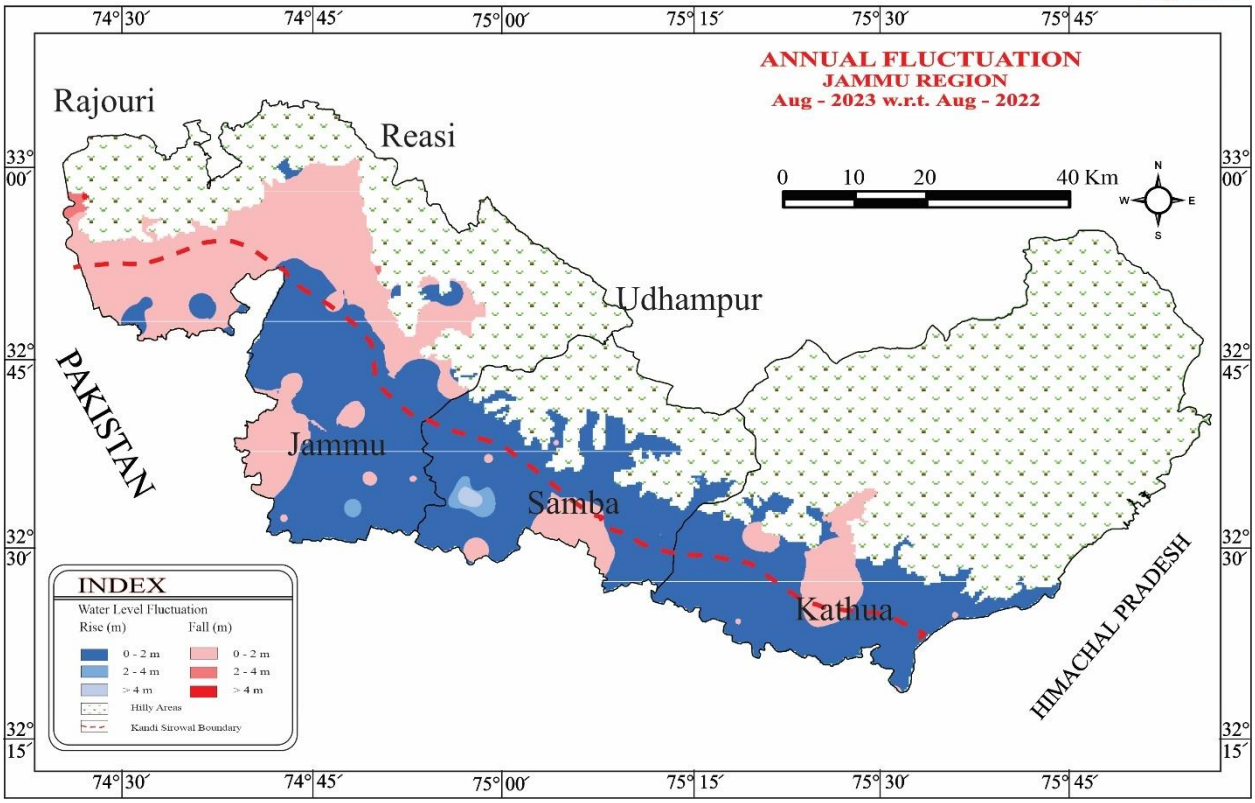


Table 11. CATEGORIZATION OF CHANGES IN WATER LEVEL BETWEEN AUGUST 2022 AND AUGUST 23

District	No. Of wells Analyzed	Range of Fluctuation (m)				No. of Wells Showing Fluctuation (m)						Percentage of wells Showing Fluctuation						Total No. Of Wells	
		Rise		Fall		Rise			Fall			Rise			Fall				
		Min	Max	Min	Max	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	Rise	Fall
Jammu	75	0.05	2.90	0.01	4.78	37	1	0	35	0	2	49.3	1.3	0.0	46.7	0.0	2.7	38	37
Kathua	40	0.05	1.76	0.02	2.25	31	0	0	8	1	0	77.5	0.0	0.0	20.0	2.5	0.0	31	9
Rajouri	36	0.02	1.26	0.02	3.37	8	0	0	24	4	0	22.2	0.0	0.0	66.7	11.1	0.0	8	28
Reasi	7	0.01	0.54			6	0	0	1	0	0	85.7	0.0	0.0	14.3	0.0	0.0	6	1
Samba	32	0.05	10.13	0.02	0.88	22	1	1	8	0	0	0.0	3.1	3.1	25.0	0.0	0.0	24	8
Udhampur	21	0.05	4.70	0.05	2.80	10	0	1	9	1	0	47.6	0.0	4.8	42.9	4.8	0.0	11	10
Total	**211**	**0.01**	**10.13**	**0.01**	**4.78**	**114**	**2**	**2**	**85**	**6**	**2**	**54.0**	**0.9**	**0.9**	**40.3**	**2.8**	**0.9**	**118**	**93**

Kashmir Region: The water level data in respect of 47 National Hydrograph Stations for the month of May 2023 was analysed. It was compared with May 2022. Majority of the wells have decline in water levels. A total of 18 wells have shown rise and 29 wells have shown fall in water levels. The minimum rise 0.10 m to maximum rise of 2.25 m is shown. Whereas minimum decline of 0.05 m is recorded to a maximum of 2.25 m. Categorization of fluctuations in water levels is given in table 12.

Rise is shown by 17 wells in the range of 0-2 m. 1 well have registered rise from 2-4 m bgl and no well shows rise of >4 m. Among 29 wells showing fall, 17 wells have shown fall in water level in the range 0-2 m, 12 wells have shown fall in water level in the range 2-4 m, whereas no well has shown decline below 4m.

Due to insufficient No of wells mapping not possible

Table 12. CATEGORIZATION OF CHANGES IN WATER LEVEL BETWEEN AUGUST 2022 AND AUGUST 23

District	No. Of wells Analyzed	Range of Fluctuation (m)				No. of Wells Showing Fluctuation (m)						Percentage of wells Showing Fluctuation						Total No. Of Wells	
		Rise		Fall		Rise			Fall			Rise			Fall			Rise	Fall
		Min	Max	Min	Max	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4		
Baramulla	15	0.40	1.15	0.08	1.55	4	0	0	0	11	0	26.7	0.0	0.0	0.0	73.3	0.0	4	11
Kupwara	30	0.10	2.25	0.05	2.25	12	1	0	16	1	0	40.0	3.3	0.0	53.3	3.3	0.0	13	17
Pulwama	2					1	0	0	1	0	0	50.0	0.0	0.0	50.0	0.0	0.0	1	1
Srinagar	0					0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	0
Total	**47**	**0.10**	**2.25**	**0.05**	**2.25**	**17**	**1**	**0**	**17**	**12**	**0**	**36.2**	**2.1**	**0.0**	**36.2**	**25.5**	**0.0**	**18**	**29**

November 2023 with respect to November 2022

Jammu Region: The water level data, in respect of 228 National Hydrograph Stations for the month of November 2023 was analysed. It was compared with those monitored during November 2022. Majority of the wells have shown rise in water levels. A total of 144 wells have shown rise and 84 wells have shown fall in water levels. The minimum rise 0.02 m to a maximum rise of 4.2 m is observed. Whereas minimum decline of 0.01 m is recorded to a maximum of 5.12 m is recorded. Categorization of fluctuations in water levels is given in table 13.

Rise is shown by 138 wells in the range of 0-2 m. 5 wells have recorded rise in the range of 2-4 m bgl and only 1 well has shown rise of >4 m. Among 84 wells showing fall, 77 wells have shown fall in the range of 0-2 m. 6 wells have shown fall between 2-4 m, and 1 well have shown fall of >4 m.

Major parts of all the districts have shown rise in water levels in the range of 0-4 m. Major parts of each district have shown decline in 0-2m with few exceptions. The decline is shown in central northwestern Jammu, central Samba and & north-western and eastern Kathua district (Figure 15).

Figure 15

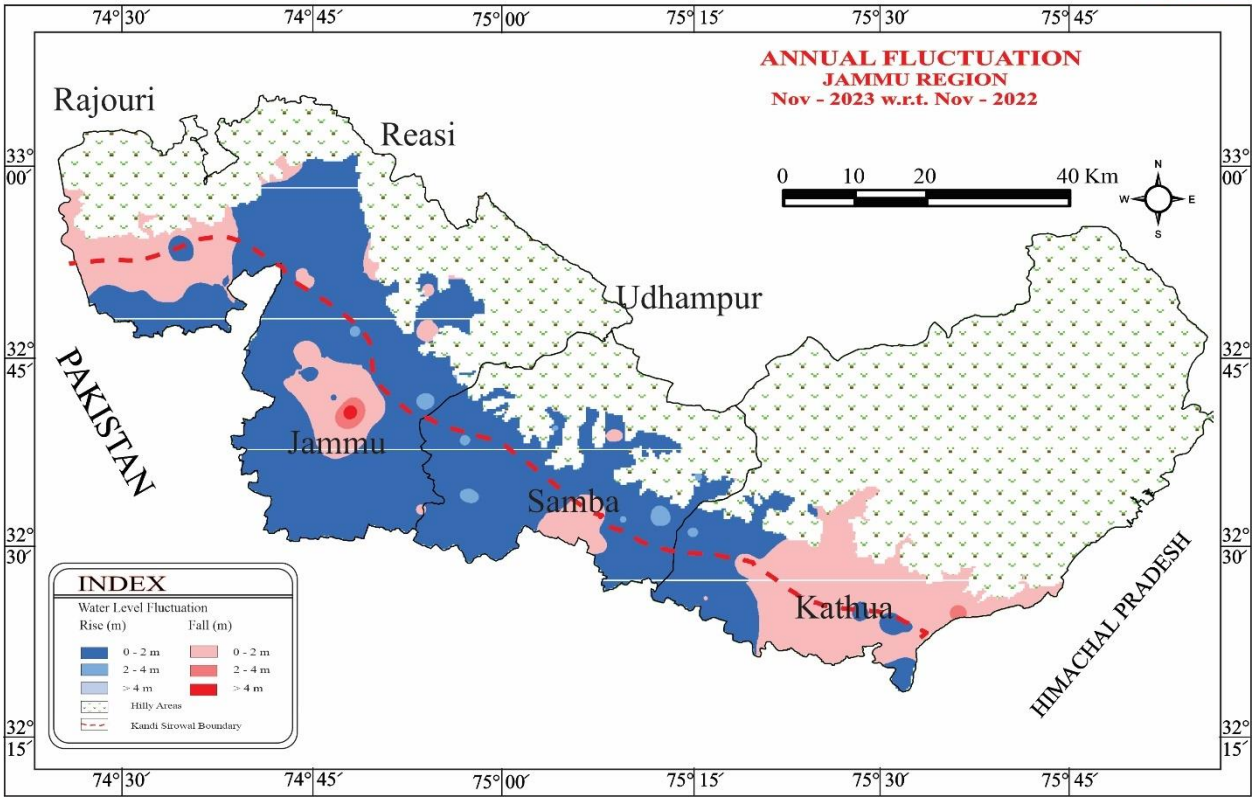


Table 13. CATEGORIZATION OF CHANGES IN WATER LEVEL BETWEEN NOVEMBER 2022 AND NOVEMBER 23

District	No. Of wells Analyzed	Range of Fluctuation (m)				No. of Wells Showing Fluctuation (m)						Percentage of wells Showing Fluctuation						Total No. Of Wells	
		Rise		Fall		Rise			Fall			Rise			Fall				
		Min	Max	Min	Max	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	Rise	Fall
Jammu	85	0.02	2.32	0.01	5.12	65	1	0	17	1	1	76.5	1.2	0.0	20.0	1.2	1.2	66	19
Kathua	41	0.02	1.68	0.03	2.26	21	0	0	19	1	0	51.2	0.0	0.0	46.3	2.4	0.0	21	20
Rajouri	36	0.10	1.58	0.04	3.62	9	0	0	24	3	0	25.0	0.0	0.0	66.7	8.3	0.0	9	27
Reasi	8	0.23	2.63	0.02	0.50	4	1	0	3	0	0	50.0	12.5	0.0	37.5	0.0	0.0	5	3
Samba	36	0.08	4.20	0.13	0.64	26	2	1	7	0	0	72.2	5.6	2.8	19.4	0.0	0.0	29	7
Udhampur	22	0.05	2.67	0.15	2.08	13	1	0	7	1	0	59.1	4.5	0.0	31.8	4.5	0.0	14	8
Total	**228**	**0.02**	**4.20**	**0.01**	**5.12**	**138**	**5**	**1**	**77**	**6**	**1**	**60.5**	**2.2**	**0.4**	**33.8**	**2.6**	**0.4**	**144**	**84**

Kashmir Region: The water level data in respect of 47 National Hydrograph Stations for the month of May 2023 was analysed. It was compared with May 2022. Majority of the wells have decline in water levels. A total of 15 wells have shown rise and 32 wells have shown fall in water levels. The minimum rise 0.07 m to maximum rise of 2.4 m is shown. Whereas minimum decline of 0.15 m is recorded to a maximum of 2.6 m. Categorization of fluctuations in water levels is given in table 14. Rise is shown by 13 wells in the range of 0-2 m. 2 well have registered rise from 2-4 m bgl and no well shows rise of >4 m. Among 32 wells showing fall, 26 wells have shown fall in water level in the

range 0-2 m, 6 wells have shown fall in water level in the range 2-4 m, whereas no well has shown decline below 4m.

Due to insufficient No of wells mapping not possible

Table 14. CATEGORIZATION OF CHANGES IN WATER LEVEL BETWEEN Nov 2022 AND Nov 23

District	No. Of wells Analyzed	Range of Fluctuation (m)				No. of Wells Showing Fluctuation (m)						Percentage of wells Showing Fluctuation						Total No. Of Wells	
		Rise		Fall		Rise			Fall			Rise			Fall				
		Min	Max	Min	Max	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	Rise	Fall
Baramulla	14	0.40	0.55	0.15	0.25	3	0	0	11	0	0	21.4	0.0	0.0	78.6	0.0	0.0	3	11
Kupwara	30	0.07	2.40	0.20	2.60	9	1	0	14	6	0	30.0	3.3	0.0	46.7	20.0	0.0	10	20
Pulwama	2					1	0	0	1	0	0	50.0	0.0	0.0	50.0	0.0	0.0	1	1
Srinagar	1					0	1	0	0	0	0	0.0	100.0	0.0	0.0	0.0	0.0	1	0
Total	**47**	**0.07**	**2.40**	**0.15**	**2.60**	**13**	**2**	**0**	**26**	**6**	**0**	**27.7**	**4.3**	**0.0**	**55.3**	**12.8**	**0.0**	**15**	**32**

January 2024 with respect to January 2023

Jammu Region: The water level data, in respect of 220 National Hydrograph Stations for the month of January 2024 was analysed. It was compared with those monitored during January 2023. Majority of the wells have shown rise in water levels. A total of 142 wells have shown rise and 78 wells have shown fall in water levels. The minimum rise 0.01 m to a maximum rise of 8.2 m is recorded. Whereas minimum decline of 0.01 m to a maximum of 3.66 m is recorded. Categorization of fluctuations in water levels is given in table 15.

Rise is shown by 132 wells in the range of 0-2 m. 8 wells have recorded rise in the range of 2-4 m bgl and 2 wells have shown rise of >4 m. Among 78 wells showing fall, 71 wells have shown fall in the range of 0-2 m, 7 wells have shown fall between 2-4m, and 0 wells has shown fall of >4 m.

In Jammu district, decline in water levels in the range of 0-2 m has been observed where as major portion shows rise. Some pockets have shown rise in water level of 2 m in all districts. Small pockets have shown decline above 2m in Western Jammu, southern Samba and central Kathua districts (Fig. 16)

Kashmir Region: Monitoring is not carried out in January Month

Figure 16

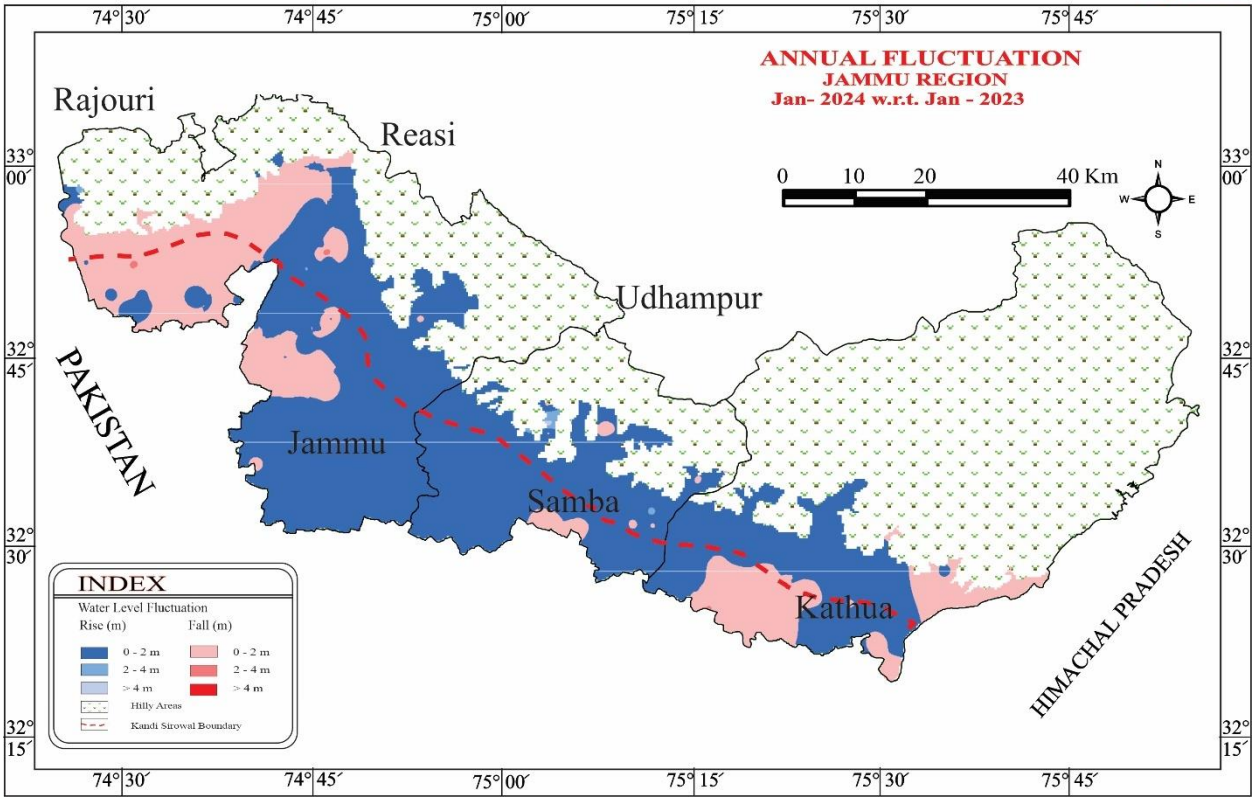


Table 15. CATEGORIZATION OF CHANGES IN WATER LEVEL BETWEEN JANUARY 2023 AND JANUARY 24

District	No. Of wells Analyzed	Range of Fluctuation (m)				No. of Wells Showing Fluctuation (m)						Percentage of wells Showing Fluctuation						Total No. Of Wells	
		Rise		Fall		Rise			Fall			Rise			Fall				
		Min	Max	Min	Max	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	Rise	Fall
Jammu	80	0.01	3.58	0.04	3.56	58	4	0	16	2	0	72.5	5.0	0.0	20.0	2.5	0.0	62	18
Kathua	40	0.01	1.34	0.06	2.17	24	0	0	15	1	0	60.0	0.0	0.0	37.5	2.5	0.0	24	16
Rajouri	35	0.10	3.53	0.01	3.66	13	1	0	18	3	0	37.1	2.9	0.0	51.4	8.6	0.0	14	21
Reasi	8	0.03	2.60	0.05	0.84	5	1	0	2	0	0	62.5	12.5	0.0	25.0	0.0	0.0	6	2
Samba	36	0.03	8.20	0.10	0.44	24	2	1	9	0	0	66.7	5.6	2.8	25.0	0.0	0.0	27	9
Udhampur	21	0.05	4.75	0.05	2.80	8	0	1	11	1	0	38.1	0.0	4.8	52.4	4.8	0.0	9	12
Total	**220**	**0.01**	**8.20**	**0.01**	**3.66**	**132**	**8**	**2**	**71**	**7**	**0**	**60.0**	**3.6**	**0.9**	**32.3**	**3.2**	**0.0**	**142**	**78**

2.4. DECADAL FLUCTUATION OF WATER LEVEL

May 2023 with respect to mean of May 2013 – May 2022

The water level fluctuation for the month of May 2023 Vs. (Mean of May 2013 – May 2022) has been worked out in respect of 207 observation wells. It is observed that a total of 127 wells have shown rise and 80 wells have shown decline in water level (especially in Kandi areas of Outer plains). The minimum rise 0.01 m to a maximum rise of 5.8 m. Whereas minimum decline of 0.02 m to a maximum of 6.43 m. Categorisation of fluctuations in water level is given in table 16.

Out of 127 number of wells showing rise, 112 wells have shown rise less than 2 m, 11 wells have shown rise from 2-4 m and 4wells have shown rise of > 4 m. Out of 80 wells showing fall, 75 wells have shown fall in the range of 0-2 m, 3 wells have shown fall between 2-4 m and 2 wells have shown fall of >4 m.

Majority of the area shows a decline in water levels in all ranges in Jammu Region. In Jammu district, the decline in range of 0-5m was found in entire area except western and southern patches. In Samba major areas have shown decline except few portions, and in Jammu & Kathua district major area is in declining trend except in the central Jammu & western Kathua. (Figure 17).

Kashmir Region: Due to insufficient No of well data analysis and mapping not possible

Figure 17

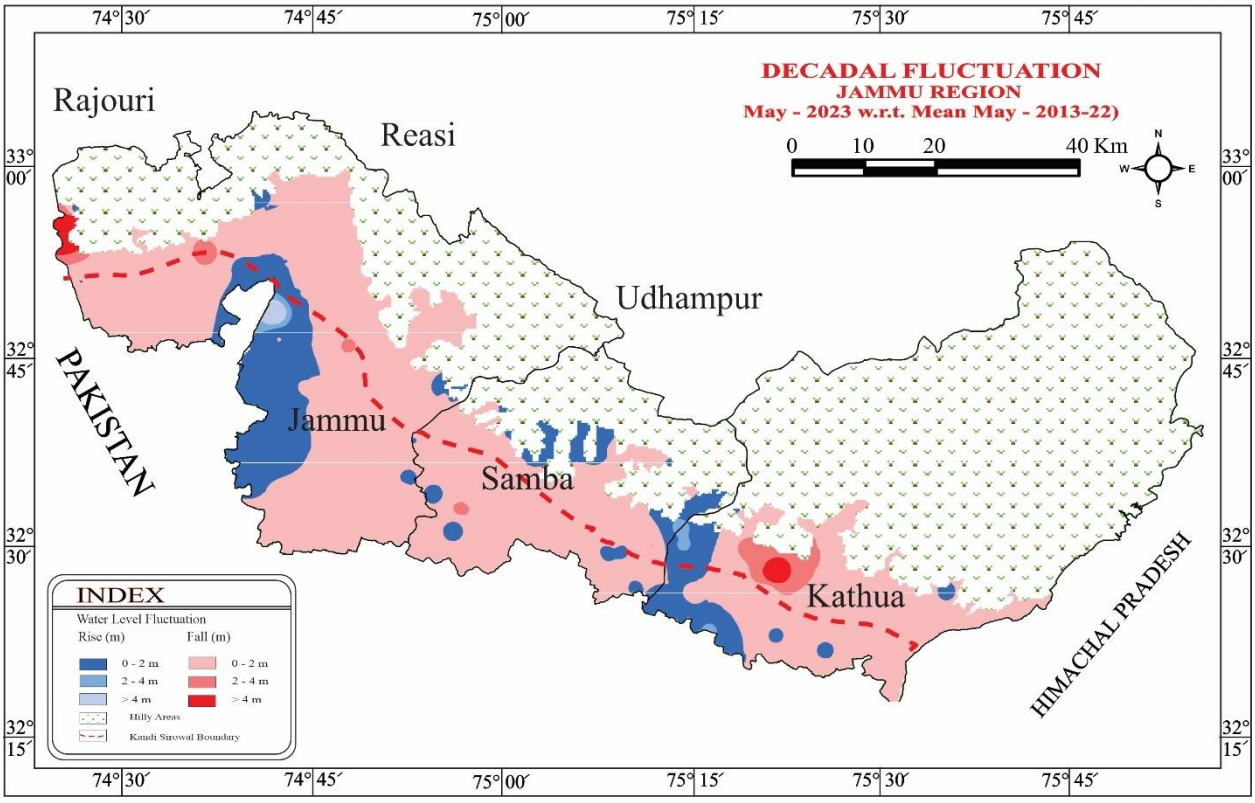


Table 16. CATEGORISATION OF CHANGES IN WATER LEVEL BETWEEN MAY 2023 TO DECADAL MEAN (MAY 2013-MAY 2022)

District	No. Of wells Analyzed	Range of Fluctuation (m)				No. of Wells Showing Fluctuation (m)						Percentage of wells Showing Fluctuation						Total No. of Wells	
		Rise		Fall		Rise			Fall			Rise			Fall			Rise	Fall
		Min	Max	Min	Max	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4		
Jammu	71	0.02	8.67	0.05	3.75	18	0	1	48	4	0	25.4	0.0	1.4	67.6	5.6	0.0	19	52
Kathua	27	0.01	3.04	0.03	6.63	13	3	0	9	1	1	48.1	11.1	0.0	33.3	3.7	3.7	16	11
Rajouri	37	0.00	3.36	0.04	2.76	16	0	0	15	6	0	43.2	0.0	0.0	40.5	16.2	0.0	16	21
Reasi	8	0.15	0.92	0.30	0.57	5	0	0	3	0	0	62.5	0.0	0.0	37.5	0.0	0.0	5	3
Samba	36	0.14	1.99	0.06	3.94	12	0	0	21	3	0	33.3	0.0	0.0	58.3	8.3	0.0	12	24
Udhampur	22	0.06	1.14	0.20	2.67	11	0	0	9	2	0	50.0	0.0	0.0	40.9	9.1	0.0	11	11
TOTAL	**201**	**0.00**	**8.67**	**0.03**	**6.63**	**75**	**3**	**1**	**105**	**16**	**1**	**37.3**	**1.5**	**0.5**	**52.2**	**8.0**	**0.5**	**79**	**122**

August 2023 with respect to mean of August 2013– August 2022

The water level fluctuation for the month of August 2023 Vs. (Mean of Aug. 2013 – Aug.2022 has been worked out in respect of 210 wells. It is observed that a total of 106 wells have shown rise and 104 wells have shown decline in water level. The minimum rise 0.01 m to a maximum rise of 2.88 m. Whereas minimum decline of 0.01 m to a maximum of 8.31 m. Categorisation of fluctuations in water level is given in table 17.

Out of 106 number of wells showing rise, 102 wells have shown rise less than 2 m, 4 wells have shown rise from 2-4 m whereas 0 well shown rise of > 4 m. Out of 104 wells showing fall, 95 wells have shown fall in the range of 0-2 m, 7 well has shown fall between 2-4 m and 2 wells has shown fall of >4 m bgl.

Almost entire Jammu and Samba districts have shown decline with few exceptions, where as in Kathua decline is highly observed. Decline of above 2mbgl is shown in Jammu in Kandi formation. In Samba district major area show decline except few patches. In Kathua district major portions show decline except eastern parts. (Figure 18).

Kashmir Region: Due to insufficient No of wells analysis and mapping not possible

Figure 18

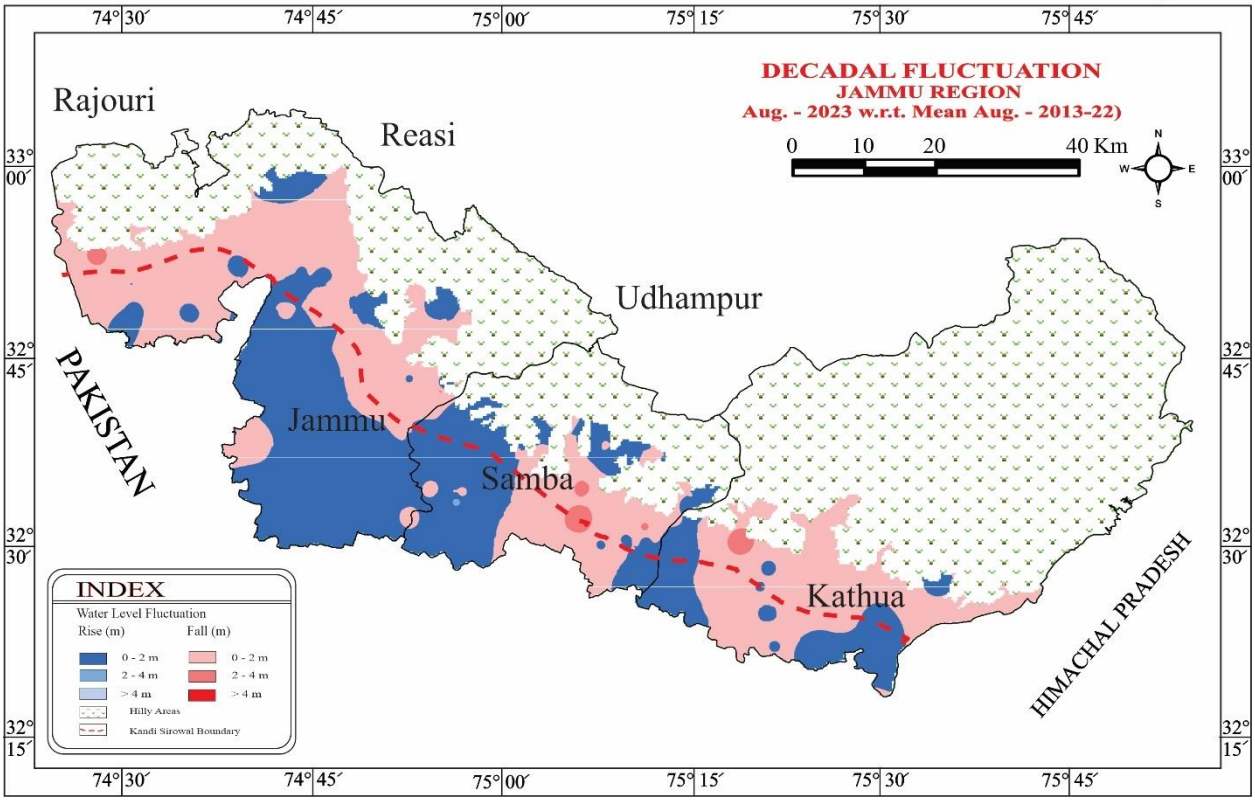


Table 17. CATEGORISATION OF CHANGES IN WATER LEVEL BETWEEN AUGUST 2023 TO DECADAL MEAN (AUGUST 2013-AUGUST 2022)

District	No. Of wells Analyzed	Range of Fluctuation (m)				No. of Wells Showing Fluctuation (m)						Percentage of wells Showing Fluctuation						Total No. of Wells	
		Rise		Fall		Rise			Fall			Rise			Fall			Rise	Fall
		Min	Max	Min	Max	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4		
Jammu	81	0.01	1.88	0.05	2.63	44	0	0	33	4	0	54.3	0.0	0.0	40.7	4.9	0.0	44	37
Kathua	37	0.02	1.17	0.07	3.41	23	0	0	13	1	0	62.2	0.0	0.0	35.1	2.7	0.0	23	14
Rajouri	36	0.01	2.21	0.02	3.32	9	1	0	24	2	0	25.0	2.8	0.0	66.7	5.6	0.0	10	26
Reasi	7	0.45	1.43	0.02	1.57	3	0	0	4	0	0	42.9	0.0	0.0	57.1	0.0	0.0	3	4
Samba	35	0.11	2.74	0.05	3.55	19	1	0	12	3	0	54.3	2.9	0.0	34.3	8.6	0.0	20	15
Udhampur	20	0.05	1.02	0.06	2.67	10	0	0	9	1	0	50.0	0.0	0.0	45.0	5.0	0.0	10	10
TOTAL	**216**	**0.01**	**2.74**	**0.02**	**3.55**	**108**	**2**	**0**	**95**	**11**	**0**	**50.0**	**0.9**	**0.0**	**44.0**	**5.1**	**0.0**	110	106

November 2023 with respect to mean of November 2013 – November 2022

The water level fluctuation for the month of November 2023 w.r.t. (mean of November 2013 to November 2022) has been worked out in respect of 218 observation wells. It is observed that a total of 90 wells have shown rise and 128 wells have shown decline in water levels. The minimum rise 0.02 m to a maximum rise of 13.12 m is observed. Whereas minimum decline of 0.01 m to a maximum of 3.54 m is recorded. Categorisation of fluctuations in water level is given in table 18.

Out of 90 number of wells showing rise, 88 wells are showing rise less than 2 m, 1 well have shown rise from 2-4 m and 1 wells have shown rise of more than 4 m. Out of 128 wells, which are showing fall, 118 wells have shown fall in water levels in the range of 0-2 m, 10 wells have shown fall between 2-4 m and 0 wells have shown fall of >4 m.

Decline in water levels was observed in all the districts of Jammu Region. A few areas have shown rise in water levels above 0- 2m in all districts. Western areas of Jammu district, northern and south eastern Samba and northern areas of Kathua districts have shown decline in water levels. Small portions in Jammu show rise above 2 m. (Figure 19).

Kashmir Region: Due to insufficient No of wells analysis and mapping not possible

Figure 19

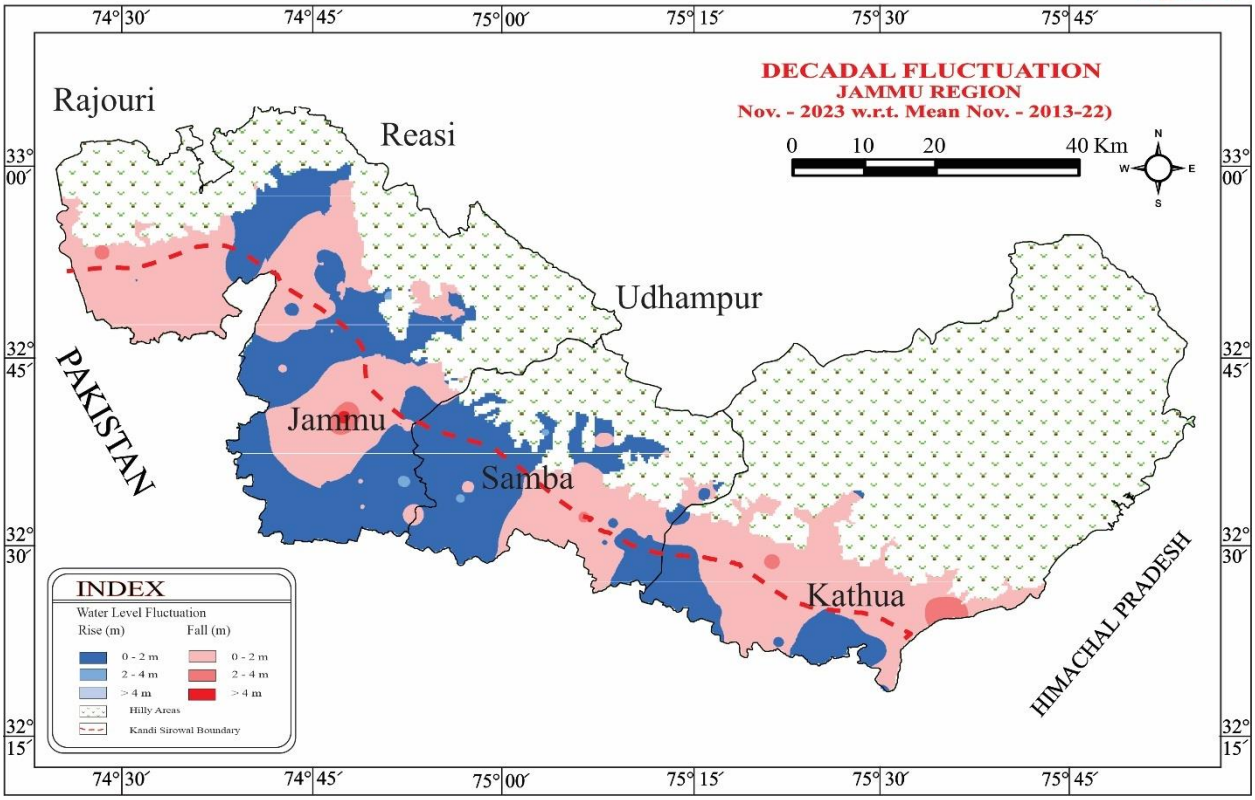


Table 18. CATEGORISATION OF CHANGES IN WATER LEVEL BETWEEN NOVEMBER 2023 TO DECADAL MEAN (NOVEMBER 2013-NOVEMBER 2022)

District	No. Of wells Analyzed	Range of Fluctuation (m)				No. of Wells Showing Fluctuation (m)						Percentage of wells Showing Fluctuation						Total No. of Wells	
		Rise		Fall		Rise			Fall			Rise			Fall			Rise	Fall
		Min	Max	Min	Max	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4		
Jammu	83	0.02	2.78	0.01	4.88	38	2	0	40	1	2	45.8	2.4	0.0	48.2	1.2	2.4	40	43
Kathua	33	0.01	0.88	0.01	3.35	19	0	0	12	2	0	57.6	0.0	0.0	36.4	6.1	0.0	19	14
Rajouri	36	0.02	1.84	0.06	3.14	15	0	0	18	3	0	41.7	0.0	0.0	50.0	8.3	0.0	15	21
Reasi	7	0.11	0.92			6	0	0	1	0	0	85.7	0.0	0.0	14.3	0.0	0.0	6	1
Samba	35	0.01	5.10	0.17	2.34	22	2	1	9	1	0	62.9	5.7	2.9	25.7	2.9	0.0	25	10
Udhampur	22	0.03	2.27	1.30	2.34	19	1	0	1	1	0	86.4	4.5	0.0	4.5	4.5	0.0	20	2
TOTAL	**216**	**0.01**	**5.10**	**0.01**	**4.88**	**119**	**5**	**1**	**81**	**8**	**2**	**55.1**	**2.3**	**0.5**	**37.5**	**3.7**	**0.9**	125	91

January 2024 with respect to mean of January 2014 – January 2023

The water level fluctuation for the month of January 2024 w.r.t. (mean of January 2014 to January 2023) has been worked out in respect of 219 observation wells. It is observed that a total of 56 wells have shown rise and 163 wells have shown decline in water levels. The minimum rise 0.01 m to a maximum rise of 1.99 m is recorded. Whereas minimum decline of 0.02 m to a maximum of 8 m is recorded. Categorisation of fluctuations in water level is given in table 19.

Out of 56 number of wells showing rise, 56 wells have shown rise less than 2 m, 0 wells have shown rise from 2-4 m and 0 well have shown rise of more than 4 m. Out of 163 wells showing fall in water

levels, 151 wells have shown fall in the range of 0-2 m, 9 wells have shown fall between 2-4 m and 3 well has shown fall of >4 m. In Jammu Region, decline is in water levels observed in all the districts of Jammu Region. Decline is shown in whole area except southern and central parts Jammu areas, central and eastern Samba, and Kathua district. (Figure 20)

Kashmir Region: Due to insufficient No of wells analysis and mapping not possible

Figure 20

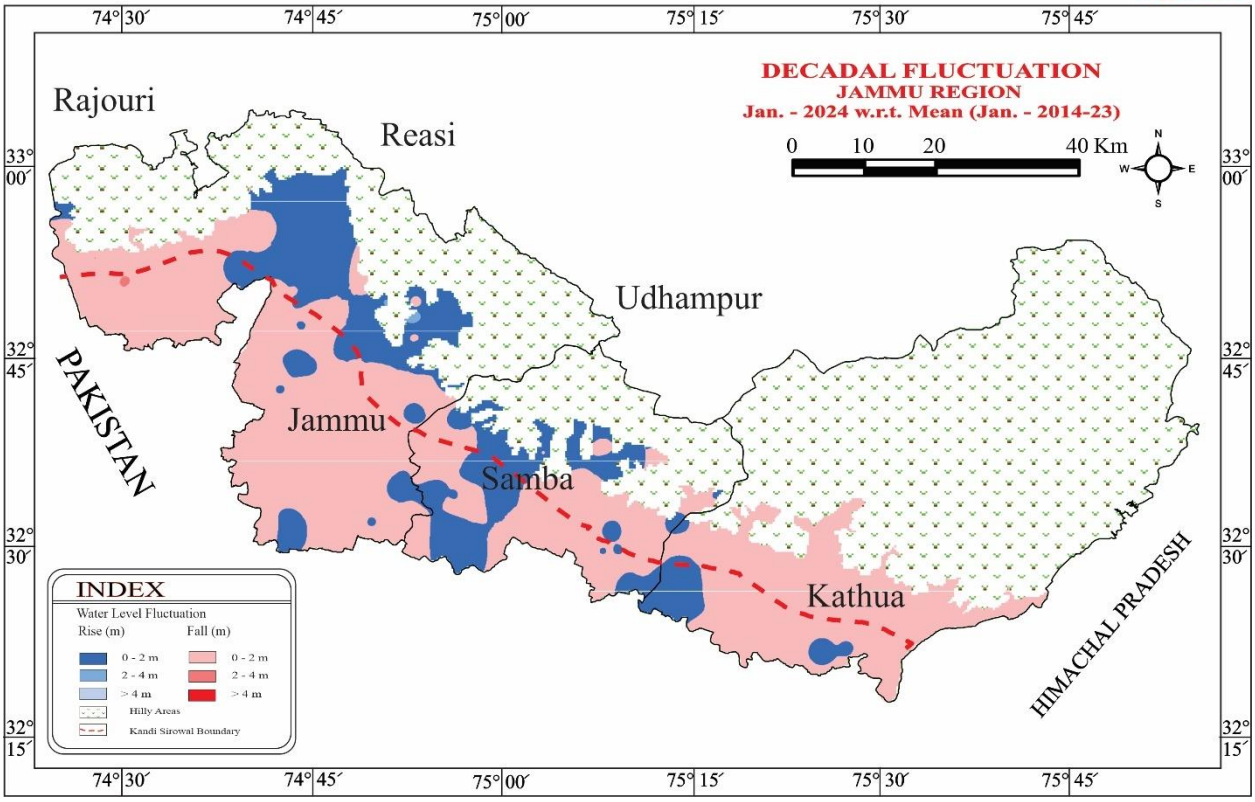


Table 19. CATEGORISATION OF CHANGES IN WATER LEVEL BETWEEN JANUARY 2024 TO DECADAL MEAN (JANUARY 2014-JANUARY 2023)

District	No. Of wells Analyzed	Range of Fluctuation (m)				No. of Wells Showing Fluctuation (m)						Percentage of wells Showing Fluctuation						Total No. of Wells	
		Rise		Fall		Rise			Fall			Rise			Fall			Rise	Fall
		Min	Max	Min	Max	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4	0 – 2	2 – 4	> 4		
Jammu	80	0.04	3.66	0.01	3.49	29	2	0	46	3	0	36.3	2.5	0.0	57.5	3.8	0.0	31	49
Kathua	38	0.01	1.13	0.04	1.86	16	0	0	22	0	0	42.1	0.0	0.0	57.9	0.0	0.0	16	22
Rajouri	34	0.04	2.34	0.15	2.58	9	1	0	21	3	0	26.5	2.9	0.0	61.8	8.8	0.0	10	24
Reasi	8	0.03	0.77			7	0	0	1	0	0	87.5	0.0	0.0	12.5	0.0	0.0	7	1
Samba	36	0.08	2.73	0.04	1.99	15	1	0	20	0	0	41.7	2.8	0.0	55.6	0.0	0.0	16	20
Udhampur	21	0.10	0.73	0.03	3.43	5	0	0	13	3	0	23.8	0.0	0.0	61.9	14.3	0.0	5	16
TOTAL	**217**	**0.01**	**3.66**	**0.01**	**3.49**	**81**	**4**	**0**	**123**	**9**	**0**	**37.3**	**1.8**	**0.0**	**56.7**	**4.1**	**0.0**	85	132

2.5. BEHAVIOUR OF WATER LEVEL IN DEEPER AQUIFERS:

Depth to Water Level -May 2023

Jammu Region: The water level data in respect of 4 Piezometers for May 2023 were analysed. The depth to water level varied from 6.84 m bgl (Pandorian PZ-1 in Jammu District) to 15.8 m bgl (R S Pura PZ-3 in Jammu district). 2 wells in the range of 5-10m, and other 2wells have recorded a water level of in the range of 10 – 20 m bgl. None of the well has shown water level below 2 m bgl. The depth to the water level in May 2023 is given in Table 20

Table 20. DTWL of Existing piezometers (May 2023)

S.No	Location	Water Level May-2023 (mbgl)
1	Pandorian PZ-2	10.88
2	Baspur Bunglow PZ-1	8
3	Pandorian PZ-1	6.84
4	RS Pura PZ-3	15.8

Depth to Water Level -August 2023

Jammu Region: The water level data in respect of 5 Piezometers for August 2023 were analysed. The depth to water level varied from 5.1 m bgl (Pandorian PZ-1 in Jammu district) to 11.05 m bgl (Pandorian PZ-2 in Jammu district). None of the well has shown water level below 2 m bgl. No well have recorded water levels in the range of 2-5m, 3 wells in the range of 5-10 and 2 wells in the range of 10-20 m. The depth to the water level in August 2023 is given in Table 21.

Table 21. DTWL of Existing piezometers (August 2023)

S. No	Location	DTWL (Aug 23)
1	Baspur Bunglow PZ-1	5.9
2	Pandorian PZ-1	5.1
3	Chakroi PZ 10	10.01
4	Pandorian PZ-2	11.05
5	RS Pura PZ-3	7.4

Depth to Water Level -November – 2023

Jammu Region: The water level data in respect of 5 Piezometers for November 2023 were analysed. The depth to water level varied from 3.45 m agl (Miran Sahib PZ-5 Jammu district) to

14.95 mbgl (R S Pura PZ-3 in Jammu district).2 wells have shown water level in range of 1 to 5 mbgl, 1 wells have shown water level in range of 5 to 10 m bgl, and 2 wells have recorded water levels in the range of 10-20 m. The depth to the water level in November 2023 is given in Table 22.

Table 22. DTWL of Existing piezometers (November 2023)

Sr. No.	Site Name	Latitude	Longitude	Water Level (mbgl)
1	Pandorian PZ-1	32.56042	74.86167	5.25
2	Baspur Bunglow PZ-1	32.61508	74.69614	4.74
3	Miran Sahib PZ-5	32.64204	74.80756	3.45
4	Baspur Bunglow PZ-3	32.61508	74.69614	13.34
5	RS Pura PZ-3	32.6114	74.7361	14.95

Depth to Water Level -January 2024

Jammu Region: The water level data in respect of 5 Piezometers for January 2024 were analysed. The depth to water level varied from 5.89 m bgl (Pandorian PZ-1 in Jammu District) to 15.02 m bgl (R S Pura PZ-3 in Jammu district). Out of 5 wells, no well has recorded a water level of in the range of 2– 5 m bgl, 3 wells (60%) in the range of 5 – 10 m bgl, 1 well is in the range of 10 – 15 m bgl. Only 1 well has recorded water level above 15 m bgl. None has shown water level below 2 m bgl. The depth to the water level January 2024 is given in Table 23.

Table 23. DTWL of Existing piezometers (January 2024)

Sr. No.	Site Name	Water Level (mbgl)
1	Pandorian PZ-1	5.89
2	Baspur Bunglow PZ-1	6.17
3	Chakroi PZ 10	7.3
4	Chakroi PZ 11	11.41
5	RS Pura PZ-3	15.02

ANNEXURE – I

Depth to Water Level Data of wells (in m) for all Seasons (Jammu Region)

Sl No.	Location	DISITRICT	May-23	Aug-23	Nov-23	Jan-24	Longitude	Latitude
DUG WELLS								
1	Agre Chak	JAMMU	3.06		2.81	3.75	74.716	32.623
2	Akhnoor (Batera)	JAMMU		11.63	12.49	14.09	74.751	32.860
3	Allah	JAMMU	4.1	2.18	2.83	3.13	74.837	32.518
4	Arnia	JAMMU		5.22	8.57	9.46	74.799	32.523
5	Badsoo	JAMMU	6.75	0.35	0.55	1.35	75.019	32.853
6	Bakore	JAMMU	5.45	2.95	3.6		74.563	32.806
7	Baradow	JAMMU	20.5	6.6	6.15	6.67	74.436	32.908
8	Batera	JAMMU	10.89	6.37	7.27	8.94	74.746	32.848
9	Bega	JAMMU	3.5	2.95	2.75	2.93	74.668	32.615
10	Bera	JAMMU			2.43	3.07	74.677	32.619
11	Bhagwanachak	JAMMU	30.51	28.56	27.13	27.94	74.575	32.860
12	Bishnah	JAMMU	4.09	1.54	1.89	2.36	74.864	32.613
13	Chatta	JAMMU	6.15	3.2	4.43	4.2	74.934	32.693
14	Chowki chowra	JAMMU	2.23	0.92	1.93	2.15	74.650	33.031
15	Devipur	JAMMU	7.13	4.08	5.78	6.97	74.658	32.856
16	Dhanpur	JAMMU	6.85	4.15	4.2	5.4	74.541	32.807
17	Dharam Khu	JAMMU	25.23		21.03	22.94	74.763	32.860
18	Gajansoo	JAMMU	3.55	1.6	3	3.22	74.711	32.761
19	Garhi (Jammu)	JAMMU	8.84	5.99	7.34	7.86	74.770	32.790
20	Gho-Manhasan	JAMMU	2.06	0.51	1.51	1.29	74.739	32.723
21	Gigrial	JAMMU	3.81	2.91	3.17	3.33	74.482	32.795
22	Greater Kailash	JAMMU	10.6	10	9.37	10.03	74.931	32.686
23	Gura	JAMMU	15.23	11.38	11.73	13.31	74.958	32.550
24	Hamirpur Kohna	JAMMU	4.42	2.7	3.35	4.08	74.549	32.767
25	Hamirpur Sidhar	JAMMU	4	2.55	2.83	3.39	74.526	32.776
26	Hazuribag	JAMMU					74.814	32.738
27	Jagati	JAMMU	1.9	1.65	1.35	1.45	74.896	32.806
28	Jaswan	JAMMU		3.45	4.4	DRY	74.726	32.791
29	Jhiri	JAMMU	5.83	2.98	5.78	6.24	74.738	32.825
30	Jogwan	JAMMU	4	6.15	5.8	3.45	74.442	32.934
31	Jourian	JAMMU	5.99	2.54	2.84	4.24	74.575	32.833
32	Kachrial	JAMMU	4.76	4.66	3.66	4.11	74.472	32.866
33	Kahpotha	JAMMU	3.9	1.3	1.6	1.5	75.042	32.834
34	Kalah	JAMMU	3.65	3.15	2.1	2.4	74.475	32.911
35	Kaluchak	JAMMU	5.7	3.38	3.83	4	74.894	32.657
36	Kana Chak	JAMMU		2.18	3.68	4.33	74.717	32.821
37	Kangar	JAMMU	15.97	8.42	13.48	15.27	74.846	32.840
38	Katcha-Pind Dansal	JAMMU	2.45	2	2.05	2.15	74.862	32.866
39	Khairi (Bishnah)	JAMMU	4.71	2.58	2.98	4.06	74.906	32.591
40	Khairi (Raipur)	JAMMU	6.83	2.83	1.88	3.93	74.858	32.808
41	Khanpur Nagrota	JAMMU	0.6		0.21	0.15		
42	Khour	JAMMU		1.58	2.45	3.75	74.517	32.829
43	Kot Kaswal	JAMMU	4.3	0.45	0.35	1.45	75.108	32.799
44	Kothey Saini	JAMMU	4.43	3	3.27	4	74.882	32.577
45	Kotli Charkan	JAMMU	5.46	1.76	2.86	3.56	74.834	32.616
46	Kunihala	JAMMU	1.93	1.4	1.6	1.5	75.033	32.904
47	Lalyal	JAMMU	3.89	2.44	3.34	3.73	74.774	32.664
48	Lam	JAMMU	3.5	2.75	3.15	5.45	74.514	32.832
49	Laswara	JAMMU	3.24	0.54	1.42	2.1	74.837	32.585

Sl No.	Location	DISITRICT	May-23	Aug-23	Nov-23	Jan-24	Longitude	Latitude
50	Leherian	JAMMU	10.17	8.87	7.52	9.47	74.688	32.903
51	Majua Laxmi	JAMMU	3.73	3.3	2.6	2.7	74.918	32.555
52	Makwal	JAMMU	3.15	1.8	2.35	2.86	74.717	32.693
53	Marh	JAMMU	2.43	1.23	2.38	2.37	74.746	32.776
54	Marjholi	JAMMU		Dry	25.41	30.99	74.767	32.850
55	Miran Sahib	JAMMU	7.55	6.85	11.84	6.77	74.795	32.646
56	Muthi	JAMMU	6.2	1.1	1.15	1.3	74.800	32.753
57	Nagbani	JAMMU	4.45	1.88	3.33	4.29	74.778	32.761
58	Nagrota (Kandoli)	JAMMU	4.85	2.6			74.921	32.804
59	Nandpur	JAMMU		2.69	3.17	3.5	74.889	32.518
60	Nikowal	JAMMU	5.83	2.97	4	4.95	74.706	32.508
61	Palatan	JAMMU	2.4	1.9	2.1	2.28	74.449	32.837
62	Pangli Colony	JAMMU	4.81	0.61	2.01	2.97	74.524	32.794
63	Pata Khu	JAMMU	22.96	19.26	18.74	20.37	74.771	32.842
64	Patyale Chak	JAMMU	4.3	2.65	3.25	3.76	74.776	32.761
65	Poal	JAMMU		1.2	2.55	3.45	74.820	32.526
66	Rangoora	JAMMU	4.7	1.65	1.03	0.9	74.896	32.751
67	Rehal	JAMMU	6.1	3.57	3.55	4.43	74.876	32.561
68	Sagoon	JAMMU	3.05	2.2	2.39	2.3	75.088	32.742
69	Sajwal	JAMMU	3.18	1.06	2.86	3.08	74.593	32.792
70	Salehar	JAMMU	4.45	2.2	2.8	3.29	74.818	32.560
71	Sandhwan	JAMMU		2.55	3.35	3.57	74.714	32.710
72	Satwari	JAMMU		10.55	10.75	11.79	74.846	32.689
73	Sei Khurd	JAMMU	5.45	2.25	2.9	3.65	74.725	32.508
74	Senth	JAMMU	3.99	1.09	2.74	3.21	74.508	32.774
75	Shame Chak	JAMMU	6.83	3.28	4.43	3.34	74.742	32.828
76	Sidhra	JAMMU	5.4	3.5	2.6	3.53	74.895	32.760
77	Sobka	JAMMU		19.75	20.17	21.87	74.753	32.875
78	Sohanjana	JAMMU	4.06	2.26	3.11	3.71	74.743	32.697
79	Suchetgarh-II	JAMMU	2.69	1.69	1.79	2.09	74.676	32.568
80	Sugetar	JAMMU	5	1.6	2.1	2.2	74.958	32.879
81	Sumah	JAMMU	3.2	3.15	3.25	3.22	74.672	32.957
82	Surinsar	JAMMU	2.1	1.45	0.95	1.4	75.043	32.773
83	Tanda Sheoda	JAMMU	3.7	0.25	1.23	1.75	74.700	32.975
84	Taryai	JAMMU	38.46	35.46	34.17	34.61	74.614	32.874
85	Trikuta Nagar	JAMMU	4.22	2.85	2.7	3.69	74.889	32.703
86	Upper Ban	JAMMU	9.4	1.2	2.48	4.75	74.855	32.829
87	Upperla kanhal	JAMMU	5.68	2.63	2.88	3.83	74.883	32.633
88	Barni	KATHUA	6.75	3.3	7.35	6.3	75.594	32.424
89	Bhagwal	KATHUA	29.74	8.32	15.46	20.52	75.367	32.450
90	Billawar	KATHUA	0.3	0.2	0.45	0.63	75.608	32.613
91	Chak hariya	KATHUA		1.4			75.367	32.389
92	Chakara	KATHUA	4.49	2.43	3.10	3.38		
93	Chan ranga	KATHUA	16.22	9.92	9.24	12.23	75.331	32.483
94	Chann Khatrian	KATHUA	8.21	2.6	5.42	8.5	75.246	32.488
95	Chapki Kalan	KATHUA	20.36	9.53	8.83	13.03	75.315	32.447
96	Feru chak	KATHUA	3.59	1.77	2.41	5.89	75.279	32.375
97	Gangu chak	KATHUA	2.97	1.73	2.10	2.1	75.263	32.401
98	Gond More JBK	KATHUA		1.03	2.11	2.45	75.500	32.333
99	Hore	KATHUA	4.29	1.9	2.34	2.75		
100	Jandi	KATHUA	4.98	2.2	3.32	4	75.246	32.463
101	Jindore	KATHUA	12.12	4.79	8.45	9.34		
102	Karol Krishna	KATHUA	8.15	6.88	6.45	7.1	75.236	32.396

Sl No.	Location	DISITRICT	May-23	Aug-23	Nov-23	Jan-24	Longitude	Latitude
103	Kathua	KATHUA	2.72	0.45	0.77	1.19	75.529	32.364
104	Kerian Gandyal-II	KATHUA		2.03	3.28	Dry	75.519	32.296
105	Kerian Ramnagar	KATHUA		2.73	2.69	3	75.514	32.281
106	Khanpur	KATHUA	2.92	1.31	1.75	2	75.356	32.425
107	Khukhial	KATHUA	1.74	0.98	1.43	1.41	75.467	32.350
108	Konthal	KATHUA	5.6	4.45	4.65	4.75	75.260	32.424
109	Kootah	KATHUA	25.03	22.3	23.33	24.35	75.242	32.511
110	Kote punnu	KATHUA	2.49	1.44	1.86	1.89	75.376	32.346
111	Kothian	KATHUA		0.03	0.38	1.38	75.508	32.367
112	Lakhanpur	KATHUA	6.78	5.57	8.56	6.4	75.594	32.382
113	Lakri	KATHUA	2.5	1.58	1.63	2.15	75.415	32.656
114	Londi	KATHUA	5.87	3.69	4.05	4.67	75.213	32.425
115	Mandli	KATHUA	1.95	1.1	2.13	2	75.508	32.636
116	Mukandpur	KATHUA	4.1	3.9	4.15	4.25	75.369	32.369
117	Nagri	KATHUA	2.5	0.8	1.74	1.68	75.433	32.350
118	Nagrota-Gujaroo	KATHUA	8.18	3.28	4.93	5.43	75.394	32.646
119	Nanak Chak	KATHUA		0.68	1.16	1.83	75.468	32.381
120	Nauni	KATHUA	2.93	1.05	1.69	1.58	75.302	32.558
121	Pallan	KATHUA	0.6	0.35	0.4	1.35	75.566	32.556
122	Pansar	KATHUA		6.12	6	6.08	75.306	32.372
123	Patiari	KATHUA		3.73		7.53	75.440	32.400
124	Patyari	KATHUA			55.75		75.440	32.400
125	Patyari II	KATHUA	4.22	1.89	2.79	3.02	75.265	32.547
126	Phinter	KATHUA	6.4	2.5	4.3	6.5	75.544	32.583
127	Ramkot	KATHUA	6.85	3.1	5.75	5.75	75.336	32.642
128	Saida	KATHUA	6.52	0.82	1.56	2.5	75.293	32.551
129	Sumwan	KATHUA	14.3	8.99	10.05	12.1		
130	Sallan	KATHUA	5.18		4.48	4.78		
131	Ainpur	RAJOURI	2.8	1.68	1.3	1.9	74.447	33.042
132	Bagnoti	RAJOURI	4.95	2.26	3.1	4.25	74.300	33.142
133	Bajabain	RAJOURI	7.9	2.61	2.47	2.3	74.411	33.054
134	Bakhar	RAJOURI	3.22	1.36	1.64	1.9	74.428	33.088
135	Banpari	RAJOURI	2.25	1.48	1.92	1.72	74.458	33.033
136	Bareri	RAJOURI	3.65	3.85	4.3	5.5	74.194	33.104
137	Bhatta Morh	RAJOURI	2.8	2.14	4.67	3.25	74.201	33.203
138	Channi Parat	RAJOURI	8.7	0.62	1.84	1.89	74.461	33.090
139	Chittiar	RAJOURI	1.8	2.12	1.26	2.4	74.281	33.289
140	Chowki Handa	RAJOURI	4.9	1.97	3.1	2.48	74.192	33.172
141	Darhal Quila	RAJOURI	6.15	3.8	5.75	6.3	74.150	33.219
142	Dharamsal	RAJOURI	4.53	2.75	3.9	3.95	74.414	33.135
143	Dhok Baniar	RAJOURI	4.2	3.29	3.1	3.67	74.417	33.032
144	Ding	RAJOURI	5.05	1.59	3.98	5.85	74.276	33.088
145	Dyala	RAJOURI	2.45				74.369	33.237
146	Gagrote	RAJOURI	6.2	5.63	6.4	6.78	74.273	33.090
147	Jabah	RAJOURI	3.95	3.11	3	4.6	74.334	33.068
148	Jhangar	RAJOURI	5.57	4.7	5.4	5.52	74.047	33.242
149	Kalal	RAJOURI	4.65	3.7	2.8	4.95	74.233	33.081
150	Kalsian	RAJOURI	3.9	0.38	0.94	2.05	74.142	33.186
151	Kangri (Grid Station)	RAJOURI	2.9	2.64	2.89	2.98	74.397	33.058
152	Lam Rajouri	RAJOURI	4.57	3.04	4.62	3.3	74.127	33.250
153	Laroka	RAJOURI	3.45	1.63	1.49	1.8	74.097	33.236
154	Lower Kharak	RAJOURI	1.22	0.83	1.22	1.32	74.416	33.166
155	Marchola	RAJOURI	4.5	0.94	1.96	4.76	74.482	33.090

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156	Narian	RAJOURI			5.14	Unaccessible	74.280	33.503
157	Naunihal	RAJOURI	5.6			Filled	74.208	33.175
158	Panja	RAJOURI	1.45	0.81	1.1	1.42	74.416	33.180
159	Potha	RAJOURI	2.15	1.91	2.23	3	74.318	33.281
160	Pukharni	RAJOURI	1.18	0.78	0.93		74.113	33.270
161	Rumli Dara	RAJOURI	3.75	4.12	4.59	4.79	74.217	33.136
162	Salote	RAJOURI	2.5	2	1.5	2.35	74.524	33.050
163	Seri	RAJOURI	3.5	3.06	3.6	4.08	74.292	33.081
164	Sial	RAJOURI	3.8	2.14	2.85	3.06	74.317	33.072
165	Siot	RAJOURI	4.1	1.94	3.22	3.48	74.381	33.117
166	Solki	RAJOURI	2.3	1.24	2.25	2.77	74.431	33.164
167	Thanda Paani	RAJOURI	2.05	1.16	1.49	1.85	74.487	33.067
168	Thangrot	RAJOURI	2.75	0.9	1.07	3.5	74.586	33.142
169	Aliyah	REASI	2.04	0.51	1.61	2.06	74.553	33.167
170	Bhamla	REASI	4.22	3.87	2.87	3.72	74.581	33.050
171	Dadua	REASI	1.9	0.89	1.61	1.73	74.637	33.069
172	Garan Jagir	REASI	4.3	1.71	2.36	2.67	74.649	33.071
173	Katra	REASI	2.5	2.5	1.82	1.95	74.925	32.908
174	Nanora	REASI	3.9	1.93	2.42	2.4	74.632	33.131
175	Riasi	REASI	25.03	24.91	24.99	25	74.833	33.092
176	Talwara	REASI	5.2	3.4	3.8	4.9	74.794	33.092
177	Bassi Kalan	SAMBA	5.96	1.96	3.18	4.14	74.901	32.637
178	Bengular	SAMBA	8.01	8.26	7.38	7.33	75.060	32.490
179	Birpur	SAMBA	20.82	10.9	10.89	15.32	74.952	32.539
180	Channi	SAMBA				Dry	74.919	32.626
181	Channi Mansar	SAMBA	3.85	-0.01	0.35	0.8	75.164	32.697
182	Daboh	SAMBA		Filled		dry	75.105	32.586
183	Dhora	SAMBA	1.95	1.15	3.07	3.3	75.140	32.613
184	Didyal	SAMBA	2.28	0.9	1.35	1.83	74.958	32.470
185	Dulme Chak	SAMBA	3.8	2.61	2.65	2.95	75.183	32.433
186	Gho-Brahamna	SAMBA	8.5	7.9	6.75	7.15	74.958	32.550
187	Gho-Rakwalan	SAMBA	4.8	2.95	2.72	3.02	74.949	32.552
188	Gudwal	SAMBA	3.98	2.35	2.2	2.55	75.010	32.550
189	Jasath	SAMBA	14.85	11.9	8.65	10.75	75.203	32.504
190	Kainthpur	SAMBA	4.8	3	3.19	3.35	74.975	32.588
191	Kamila	SAMBA	5.5	4.29	4.69	5	75.065	32.609
192	Lale Chak	SAMBA	3.42	1.16	1.85	2.37	75.198	32.454
193	Lokli	SAMBA	6.28	0.88	3.37	4.83	75.273	32.544
194	Madun	SAMBA	2.75	1.6	2.1	2.1	75.164	32.480
195	Mahal Shah Kalandrian	SAMBA	4.53	2.88	3.29	3.73	74.943	32.510
196	Maheen Charkan	SAMBA	10.45	6.2	7.3	8.6	74.952	32.656
197	Mothlian Kalan	SAMBA	8.9	5.62	5.4	4.2	75.074	32.657
198	Nagrota	SAMBA			1.58	3.27	75.065	32.624
199	Nagrota Utterbani	SAMBA	6.85	5.06	4.99	5.9		
200	Naran	SAMBA	8.97	6.3	5.24	5.72	75.154	32.504
201	Nilcha	SAMBA	12.8	8.29	9.35	11.05	75.254	32.560
202	Nud	SAMBA	5.45	2.17	2.87	2.97	75.148	32.613
203	Painthi	SAMBA	9	3.2	4.48	5.6	75.156	32.593
204	Palli	SAMBA	2.54	1.55	1.83	2.04	74.889	32.627
205	Pangdour	SAMBA	4.87	4.91	4.75	4.75	75.108	32.481
206	Patli	SAMBA	10.47	5.57	6.22	7.42	74.946	32.608
207	Phalora	SAMBA	2.63	1.27	1.88	1.93	75.143	32.478
208	Raghu chak	SAMBA	5.24	0.55	1.43	3	75.204	32.486

Sl No.	Location	DISITRICT	May-23	Aug-23	Nov-23	Jan-24	Longitude	Latitude
209	Raiyan	SAMBA	22.67	23.73	20.15	20.72	75.117	32.511
210	Sadoh	SAMBA	9.5	10.05	9.22	9.27	75.126	32.472
211	Samba	SAMBA	18.57	18.55	16.76	16.64	75.119	32.558
212	Sanoora	SAMBA	1.2	0.67	0.85	0.85	75.178	32.488
213	Supwal	SAMBA	8.78	3.06	4.23	5.73	75.067	32.558
214	Uttarbani	SAMBA	1.8	1.32	1.79	1.8	75.064	32.648
215	Badola	UDHAMPUR	3.5	1.7	1.77	2.6	75.035	32.944
216	Battal Ballian	UDHAMPUR	6.8	3.85	2.73	8.6	75.126	32.880
217	Birmah	UDHAMPUR	2.75	1.4	2.3	2.05	75.109	32.915
218	Dalsar	UDHAMPUR	2.1	0.6	0.1	0.5	75.313	32.819
219	Dehari	UDHAMPUR	4.17	2.27	2.12	4.32	75.273	32.781
220	Dhanu Kanal	UDHAMPUR	1.32	0.93	0.4	0.97	75.007	32.962
221	Eastern Mand	UDHAMPUR	3.15	1.6	4.73	5.65	75.024	32.897
222	Garhi (Udh)	UDHAMPUR	2.3	1.65	0.45	1.4	75.083	32.905
223	Jallow	UDHAMPUR	4.84	1.29	1.26	1.99	75.232	32.796
224	Jhakkar	UDHAMPUR	5	1.3	2.8	4.4	75.123	32.946
225	Kotli Pain Megaini	UDHAMPUR	1.05	0.55	0.45	0.65	75.425	32.909
226	Kuperlah	UDHAMPUR	2.35	3.42	1.07	1.52	75.182	32.850
227	Manwall	UDHAMPUR	8.8	4.5	5.63	7.3	75.150	32.756
228	Nagrota Panjgarain	UDHAMPUR	0.95	0.6	0.1	1	75.271	32.836
229	Phangyal	UDHAMPUR	7.25	2.3	3.64	6.1	75.135	32.896
230	Rakh Badali	UDHAMPUR	4.65	2.5	2.04	3.85	75.109	32.915
231	Ramnagar	UDHAMPUR	6.25	4.85	4.65	5.45	75.310	32.806
232	Ritti	UDHAMPUR	2.55	0.5	0.72	0.9	75.163	32.842
233	Salabra	UDHAMPUR	2.38	1.28	1.37	1.63	75.175	32.717
234	Seen Thakaran	UDHAMPUR	2.85	2	2.5	2.85	75.038	32.913
235	Sunal	UDHAMPUR	3.3	0.8	1.2	2.3	75.243	32.679
236	Talpad	UDHAMPUR	2.05	1	0.52	1.6	75.199	32.859
PIEZOMETERS								
Sl No.	**Location**	**DISITRICT**	**May-23**	**Aug-23**	**Nov-23**	**Jan-24**	**Longitude**	**Latitude**
1	52 Brigade Pallanwala	JAMMU	10.38	9.6	9.68	10.23	74.472	32.846
2	Baspur Bunglow PZ-1	JAMMU	8	5.9	4.74	6.17	74.696	32.615
3	Baspur Bunglow PZ-2	JAMMU	9.72	7.45	7.9	8.77	74.696	32.615
4	Baspur Bunglow PZ-3	JAMMU	14.17	14.16	13.34	13.72	74.696	32.615
5	Chak Mangna	JAMMU		2.29	2.29	2.29	74.676	32.739
6	Chakroi PZ 10	JAMMU		10.01	7.21	7.3	74.719	32.537
7	Chakroi PZ 11	JAMMU		13.58	12.01	11.41	74.719	32.537
8	CNS Vihar, MES	JAMMU	36.87	31.65	31.78	33.62	74.768	32.899
9	CWC, Campus, Bantalab	JAMMU	91.5	DRY	87.26	DRY	74.831	32.781
10	Deli New	JAMMU	40.34	38.85	34.37	33.88	74.893	32.679
11	GGM Science, College	JAMMU	17.97	16.36	16.62	18.8	74.852	32.723
12	Khadwala I	JAMMU	35.94	34.01	33.97	35.16	74.873	32.702
13	Lower Marh-II	JAMMU	5.28	3.88	3.98	4.18	74.882	32.910
14	Lower Rangoora	JAMMU	2.4	0.74	0.64	0.99	74.896	32.750
15	Miran Sahib PZ-5	JAMMU	13.77	11.75	3.45	12.41	74.808	32.642
16	Nirman Bhawan	JAMMU	74.67	33.8	33.81	35.29	74.872	32.706
17	Pandorian PZ-1	JAMMU	6.84	5.1	5.25	5.89	74.862	32.560
18	Pandorian PZ-2	JAMMU	10.88	11.05	10.45	9.79	74.862	32.560
19	Raipur Domana	JAMMU			75.35	75.01	74.811	32.808
20	RS Pura PZ-3	JAMMU	15.8	7.4	14.95	15.02	74.736	32.611
21	SICOP III, Gangyal	JAMMU	38.5	37.42	34.3	36.92	74.880	32.678
22	Sitlee Plant	JAMMU	10.3	10.02	9.97	11.13	74.888	32.777
23	Basholi	KATHUA	0	31.8	37.69	42.16	75.814	32.496

Sl No.	Location	DISITRICT	May-23	Aug-23	Nov-23	Jan-24	Longitude	Latitude
24	Chhan Datyal	KATHUA				26.83	75.333	32.481
25	Community Hall	KATHUA	Artisian Well			Artisian Well	75.268	32.457
26	Dewal	KATHUA	16.21	13.77		18.32	75.580	32.605
27	Dhalli,	KATHUA	39.84	34.35	32.02	34.03	75.307	32.482
28	FPF, Kathua	KATHUA	31.19	14.37	23.08	26.82	75.560	32.377
29	FPF-IIGamma Unit, Dewal	KATHUA	23.32	18.65	20.64	22.74	75.561	32.589
30	Galak	KATHUA	3.24	2.58	2.67	2.75	75.352	32.627
31	Govt. Degree College, Heera Nagar	KATHUA	15.27	6.53	6.16	8.93	75.275	32.476
32	Hamadan	KATHUA	1.47	1.2	1.29	1.4	75.414	32.649
33	Haripur Patli	KATHUA	Artisian well		0	Artisian well	75.295	32.418
34	IIDC, Govindsar	KATHUA	60.26	58.71	56.51	58.28	75.563	32.404
35	Karanbara	KATHUA	19.95	17.32	17.79	18.37	75.694	32.516
36	KVK Kathua	KATHUA	15.03	4.43	9.88	13.04	75.546	32.369
37	KVK Kathua	KATHUA	15.21	4.76	10.04	12.17	75.546	32.369
38	Ladera	KATHUA	13.75	11.98	13.73	14.34	75.500	32.646
39	Lakhri	KATHUA	1.94	1.58	1.63	1.92	75.413	32.654
40	Logate	KATHUA	54.72	53.14	44.58	49.44	75.500	32.434
41	Pacca Chumber	KATHUA	2.71	0.72	1.3	1.56	75.528	32.284
42	Patyari Old	KATHUA	60.07	59.11	55.75	70.65	75.535	32.427
43	Sarni	KATHUA	11.99	9.53	10.54	11.61	75.478	32.638
44	Thakurpur	KATHUA	Dry		60.49	63.01	75.338	32.485
45	Bhimbergali	POONCH	8.94	9.34	9.56	13.78	74.224	33.549
46	Daraba	POONCH	5.8	5.46	6.77	8.11	74.302	33.612
47	Khanetar Nalla, (AP-253 Army Bn)	POONCH	10	10.04	13.18	17.86	74.154	33.747
48	Mendhar,	POONCH	4.64	4.86	2.5	5.41	74.144	33.605
49	Surhoti	POONCH	17.15	13.65	16.98	18.33	74.193	33.619
50	Darhar Quila	RAJOURI	14.82	18	13.72	25.3	74.152	33.224
51	Handan	RAJOURI	0.54	0.31	0.6	0.92	74.198	33.162
52	Narian	RAJOURI	4.97	4.8	5.14	5.36	74.291	33.219
53	Panjah	RAJOURI	4.88	3.24	4.64	5.38	74.416	33.181
54	Sial Sui	RAJOURI		2.44	5.39	8.81	74.367	33.216
55	Tariyath	RAJOURI	Artesan	0		0	74.561	33.153
56	Allya	REASI			0.72	3.13	74.548	33.179
57	Dadooa	REASI	2.9	1.63	1.89	2.37	74.636	33.074
58	Gajore	REASI			15.62	41.53	74.664	33.107
59	JNV Kotili Manotrian	REASI	0.1	Artesan	0.39	0.38	74.887	33.038
60	Panasa	REASI		59.13	58.39	59.41	74.747	33.181
61	Sermegha-II	REASI		82.2	81.44	84.76	74.875	33.131
62	Talwara	REASI		41.85	43.15		74.797	33.089
63	Thanpal-II	REASI	8.75	8.6	9.11	9.25	74.789	33.173
64	Badheri	SAMBA	30.03	29.68	29.32	29.47	75.082	32.559
65	Rakh Barotian	SAMBA			34.23	33.72	75.040	32.582
66	Rakh Dhiansar	SAMBA	10.21	12.9	11.31	12.02	74.919	32.631
67	Ramgarh PZ-2	SAMBA	3.21	3.57	1.04	1.38	74.969	32.508
68	SKUAST Samba	SAMBA	17.96	16.05		16.16	75.121	32.569
69	WSS Raya Bogal	SAMBA	19.45	26.56	17.39	17.33	74.967	32.597
70	WSS, New Tapyal	SAMBA	37.44	18.27	23.94	27.92	75.221	32.508
71	15th ITBP	UDHAMPUR	0.24	-0.13	0.2	-0.09	75.078	32.915
72	Battal Badhol	UDHAMPUR	3	2.1		2.95	75.268	32.825
73	Bhaletar	UDHAMPUR	2.85	2.29	2.52	3.08	75.186	32.716
74	Channi Mansar	UDHAMPUR	1.7	-0.01	0.35	0.8	75.183	32.679

Sl No.	Location	DISITRICT	May-23	Aug-23	Nov-23	Jan-24	Longitude	Latitude
75	Deot	UDHAMPUR		15.84		16.89	75.263	32.680
76	Dhalpar	UDHAMPUR	8.01	5.8	7.12	7.66	75.196	32.859
77	Dhanu Gatyal	UDHAMPUR	12.05	8.2	10.65	11.74	75.007	32.958
78	Kanjli	UDHAMPUR	1.53	1.43	1.49	1.55	75.148	32.878
79	Krimchi Mansar	UDHAMPUR	24.81	20	23.05	24	75.115	32.968
80	Naglyan Baryal	UDHAMPUR	3.55	3.25	3.35	3.53	75.143	32.909
81	Sandoh	UDHAMPUR	3.06				75.260	32.660
82	Sangote	UDHAMPUR	3.98	4.07	4.22	4.09	75.305	33.062
83	Shivnagar	UDHAMPUR	5.02	3.18	4.45	4.8	75.136	32.927

ANNEXURE – II

Depth to Water Level Data (in m) for all Seasons (Kashmir Region)

Sl No.	Location	DISSTRICT	May-23	Aug-23	Nov-23	Longitude	Latitude
DUG WELLS							
1	Dar Mohalla Gurura	BANDIPORA	2.03	2.1	2.1	34.367	74.667
2	Lonepora Kehnoosa	BANDIPORA	2.35	2.65	2.75	74.523	34.384
3	Shahgund	BANDIPORA	0.5			74.561	34.275
4	Sheikh Muqam	BANDIPORA	2.25	2.73	2.6	74.528	34.430
5	Teng Mohalla Baharabad	BANDIPORA	1.1	1.7	2.35	74.611	34.265
6	Hamabal Gadoora	BANDIPORA			2.2		
7	Authoora	BARAMULA	0.62	1.7	1.05	74.466	34.214
8	Badran	BARAMULA	3	4.2	4.3	74.576	34.243
9	Belia Nagsari	BARAMULA	2.2	2.2	2.35	74.327	34.620
10	Binner	BARAMULA	0.52	2.62	1.92	74.355	34.232
11	Bomai	BARAMULA	0.75	1.29		74.421	34.356
12	Delina	BARAMULA	2.05	3.65	3.8	74.415	34.236
13	Dusilpora	BARAMULA	3.12	3.25	3.6	74.613	34.170
14	Hadipora	BARAMULA	4.05	4.2	5	74.391	34.291
15	Hib Dangerpora	BARAMULA	1.85	2.6	4.2	74.411	34.321
16	Ibrahim Colony (Sopore)	BARAMULA	0.5	2.45	3.25	74.467	34.297
17	Jambazpora	BARAMULA	0.88	2.68	2.38	74.363	34.219
18	Janwara	BARAMULA	1.4	1.6	2.38	74.493	34.336
19	Lolipora	BARAMULA	2.52	3.4	3.3	74.536	34.216
20	Mandji	BARAMULA	0.5	1.8	3.15	74.472	34.360
21	Mazbugh (Sopore)	BARAMULA	0.2	1.3	2.1	74.429	34.278
22	Mirgund Silk Centre	BARAMULA	2.1	3.1	3.45	74.653	34.141
23	Najar Mohalla Dangerpora	BARAMULA	0.77			74.462	34.339
24	Noorabad Harwan	BARAMULA	1.5	1.75	1.95	74.387	34.398
25	Railway Station Sopore	BARAMULA	1.65	2.39	3.5	74.451	34.259
26	Saidpora	BARAMULA	0.55	1.6	1.6	74.463	34.321
27	Sheikhpora Heewan	BARAMULA	2.65	3.35	3.8	74.334	34.169
28	Tujjer Sharief	BARAMULA	1	1.5	1.95	74.408	34.377
29	Uplna	BARAMULA	3.4	3.15	3.7	74.398	34.201
30	Waripora	BARAMULA	0.72	2.3	7.2	74.561	34.091
31	Watlab	BARAMULA	2.08	2.6	2.85	74.517	34.368
32	Zamzampora Sheeri	BARAMULA	6.65	6.9	6.65	74.299	34.172
33	KVK Harn Budgam	BUDGAM			0.95		
34	Azam Baba Mohalla Awoora	KUPWARA	1.75	2.35	2.3	74.186	34.557
35	Batpora Bala	KUPWARA	2.04	1.2	0.8	74.089	34.494
36	Bramri	KUPWARA	1.4	3	4.45	74.278	34.466
37	Chanjmul	KUPWARA	4.24	6	5.6	74.182	34.392
38	Check Sodal	KUPWARA	1.35	2.35	2.95	74.239	34.442
39	Cherkot	KUPWARA	1.68	5.03	2.48	74.326	34.544
40	Chowgal	KUPWARA	0.6	2.2	2.9	74.321	34.406
41	Dohama	KUPWARA	2.12	4.3	4.8	74.148	34.488
42	Dolipora	KUPWARA	2.5	4.38	4.43	74.162	34.469
43	Drugmulla	KUPWARA	2	5	5.3	74.289	34.489
44	Goose - II	KUPWARA	1.01	1.4	3.19	74.280	34.539

45	Gulgam	KUPWARA	3.35	5.11	3.61	74.219	34.537
Sl No.	**Location**	**DISSTRICT**	**May-23**	**Aug-23**	**Nov-23**	**Longitude**	**Latitude**
46	Guloora	KUPWARA	1.35	2.2	2.3	74.316	34.388
47	Gundmacher	KUPWARA	1.35	1.4	2.2	74.407	34.492
48	Hajin Kralgund	KUPWARA	1.85	2.2	1.95	74.301	34.351
49	Halmathpora Chota Mohalla	KUPWARA	0.42	1.75	0.65	74.236	34.571
50	Hampora	KUPWARA	1.65	3.88	4.85	74.327	34.356
51	Handwara Almustafa colony	KUPWARA	1.82	2.2	2.73	74.278	34.404
52	Karihama	KUPWARA	3.6	7.6	7.05	74.224	34.506
53	Khanpora	KUPWARA	2.28	2.76	1.96	74.273	34.439
54	Khar Mohalla Tekipora	KUPWARA	1.25	1.4	3.6	74.432	34.463
55	Khushipora Rohama	KUPWARA	0.8	0.6	1.2	74.322	34.276
56	Kunel	KUPWARA	0.18	0.55	0.9	74.259	34.528
57	Kupwara Main Chowk	KUPWARA	1.65	2.8	3.55	74.259	34.528
58	Lalpora Shalgund	KUPWARA	1.1	1.8	1.6	74.428	34.502
59	Lassipora	KUPWARA	3.82	5.5	6.5	74.383	34.508
60	Machil	KUPWARA	1.5	1.8		74.444	34.654
61	Magam	KUPWARA	1.3	3.9	3.4	74.233	34.461
62	Melyal	KUPWARA	1.9	2	2.25	74.092	34.539
63	Mir Mohalla (Katyanwali)	KUPWARA	1.45	2.05	2.5	74.385	34.544
64	Mughalpora	KUPWARA	1	2.9	1.4	74.248	34.508
65	Palpoora	KUPWARA	0.25	2.1	3.2	74.358	34.341
66	Panipora Sagipora	KUPWARA	1.4	2.35	2	74.364	34.412
67	Panzgam - II	KUPWARA	2.07	2.1	2	74.077	34.483
68	Pazipora Payeen	KUPWARA	1.9	4.3	5.75	74.192	34.494
69	Radbug	KUPWARA	0.7	3	3.4	74.303	34.461
70	Taratpura	KUPWARA	1.13	1.2	1.6	74.117	34.470
71	Tarich	KUPWARA	1.5	2.7	2	74.326	34.436
72	Trehgam	KUPWARA	1.34	5.54	2.14	74.175	34.517
73	Wadipora	KUPWARA	3.21	3.72	4.4	74.233	34.410
74	Waise Kawnar	KUPWARA	2	3.5	3.7	74.143	34.446
75	Wantiwara Kandi	KUPWARA	2.5	2.85	2.2	74.346	34.451
76	Warsun Kashmiri	KUPWARA	1.15	2.25	7.8	74.120	34.533
77	Wasarkhoto	KUPWARA	2	2.7	2.5	74.106	34.506
78	Yaroo	KUPWARA		1.8	1.8		
79	Yunsoo	KUPWARA	1.75	2.4	2.2	74.372	34.378
80	Zachaldara	KUPWARA	6.68	6.2		74.198	34.407
81	Tral	PULWAMA	14.46	15.34	15.29	75.035	33.914
82	Urwan (Warwan)	PULWAMA	0.17	0.53	-0.35	74.885	33.931
83	Regal Chowk,Srinagar	SRINAGAR	2.03	3.2	0.5	74.835	34.073
PIEZOMETERS							
1	SKUAST Shuhama	GANDERBAL		9	9.25	74.826	34.200
2	Botanical Garden EW	SRINAGAR		4.5	5.15	74.883	34.090
3	Botanical Garden OW	SRINAGAR		4.88	5.79	74.883	34.090