



GROUND WATER YEAR BOOK 2015-16

JAMMU & KASHMIR



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FOREWORD

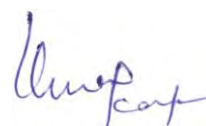
WATER is one of the essential natural resources for sustaining life on blue planet “**Earth**”. The demand of fresh / usable water has increased manifold globally due to rapid growth in population, which in turn caused change in agricultural pattern and increase in industrial activities. To meet the demand of fresh water of various sectors, there is an enormous stress on ground water resources as the surface water pollution is increasing day by day. 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 behavior of the ground water regime through a network of ground water monitoring wells spread across the country. The water level data collected from such observation wells in each state are compiled, processed and the salient features brought out as a “Ground Water Year Book” every year. This report pertains to the scenario of ground water regime in the state of Jammu and Kashmir for the year 2015-2016.

Central Ground Water Board, North Western Himalayan Region, Jammu is monitoring the groundwater regime under various hydrogeological setting through Dug wells and Piezometers in valley areas of Jammu and Kashmir State, viz. Jammu, Kathua, Rajouri, Reasi, Samba and Udhampur districts four times in a year (January, May, August and November) and Anantnag, Bandipora, Baramulla, Budgam, Ganderbal, Kupwara, Pulwama and Srinagar Districts three times in a year (May, August and November). Due to the heavy snowfall monitoring of January month is not being done. The effect of rainfall/snowfall on the ground water regime is studied through the fluctuations between pre and post monsoon seasons in Jammu Region and pre and post winter season in Kashmir Valley. Similarly water level fluctuations between the two consecutive seasons are studied and comparisons of water level for the year are done with the long-term mean of at least one decade. The spatial and temporal variations in the chemical quality of the formation water are studied through chemical analysis results of water samples collected from the ground water monitoring wells during May.

The information and data presented in this report will serve as a database to the user agencies, ground water planners and managers and will be of immense use to understand the regional picture on the quantitative and qualitative aspects of ground water regime in Jammu & Kashmir State.

The present Ground Water Year Book, 2015 – 2016 is the hard work & outcome of the efforts made by **Rayees Ahmad Pir, Assistant Hydrogeologist**. The efforts in depicting the groundwater scenario of Jammu & Kashmir State through maps and giving proper shape to this report, is highly appreciable.



Place: Jammu
Date: 7.10.2016

Dr Uma Kapoor
Regional Director

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INTRODUCTION

Jammu and Kashmir is the northern most and 6th largest state of India. It lies within latitudes of 32°17' and 36° 58' N and longitudes of 73° 26' and 80° 30' E. It has a total geographical area of 2,22,236 km² which includes an area of 78,114 km² under occupation of Pakistan and 5180 km² which has been illegally handed over by Pakistan to China. It also includes 37,555 km² area which is under illegal occupation of China. Total 30 Survey of India Degree Sheets cover entire J&K State. The state has international border with China and Afghanistan in the north, Tibet in east and Pakistan in the west. The states of Punjab and Himachal Pradesh lie in the south. Major parts of Jammu and Kashmir State represent high rugged mountainous terrain. The Jammu and Kashmir State is divided into two administrative divisions viz. Kashmir Division comprising Kashmir and Ladakh Regions and Jammu division comprising of Jammu Region. There are total twenty-two districts in J&K state. The administrative map of the state is shown in figure 1.

The Central Ground Water Board started monitoring of ground water regime through All India network of hydrograph stations from 1969 onwards. The density of observation wells was increased year after year. Earlier ground water monitoring was carried out through a network of open wells, generally dug wells for drinking purpose tapping shallow aquifers. Keeping in view the importance of future ground water development, the network was subsequently strengthened by construction of purpose built piezometers. Presently in Jammu and Kashmir, a total of 261 dug wells are being monitored for this purpose. The Central Ground Water Board, North Western Himalayan Region 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 in a year during May for quality testing. The water level and chemical analysis data thus collected is analyzed and interpreted by GEMS and Map Info software and Ground Water Regime Monitoring Bulletin is prepared and issued seasonally with interpreted data and thematic maps depicting ground water scenario of J&K state.

The total number of active ground water monitoring wells are 261 (as on January 2016) which are located in alluvial areas of Jammu, Kathua, Samba, Rajouri, Reasi, Udhampur, Srinagar, Baramulla, Bandipora, Anantnag, Ganderbal, Kupwara and Pulwama Districts. Most of monitoring stations fall in valley areas of these districts.

The present report discusses regional behaviour of water levels in phreatic aquifers for the period May, August, November 2015 and January 2016 which will enable user agencies to plan development strategies. The results of chemical analysis of water samples collected in May 2015 from observation wells established by Central Ground Water Board, North Western Himalayan Region are also discussed.

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

1. To study fluctuation of water levels both spatially and temporally in response to ground water recharge and/or discharge.
2. To evaluate changes in ground water level with respect to preceding year for the same period.
3. To evaluate changes in ground water levels with respect to a long term average water level such as decadal mean.
4. To study fluctuation of water level during different seasons of 2015-16.
5. To study hydro-chemical behaviour of phreatic aquifers.

1.1 Status of Hydrograph Network Stations

In Jammu & Kashmir, at present there are 261 Hydrograph Network Stations which are being monitored every year during pre-monsoon and post-monsoon periods. 231 NHS exist in Jammu Region and 30 stations in Kashmir Region. Till date no monitoring stations have been established in Ladakh Region. District-wise number of hydrograph network stations as on 31.03.2016 is given in table-1 and their locations are shown in Figure 2.

Table: 1 District-wise break-up of active Ground Water Monitoring Wells in J&K State (as on January 2016)

S. No.	REGION	DISTRICT	Total No of Monitoring wells	Number of Active Ground Water Monitoring Wells			
				May-15	Aug-15	Nov-15	Jan-16
1	KASHMIR REGION	ANANTNAG	1	1	1	1	
2		BANDIPORA	2	1	2	2	
3		BARAMULLA	7	6	7	6	
4		BUDGAM	2	1	2	2	
5		KUPWARA	11	9	10	10	
6		PULWAMA	4	1	3	3	
7		SRINAGAR	3	3	0		
	Total		30	22	25	24	
8	JAMMU REGION	JAMMU	89	84	87	86	86
9		KATHUA	33	31	32	33	33
10		RAJAURI	38	35	38	37	36
11		REASI	9	9	9	8	9
12		SAMBA	40	35	39	40	38
13		UDHAMPUR	22	20	22	22	22
	Total		231	214	227	226	224
	TOTAL J&K		261	236	252	250	224

PHYSIOGRAPHY

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

Sirowal Belt: The Sirowal belt covers an area of about 1000 km² and has an average topographic gradient of 1:250 to 1:300 in southwest direction. The land elevation of Sirowal belt above mean sea level is normally within 320 m. Southern parts of Jammu and Kathua Districts fall in this belt.

Kandi Belt: The elevation of 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 km² and occupies parts of Jammu and Kathua Districts imperceptibly north of Sirowal belt. Kandi belt in Jammu & Kashmir state runs in northwest - southeast direction as a narrow strip between rivers Munnawar Tawi in the west and Ravi in the east. The belt is occupied by reworked Siwalik debris, which has master slope towards southwest.

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

Kashmir Valley: The elevation of valley floor above 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 the elevation between 2000 m and 5000 m above mean sea level and form parts of Udhampur, Anantnag, Baramulla, Srinagar and Kupwara Districts.

Trans-Himalayan Zone: The trans-Himalayan zone constitutes the inaccessible mountainous terrain of Kargil and Leh districts in Ladakh Region. The elevation of this zone varies between 5000 m and 8000 m above mean sea level. However, along the lower reaches of Indus and Shyok rivers the elevation is less than 5000 m.

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 of claystone, siltstone, sandstone etc. Unconsolidated formations from Quaternary to Recent age are comprised of Clay, Silt, Sand, Gravel, pebbles, Boulder 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
Palaeozoic	Panjal Traps/ Tanwal
Carboniferous / Permian	Agglomeratic Slates Fenestella Shales Gondwana Formations Zewan Beds
Silurian-Devonian	Muth Quartzites
Upper Pre-Cambrian to Lower Cambrian	Dogra Slates
Lower Pre-Cambrian	Salkhala Series
Pre-Cambrian	Granite & Basic Intrusives

DRAINAGE

Entire state of Jammu and Kashmir falls in the Indus River Basin and the only exception is the small area in the extreme north-east which is part of Quraqush River Basin.

4.1. Indus Basin

The total drainage area of Indus Basin is 11,78,440 km² out of which an area of 453,250 km² falls in high Himalayan mountains and the remaining 725,190 km² falls in the plains of the drainage area in plains. A total of 321,290 km² area of Indus basin falls in India whereas only 131,960 km² 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 kms 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 Ghar River at about 257 kms from its source. After 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 Zaskar 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 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 km² and a vast coastline of about 201 km.

Major sub-basins of 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 under:-

4.1.1. Jhelum Sub-Basin

The Jhelum is known in Kashmir as the Veth River. Most parts of Kashmir valley are drained by Jhelum River, which flows in 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, in fact, is a delta of 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.

4.1.2. 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, at about 250 km from its source. Ranbir canal takes off from its left bank in Akhnoor tehsil.

4.1.3. Ravi Sub-Basin

Very small parts of the state, mainly the extreme south-eastern parts, fall in the RaviSub-basin. The RaviRiver rises from the northern face of Rohtang Pass in Himachal Pradesh at an elevation of 4116 m. After passing through 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 Ravi River, the Ujh River Which originates from the Basohli hills of Kathua District joins the mainstream to its right at Lassian.

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.

5.1. Climate of Jammu Division

Climate of 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 south-west and north-east monsoons. The reversal of pressure takes place regularly twice a year. This region has sub-tropical climate with hot and dry climate in summer and 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 Jammu region due to south-west monsoon from July to September and contributes about 80% of the total rainfall. The temperature in plain areas of Jammu region goes up to 45°C during summer and drops to as low as 3° C during winter season. Average number of Annual rainy days in Jammu region is 59.

5.2. Climate of Kashmir Division

The weather and climate of 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 winters, 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 winter season, i.e. December to February. March and April are the months of rainfall. May to September are relatively dry months. The mercury drops between -8°C and 12°C during winter and attains a moderate temperature of around 35°C during summer.

5.3. Climate of Ladakh Division

Ladakh Division, lying mainly to the north of the Greater Himalayas, has unique geographical feature. It is characterized with parallel mountain ranges, numerous snow-covered peaks, gigantic glaciers, narrow fertile valleys, alluvial fans, river terraces and seasonal lush green pastures. For the most part, Ladakh has bare grounds, barren rock and granite table lands, devoid of natural vegetation. All these factors have closely influenced the climate of Ladakh. Moreover, the influence of local relief is most pronounced in respect of the effectiveness of isolation on slopes having different exposures and with the modification of wind direction and speed. Every variation in slope with respect to the sun rays produces a different micro-climate. In general the climate of Ladakh division is very cold, arid and dry resembling to that of a cold desert. It is a Cold Continental arid type Climate. Ladakh Division covering Leh and Kargil districts receives an average annual precipitation of 150 mm. Leh, located at the edge of the Tibetan plateau receives an annual precipitation of only 83 mm in the form of rain. In addition, it receives moderate to high snow fall. Kargil gets about 150 mm of rain and snowfall. The temperature falls down to -5°C to -35° C during winter. Drass, the second coldest inhabited place in the world falls in this region.

SOILS

Various types of soils are formed in different regions of the state owing to marked physiographic and climatological variations.

Alluvial soils occur in parts of Jammu and Kathua Districts where the land elevation is less than 300 m above mean sea level. These soils are homogeneous and very fertile.

Brown hilly soils are formed at elevations between 300 and 1500 m amsl in the areas of moderately undulating topography. Spodo soils are developed in areas with land elevation between 1500 and 3000 m amsl experiencing relatively colder winters and higher mean annual rainfall. These soils occur in Poonch and Doda districts.

Ochara-qulf soils are yellowish brown in colour and have moderately low permeability. These are developed at an elevation of about 1600 m amsl in mid upland areas of Kashmir Valley. Hapludalf soils are yellowish brown to dark brown in colour, very deep and well drained.

Skeletal soils are developed in parts of Leh and Kargil districts of Ladakh Region, which vary in altitude between 2400 m and 7200 m amsl and experience severely cold and dry winters.

HYDROGEOLOGY

The hydrogeological set up in the state is very complicated owing to varied geological settings and ground water conditions. All the three regions of Jammu & Kashmir state represent entirely different ground water 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.

7.1.Porous Formation

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

7.1.1. Jammu Region

In Outer Plains of Jammu Region, extending between River Ravi in the east to MunawarTawi in the west, the ground water occurs in piedmont deposits belonging to upper Pleistocene to 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 clastics 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 quantity.

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 peck of gravels 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 substantial amount of clay sometimes hard and sticky of varying thickness. The clay proportion increases towards southwest. Occurrence of perched water bodies is a common phenomenon in the Kandi belt of Jammu & Kashmir state. The ground water generally occurs under unconfined conditions in Kandi formation.

➤ **Sirowal Formation**

The Kandi formation coalesces into Sirowal formation in the south, finer outwash of Siwalik debris, brought by streams. Ground water 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 ground water oozes out along this line causing marshy

conditions. The spring line has undergone deformation due to decline of water level resulting from development of ground water in 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 of coarse clastics such as boulders, cobbles, pebbles etc. inter-bedded with lenticular clays.

➤ ***Isolated Valley Fills in Middle Himalayas***

There exist a number of isolated valleys in middle Himalayas where ground water occurs in valley fill deposits comprising of lacustrine to fluvio-glacial sediments. A few meter thick layer of loess overlies these deposits, which is windblown.

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

7.1.2. Kashmir Region

Kashmir valley covers an area of 5600 km and is occupied by Karewas that 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 it is very rare that they are medium to coarse grained. There is considerable lateral facies variation in the nature of sediments. The aggregate thickness of these sediments is of the order of 2500-3000 m. Ground water in the Karewas of Kashmir valley occurs under both confined as well as unconfined conditions.

7.1.3. Ladakh Region

In Leh plains of Ladakh Region, the sediments comprise of morainic and fluvio-glacial boulders, cobbles underlain by lacustrine deposits consisting of clay and silt. The Leh plains cover an area of about 100 km² between PhayangNala in the west to Sabu Nala in the east. Ground water generally occurs under unconfined conditions.

7.2. 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,

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 aquifers.

7.3. BEHAVIOUR OF WATER LEVELS

7.3.1. DEPTH TO WATER LEVEL

The water levels in Ground Water Monitoring Wells of Jammu and Kashmir State were measured four times during the period 2015 – 2016 (May 2015, August 2015, November 2015 and January 2016). The water levels observed are shown in Annexures – I & II. The ground water levels in different seasons were analysed to evaluate the temporal behaviour of water level. The behaviour of water levels during the period May 2015 to January 2016 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 ground water 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 same water levels and the areas have been demarcated with uniform contour intervals. The contouring has been done by Natural Neighbourhood Interpolation method. District wise categorization of water levels observed during May, August, November 2015 and January, 2016 is given in Annexure – I & II.

7.3.1.1. Depth to Water Level -May 2015

Jammu Region: The water level data in respect of 215 out of 246 National Hydrograph Network Stations for the month of May 2015 were analysed. The depth to water level varied from -0.01m bgl (Jagati in Jammu District) to 31.52 m bgl (Taryai in Jammu district). Categorization of depth to water level May 2015 is given in table 3.

Majority of the wells i.e. 60 number of wells (27.91%) have recorded the water level less than 2.0 m bgl. About 47.44% of the total wells (102 wells) analysed have shown depth to water level in the range 2-5 m bgl. Whereas 35 wells (16.28%) have shown water levels in the range of 5-10 m bgl. 9 (4.19%) wells have registered deeper water levels, in the range of 10-20 m bgl. Another 09 wells (4.19%) of the total wells analysed have shown water levels in the range of 20-40 m bgl. None of the wells have shown water levels more than 40.0 m bgl.

Valley areas of Jammu, Samba and Kathua districts show water level between 2-5 m bgl except for a 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 and 5 m bgl except for a

few small patches that show water levels from 0 to 2 m bgl. In Kandi Belt, the water levels are deeper ranging between 2 and 10 m bgl and a few patches having water levels more than 20 m bgl (Figure 4).

Kashmir Region: The water level data in respect of 22 out of all the 31 National Hydrograph Network Stations for the month of May 2015 were analysed. The depth to water level varied from 0.21 mbgl (Sopore Model Town in Baramulla District) to 13.29 m bgl (Rambarpora, district Anantnag).

The water level less than 2.0 m below ground level has been recorded in 14 (63.64%) wells, 06 well (27.27%) have shown depth to water level in the range 2-5 m bgl, whereas 01 well (4.55%) has shown water level in the range of 5-10 m bgl, 01 (4.55%) well has registered deeper water level i.e., 10-20 m bgl. None of the wells have shown water level more than 20.0 m bgl.

Due to non-availability of sufficient data, contour map of May 2015 could not be prepared in Kashmir Valley.

7.3.1.2. Depth to Water Level -August 2015

Jammu Region: The water level data in respect of 227 out of 249 National Hydrograph Network Stations for the month of August 2015 were analysed. The depth to water levels varied from 0.07 m bgl (in Kothian of Kathua district) to a maximum of 32.28 m bgl (Kootah in Samba district). Categorization of depth to water level August 2015 is given in table 4.

The water level less than 2 meters below ground level was recorded in 115 wells (50.66%). 72 wells (31.72%), have shown water level in the range of 2 to 5 m bgl, whereas 24 wells (10.57%) have shown water level in the range of 5 to 10 m bgl. 11 wells (4.85%) have shown deeper water levels i.e. in the range of 10 to 20 m bgl. 5 wells (2.20%) have shown very deep water level of > 20 m bgl. None of the wells have shown water levels more than 40 m bgl.

In Sirowal formation of Jammu, Samba and Kathua, water levels varied between 2 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 water levels between 5 to 10 m bgl and 10 to 20 m bgl. Water levels deeper than 20m bgl were observed in the extreme north-western portion of Jammu district in Kandi belt and north eastern patches in Samba district (Figure 5).

Kashmir Region: The water level data in respect of 28 out of 31 National Hydrograph Network Stations for the month of August 2015 were analysed. The depth to water levels ranges from 0.54 (in Khanpora, Kupwara district) to 15.8 m bgl (in Tral, Pulwama district).

The water levels less than 2.0 m below ground level have been recorded in 12 wells (42.86%), 11 wells (39.29%) have shown depth to water level in the range of 2-5 m bgl, whereas 02 wells (7.14%) have shown water levels in the range of 5-10 m bgl, 03 wells (10.71%) have shown deeper water level i.e., 10-15 m bgl, none of the wells have shown water level more than 15 m bgl.

Maximum portions in the northern areas of Baramulla and eastern patch of Kupwara district have water level in the range of 0 – 2 m bgl whereas the valley portions of entire Budgam, Kupwara, Bandipora and small portions of Baramulla, Kupwara, Pulwama and Shopian districts have shown water levels between 2 – 5 m bgl. The water levels in the range of 5 – 10 m bgl has been observed most parts of Srinagar and Shupian districts, entire Kulgam and major parts of Pulwama districts. The water level between 10 – 15 m bgl is observed in Anantnag and small portion of Kulgam districts (Figure 6).

7.3.1.3. Depth to Water Level -November 2015

Jammu Region: The water level data in respect of 225 out of 249 National Hydrograph Network Stations for the month of November 2015 were analysed. The depth to water level ranges from 0.16 m bgl (Kothian in Kathua district) to 32.40 m bgl (Taryai in Jammu district). Categorization of depth to water level November 2015 is given in table 5.

A total of 59 numbers of wells (26.22%) have recorded the water level less than 2.0 m bgl. Majority of the wells,(112 wells, 49.78% of the total wells)analysed have shown depth to water level in the range of 2-5 m bgl. Whereas 36 wells (16%) have shown water levels in the range of 5-10 m bgl. 12 (5.33%) wells have registered deeper water levels, in the range of 10-20 m bgl. Another 06 wells (2.67%) of the total wells analysed have shown water levels in the range of 20-40 m bgl. None of the wells have shown water levels more than 40 m bgl.

In Sirowal formation of Jammu, Samba and Kathua, water levels varied between 2 to 5 in major portion and 0-2 m bgl at a few portions. 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 5 – 10 m bgl have been observed at a few patches. In Kandi belt, the water levels generally found are within the range of 5-10 and 10 - 15 mbgl. Water levels deeper than 20m bgl were observed in the extreme north-western portion of Jammu district in Kandi belt, north eastern patches in Samba district and in the interior parts of Kathua district(Figure 7).

Kashmir Region: The water level data in respect of 27 out of 31 National Hydrograph Network Stations for the month of November 2015 were analysed. The depth to water level varied from 0.79mbgl (Sopore Model Town, Baramulla District) to 15.16 m bgl (Tral in Pulwama District).

The water level has been recorded less than 2.0 m below ground level in 11 (40.74%) wells, 11 wells (40.74%) have shown depth to water level in the range 2-5 m bgl, whereas 02 wells (7.41%) have shown water levels in the range of 5-10 m bgl, 03 (11.11%) wells have registered deeper water levels i.e. 10-20 m bgl. None of the wells have shown water level more than 20 m bgl.

South-western parts of Baramulla and southern parts of Kupwaradistricts have shallow water levels (0 – 2 m bgl), whereas entire Budgam, Bandipora, and a few areas of Baramulla, Pulwama and Bandipora districts have water level in the range of 2 to 5 mbgl. Water levels between 5 and 10 m bgl have been observed in small parts of Kupwara, Baramulla, Pulwama, Kulgam and entire Srinagar and Shopian districts. Only in a single well in Anantnag District water level more than 15 m bgl was observed (Figure 8).

7.3.1.4. Depth to Water Level -January 2016

Jammu Region: The water level data in respect of 224 out of 249 National hydrograph Network Stations for the month of January 2016 were analysed. The depth to water levels varied from 0.24 in Billawar Kathua District to 32.49 m bgl in Taryai Jammu District. Categorization of depth to water level January 2016 is given in table 6.

A total of 47 wells (20.98% of the total wells analysed) have recorded the water level less than 2.0 m bgl. 114 wells (50.89%) have shown depth to water level in the range 2-5 m bgl, whereas 43 wells (19.20%) wells have shown water levels in the range of 5-10 m bgl, 13 (5.80%) wells have shown the deeper water levels i.e. 10-20 m bgl and 07 (3.13%) wells have shown water level more than 20.0 m bgl. None of the wells had shown water levels deeper than 40 m bgl.

In entire Sirowal area, the water levels varied between 2 to 5 m bgl with few small patches of 0-2 m. Besides, small portions of all the three districts recorded water level in the range of 5 to 10 mbgl. The Kandi belt in Jammu, Samba and Kathua Districts shows deeper water levels between 5 to 10 & 10 to 20 m bgl. In parts of Kandi Belt of all the three districts, the deeper water levels deeper i.e. more than 20 m bgl were also observed (Figure 9).

Kashmir Region: Due to heavy snowfall, Monitoring of NHS stations was not done for the month of January.

Table 3. CATEGORIZATION OF DEPTH TO WATER LEVEL- MAY 2015

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	ANANTNAG	1	13.29	13.29	0	0	0	1	0	0.00	0.00	0.00	100.00	0.00
	BANDIPORA	1	0.85	0.85	1	0	0	0	0	100.00	0.00	0.00	0.00	0.00
	BARAMULLA	6	0.21	1.95	6	0	0	0	0	100.00	0.00	0.00	0.00	0.00
	BUDGAM	1	1.49	1.49	1	0	0	0	0	100.00	0.00	0.00	0.00	0.00
	KUPWARA	9	0.60	2.74	6	3	0	0	0	66.67	33.33	0.00	0.00	0.00
	PULWAMA	1	2.42	2.42	0	1	0	0	0	0.00	100.00	0.00	0.00	0.00
	SRINAGAR	3	2.10	8.80	0	2	1	0	0	0.00	66.67	33.33	0.00	0.00
	Total	22	0.21	13.29	14	6	1	1	0	63.64	27.27	4.55	4.55	0.00
JAMMU REGION	JAMMU	84	0.01	31.52	13	50	13	3	5	15.48	59.52	15.48	3.57	5.95
	KATHUA	32	0.79	22.39	2	17	11	1	1	6.25	53.13	34.38	3.13	3.13
	RAJOURI	35	0.52	4.95	23	12	0	0	0	65.71	34.29	0.00	0.00	0.00
	REASI	9	1.04	24.08	3	5	0	0	1	33.33	55.56	0.00	0.00	11.11
	SAMBA	35	1.09	26.35	5	15	8	5	2	14.29	42.86	22.86	14.29	5.71
	UDHAMPUR	20	0.37	7.78	14	3	3	0	0	70.00	15.00	15.00	0.00	0.00
	Total	215	0.01	31.52	60	102	35	9	9	27.91	47.44	16.28	4.19	4.19
TOTAL J&K	237	0.01	31.52	74	108	36	10	9	31.22	45.57	15.19	4.22	3.80	

Table 4. CATEGORIZATION OF DEPTH TO WATER LEVEL- AUGUST 2015

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	ANANTNAG	1	11.23	11.23	0	0	0	1	0	0.00	0.00	0.00	100.00	0.00
	BANDIPORA	2	1.52	1.68	2	0	0	0	0	100.00	0.00	0.00	0.00	0.00
	BARAMULLA	7	0.70	3.38	5	2	0	0	0	71.43	28.57	0.00	0.00	0.00
	BUDGAM	2	3.43	3.45	0	2	0	0	0	0.00	100.00	0.00	0.00	0.00
	KUPWARA	10	0.54	12.62	4	5	0	1	0	40.00	50.00	0.00	10.00	0.00
	PULWAMA	3	1.00	15.08	1	0	1	1	0	33.33	0.00	33.33	33.33	0.00
	SRINAGAR	3	2.26	9.43	0	2	1	0	0	0.00	66.67	33.33	0.00	0.00
	Total	28	0.54	15.08	12	11	2	3	0	42.86	39.29	7.14	10.71	0.00
JAMMU REGION	JAMMU	87	0.20	32.86	38	32	8	6	3	43.68	36.78	9.20	6.90	3.45
	KATHUA	32	0.07	15.44	13	12	6	1	0	40.63	37.50	18.75	3.13	0.00
	RAJOURI	37	0.27	4.29	26	11	0	0	0	70.27	29.73	0.00	0.00	0.00
	REASI	9	0.61	25.12	7	1	0	0	1	77.78	11.11	0.00	0.00	11.11
	SAMBA	39	0.70	23.82	12	13	9	4	1	30.77	33.33	23.08	10.26	2.56
	UDHAMPUR	23	0.20	5.15	19	3	1	0	0	82.61	13.04	4.35	0.00	0.00
	Total	227	0.07	32.86	115	72	24	11	5	50.66	31.72	10.57	4.85	2.20
TOTAL J&K	255	0.07	32.86	127	83	26	14	5	49.80	32.55	10.20	5.49	1.96	

Table 5. CATEGORIZATION OF DEPTH TO WATER LEVEL- NOVEMBER 2015

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	ANANTNAG	1	11.70	11.70	0	0	0	1	0	0.00	0.00	0.00	100.00	0.00
	BANDIPORA	2	1.70	2.88	1	1	0	0	0	50.00	50.00	0.00	0.00	0.00
	BARAMULLA	6	1.07	15.79	3	2	0	1	0	50.00	33.33	0.00	16.67	0.00
	BUDGAM	2	3.70	3.75	0	2	0	0	0	0.00	100.00	0.00	0.00	0.00
	KUPWARA	10	0.79	13.02	7	3	0	0	0	70.00	30.00	0.00	0.00	0.00
	PULWAMA	3	2.20	15.16	0	1	1	1	0	0.00	33.33	33.33	33.33	0.00
	SRINAGAR	3	2.44	8.70	0	2	1	0	0	0.00	66.67	33.33	0.00	0.00
	Total	27	0.79	15.79	11	11	2	3	0	40.74	40.74	7.41	11.11	0.00
JAMMU REGION	JAMMU	86	2.02	32.40	15	52	10	5	4	17.44	60.47	11.63	5.81	4.65
	KATHUA	33	0.16	15.60	7	16	8	2	0	21.21	48.48	24.24	6.06	0.00
	RAJOURI	35	0.50	8.85	19	12	4	0	0	54.29	34.29	11.43	0.00	0.00
	REASI	8	0.20	25.58	4	3	0	0	1	50.00	37.50	0.00	0.00	12.50
	SAMBA	40	0.84	24.53	6	18	11	4	1	15.00	45.00	27.50	10.00	2.50
	UDHAMPUR	23	0.73	12.20	8	11	3	1	0	34.78	47.83	13.04	4.35	0.00
	Total	225	0.16	32.40	59	112	36	12	6	26.22	49.78	16.00	5.33	2.67
TOTAL J&K	252	0.16	32.40	70	123	38	15	6	27.78	48.81	15.08	5.95	2.38	

Table 6. CATEGORIZATION OF DEPTH TO WATER LEVEL- JANUARY 2016

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	86	0.96	33.49	14	46	16	6	4	16.28	53.49	18.60	6.98	4.65
	KATHUA	33	0.24	21.50	8	12	10	2	1	24.24	36.36	30.30	6.06	3.03
	RAJOURI	36	0.60	5.12	12	23	1	0	0	33.33	63.89	2.78	0.00	0.00
	REASI	9	2.05	25.10	0	7	1	0	1	0.00	77.78	11.11	0.00	11.11
	SAMBA	38	0.88	26.08	4	17	11	5	1	10.53	44.74	28.95	13.16	2.63
	UDHAMPUR	22	0.54	7.40	9	9	4	0	0	40.91	40.91	18.18	0.00	0.00
	Total	224	0.24	33.49	47	114	43	13	7	20.98	50.89	19.20	5.80	3.13

7.4. SEASONAL FLUCTUATION OF WATER LEVEL

7.4.1 November 2015 with respect to May 2015

Jammu Region:The seasonal water level fluctuation between November 2015& May 2015 in respect of 210 National Hydrograph Stations are analysed. It is observed that 131 stations (62.38%) have shown rise in water level where as only 79 stations (37.61%) have shown fall in water levels in the range of 0-2 m, 2-4 m and >4 m. Categorization of changes in water level between May 2015-November 15 –(Jammu Region) is given in Table 7.

Out of 210 stations showing rise in water levels, 107 wells (50.95%) have shown rise less than 2 m. 16 wells (7.62%) and 8 wells (3.81%) have shown rise in the range of 2-4 m and >4 m respectively. 71wells (33.81%) have shown decline between 0-2 m and 4 wells (1.90%) have shown fall between 2-4 and 4 wells (1.90%) have shown decline of>4 m.

Effect of rainfall is directly reflected in all parts of the area monitored during November 2015. Almost all the valley areas are showing rise in the water levels except for small patches in Jammu and Samba districts. A few locations of Jammu, Samba and Kathua Districts have registered fall of water level within 2 m bgl (Figure 10).

Kashmir Region: Out of 31 stations showing rise in water levels, 18 wells (50.95%) have shown rise whereas only 3 have shown decline in water levels. The rise less than 2 m was found in 12 wells (57.14%), 2 wells (9.52%) and 4 wells (19.05%) have shown rise in the range of 2-4 m and >4 m respectively. Whereas 2wells (9.52%) have shown decline between 0-2 m and 1 well (4.76%) have shown fall between 2-4 and no any well (0.00%) have shown decline of>4 m. Categorization of changes in water level between November 2014 - May 15 –(Kashmir Region) is given in Table 8.

Since only 22 wells have been monitored in May 2015 out of 31 wells, contouring has not been done.

Table 7. CATEGORIZATION OF CHANGES IN WATER LEVEL BETWEEN MAY 2015-NOVEMBER 15 - JAMMU REGION

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			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 REGION	Jammu	82	0.01	6.35	0.17	3.27	49	8	1	22	2	0	59.76	9.76	1.22	26.83	2.44	0.00	58	24
	Kathua	31	0.02	12.15	0.34	1.72	19	4	3	5	0	0	61.29	12.90	9.68	16.13	0.00	0.00	26	5
	Rajauri	34	0.10	2.05	0.02	7.94	11	1	0	19	1	2	32.35	2.94	0.00	55.88	2.94	5.88	12	22
	Reasi	8	0.63	2.54	0.07	1.50	1	1	0	6	0	0	12.50	12.50	0.00	75.00	0.00	0.00	2	6
	Samba	35	0.03	8.76	0.05	2.10	22	2	4	6	1	0	62.86	5.71	11.43	17.14	2.86	0.00	28	7
	Udhampur	20	0.02	0.82	0.14	4.91	5	0	0	13	0	2	25.00	0.00	0.00	65.00	0.00	10.00	5	15
	TOTAL	210	0.01	12.15	0.02	7.94	107	16	8	71	4	4	50.95	7.62	3.81	33.81	1.90	1.90	131	79

Table 8. CATEGORIZATION OF CHANGES IN WATER LEVEL BETWEEN NOVEMBER 14 AND MAY 15 - KASHMIR REGION

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			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		
KASHMIR REGION	Anantnag	1			0.59	0.59	0	0	0	1	0	0	0.00	0.00	0.00	100.00	0.00	0.00	0	1
	Bandipora	1	0.70	0.70			1	0	0	0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	1	0
	Baramulla	6	0.28	4.25			5	0	1	0	0	0	83.33	0.00	16.67	0.00	0.00	0.00	6	0
	Budgam	1	1.06	1.06			1	0	0	0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	1	0
	Kupwara	9	0.38	3.40	0.04	0.04	3	2	3	1	0	0	33.33	22.22	33.33	11.11	0.00	0.00	8	1
	Pulwama	1	3.16	3.16			0	0	0	0	1		0.00	0.00	0.00	0.00	100.00	0.00	0	1
	Srinagar	2	0.30	1.10			2	0	0	0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	2	0
	TOTAL	21	0.28	4.25	0.04	0.59	12	2	4	2	1	0	57.14	9.52	19.05	9.52	4.76	0.00	18	3

7.5. ANNUAL FLUCTUATION OF WATER LEVEL

7.5.1. May 2015 with respect to May 2014

Jammu Region: The water level data in respect of 221 National Hydrograph Stations for the month of May 2015 was analyzed. It was compared with those monitored during May 2014. Majority of the wells have shown rise in water levels. A total of 143 wells have shown rise and 56 wells have shown fall in water levels in the range of 0-2 m, 2-4 m and >4 m. Categorization of changes in water level between May 2014 and May 15 is given in table 9.

Rise is shown by 124 wells (62.31%) in the range of 0-2 m. 16 wells (8.04%) have registered rise from 2-4 m bgl and 03 wells (1.51%) are showing rise of >4 m. Among 56 wells showing fall, 45 wells (22.61%) have shown fall in water level in the range of 0-2 m, 9 wells (4.52%) have shown fall between 2-4 m, and 02 (1.01%) wells have shown fall of >4 m.

Major parts of all the districts, i.e., Jammu, Kathua and Samba, have shown rise in water levels in the range of 0-2 m and some pockets have shown rise in water level >2 m. Fall in water levels in the range of 0-2 m is observed in a few portions in all the districts. None of the districts has registered decline in water levels of > 4 mbgl (Figure 11).

Kashmir Valley: The water level data in respect of 22 National Hydrograph Stations for the month of May 2015 were analysed. It was compared with those monitored during May 2014. Of 22 wells, a total of 19 wells (86.36%) have shown rise. A total of 03 wells (13.63%) have shown fall in water levels in the range of 0-2 m. Rise is shown by 18 wells (81.82%) in the range of 0-2 m and 1 well (4.55%) rise of >4 m has been observed. None of the wells have registered rise in the range of 2 to 4 m. Among 22 wells, all 3 wells (13.64%) have registered fall in the range of 0-2 m. None of the wells have registered fall > 2 m.

7.5.2. August 2015 with respect to August 2014

Jammu Region: For analysing the annual fluctuation, the water level data in respect of 216 National Hydrograph Network Stations for the month of August 2015 were analysed and compared with the water levels of August 2014. Categorization of changes in water level between August 2014 and August 15 is given in table 10.

A total of 149 wells (68.98%) have shown rise and 67 wells (31.01%) have shown fall in water levels. Rise is shown by 119 wells (55.09%) in the range of 0-2 m, 26 wells (12.04%) in the range of 2-4 m bgl and 04 wells (1.85%) have registered rise of >4 m. Among 216 wells showing decline, a total of 57 wells (26.39%) have registered fall in water level in the range of 0-2 m, 7 well (3.24%) have shown fall between 2-4 m and 3 wells (1.39%) have shown fall of >4 m.

The entire Jammu Region is showing rise in water levels except for a few small portions in all districts. The decline in the range of 0 – 2 m has been observed in a few patches in Jammu, Kathua and Samba districts. A few portions of Jammu and Samba districts have shown decline in water levels more than 4m in Kandi areas (Figure 12).

In Kashmir Valley, the water level data in respect of 27 National Hydrograph Stations for the month of August 2015 were analysed. It was compared with those monitored during August 2014.

Out of 27 wells, a total of 27 wells (100%) have shown rise in the range of 0-4m and none of the wells have shown decline in water levels. Rise is shown by all 17 wells (62.96%) in the range of 0-2 m, 09 wells (62.96%) have shown rise of >2 m and only 01 well (3.70%) has shown fall of >4 m.

The rise in water level in the range of 0 – 2 m has been observed in major parts of Kashmir valley in Anantnag, Kulgam, Shopian, Bandipora, Ganderbal, and in major parts of Kupwara, Baramulla, Budgam and Pulwama districts, whereas in small portion of Baramulla and major parts of Kupwara district, rise in the range of 2-4 m was observed. In some parts of Budgam and Pulwama districts, decline in range of 0-2 m was also observed. (Figure 13)

7.5.3. November 2015 with respect to November 2014

Jammu Region: The water level data, in respect of 199 National Hydrograph Stations for the month of November 2015 was analysed. It was compared with those monitored during November 2014. Majority of the wells have shown rise in water levels. A total of 102 wells (51.25%) have shown rise and 97(48.74%) wells have shown fall in water levels. Categorization of changes in water level between November 2014 and November 15 is given in table 11.

Rise is shown by 98 wells (49.25%) in the range of 0-2 m. 03 wells (1.51%) have recorded rise in the range of 2-4 m bgl and only 01 well (0.50%) has shown rise of >4 m. Among 199 wells showing fall, 87 wells (43.72%) have shown fall in water level in the range of 0-2 m. 05 wells (2.51%) have shown fall between 2-4 m, and 05 (2.51%) wells have shown fall of >4 m.

Major parts of all the districts, i.e., Jammu, Kathua and Samba, have shown equally rise and decline in water levels in the range of 0-2 m and some pockets have shown rise in water level >2 m. Fall of water levels in the range of 0-2 m has been observed in major portions in Samba especially in Kandi belt and also a few portions of Jammu and Kathua districts (Figure 14).

Kashmir Valley: The water level data in respect of 25 National Hydrograph Stations for the month of November 2015 were analysed. It was compared with those monitored during November 2014.

Of 25 wells, a total of 18 wells (72.00%) have registered rise. A total of 07 wells (28.00%) have shown fall in water levels in the range of 0-2 m. Rise is shown by 14 wells (56.00%) in the range of 0-2 m, 4 wells (16.00%) in the range of 2-4m and none of the wellshas shown rise of >4 m. Among 25 wells, 06 wells (24.00%) have shown fall in water level in the range of 0-2 m, only 01 well (4.00%) has shown fall in water level in the range of 2-4 m whereas fall of >4 m has been recorded in none of the wells.

Maximum parts in Kashmir have shown rise in the water levels except a few patches in, Budgam, Bandipora and Baramulla districts. The rise in the water levels in the range 0 – 2 m was observed almost in all the districts except for a few portions viz. Kupwara and entire Budgam districts. Whereas rise in the water levels in the range 2 – 4 m was observed in western and southern parts of Kupwara and in small patch of Baramulla district. The decline in the range of 0-2m was observed in entire Budgam and a few areas of Bandipora, Pulwama and Baramulla districts (Figure 15).

7.5.4. January 2016 with respect to January 2015

Jammu Region: The water level data, in respect of 205 National Hydrograph Stations for the month of January 2016 was analysed. It was compared with those monitored during January 2015. Majority of the wells have shown rise in water levels. A total of 121 wells have shown rise and 84 wells have shown fall in water levels. Categorization of changes in water level between January 2015 and January 16 is given in table 12.

Rise is shown by 111 wells (54.15%) in the range of 0-2 m. 07 wells (3.41%) have recorded rise in the range of 2-4 m bgl and 03 wells (1.46%) have shown rise of >4 m. Among 205 wells showing fall, 78 wells (38.05%) have shown fall in the range of 0-2 m, 5 wells (2.44%) have shown fall between 2-4m, and only 1 well (0.49%) has shown fall of >4 m.

In Jammu district, rise and decline in water levels in the range of 0-2 m has been observed equally and some pockets have shown rise in water level >2 m whereas almost entire Samba district has registered decline in range of 0-2m. In southern parts of Samba district, decline of more than 4m was also observed. Entire Kathua district has registered rise within range of 0-2m with few patches above 2m rise (Figure 16).

Table 09. CATEGORIZATION OF CHANGES IN WATER LEVEL BETWEEN MAY 2014 AND MAY 15

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			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		
KASHMIR REGION	ANANTNAG	1	0.96	0.96			1	0	0	0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	1	0
	BANDIPORA	1	0.45	0.45			1	0	0	0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	1	0
	BARAMULLA	6	0.06	0.76	0.57	1.45	4	0	0	2	0	0	66.67	0.00	0.00	33.33	0.00	0.00	4	2
	BUDGAM	1	0.33	0.33			1	0	0	0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	1	0
	KUPWARA	9	0.16	10.79	0.53		7	0	1	1	0	0	77.78	0.00	11.11	11.11	0.00	0.00	8	1
	PULWAMA	1	0.69	0.69			1	0	0	0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	1	0
	SRINAGAR	3	0.50	1.02			3	0	0	0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	3	0
	Total	22	0.06	10.79	0.53	1.45	18	0	1	3	0	0	81.82	0.00	4.55	13.64	0.00	0.00	19	3
JAMMU REGION	JAMMU	82	0.01	3.90	0.02	10.75	57	10	0	9	4	2	69.51	12.20	0.00	10.98	4.88	2.44	67	15
	KATHUA	29	0.03	7.21	0.06	3.79	15	2	1	9	2	0	51.72	6.90	3.45	31.03	6.90	0.00	18	11
	RAJOURI	28	0.15	3.68	0.15	0.97	19	1	2	6	0	0	67.86	3.57	7.14	21.43	0.00	0.00	22	6
	REASI	9	0.34	2.74	0.66	0.71	6	1	0	2	0	0	66.67	11.11	0.00	22.22	0.00	0.00	7	2
	SAMBA	32	0.01	2.72	0.02	3.99	17	2	0	11	2	0	53.13	6.25	0.00	34.38	6.25	0.00	19	13
	UDHAMPUR	19	0.16	1.80	0.01	3.88	10	0	0	8	1	0	52.63	0.00	0.00	42.11	5.26	0.00	10	9
	Total	199	0.01	10.79	0.01	10.75	124	16	3	45	9	2	62.31	8.04	1.51	22.61	4.52	1.01	143	56
TOTAL J&K	221	0.01	10.79	0.01	10.75	142	16	4	48	9	2	64.25	7.24	1.81	21.72	4.07	0.90	162	59	

Table 10. CATEGORIZATION OF CHANGES IN WATER LEVEL BETWEEN AUGUST 2014 AND AUGUST 15

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			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		
KASHMIR REGION	ANANTNAG	1	1.27	1.27			1	0	0	0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	1	0
	BANDIPORA	1	0.64	0.64			1	0	0	0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	1	0
	BARAMULLA	7	0.73	2.44			5	2	0	0	0	0	71.43	28.57	0.00	0.00	0.00	0.00	7	0
	BUDGAM	2	0.25	0.09			2	0	0	0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	2	0
	KUPWARA	10	0.27	4.08			2	7	1	0	0	0	20.00	70.00	10.00	0.00	0.00	0.00	10	0
	PULWAMA	3			0.11	0.39	3	0	0	0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	3	0
	SRINAGAR	3	0.30	1.76			3	0	0	0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	3	0
	Total	27	0.25	4.08	0.11	0.39	17	9	1	0	0	0	62.96	33.33	3.70	0.00	0.00	0.00	27	0
JAMMU REGION	JAMMU	86	0.03	5.29	0.02	10.66	46	10	1	25	1	3	53.49	11.63	1.16	29.07	1.16	3.49	57	29
	KATHUA	31	0.01	4.45	0.02	2.87	17	5	1	6	2	0	54.84	16.13	3.23	19.35	6.45	0.00	23	8
	RAJOURI	29	0.05	5.89	0.04	0.44	16	4	1	8	0	0	55.17	13.79	3.45	27.59	0.00	0.00	21	8
	REASI	9	0.21	2.33	0.02	1.55	4	1	0	4	0	0	44.44	11.11	0.00	44.44	0.00	0.00	5	4
	SAMBA	38	0.13	3.80	0.03	3.70	25	5	0	4	4	0	65.79	13.16	0.00	10.53	10.53	0.00	30	8
	UDHAMPUR	23	0.05	7.92	0.03	1.32	11	1	1	10	0	0	47.83	4.35	4.35	43.48	0.00	0.00	13	10
	Total	216	0.01	7.92	0.02	10.66	119	26	4	57	7	3	55.09	12.04	1.85	26.39	3.24	1.39	149	67
TOTAL J&K	243	0.01	7.92	0.02	10.66	136	35	5	57	7	3	55.97	14.40	2.06	23.46	2.88	1.23	176	67	

Table 11. CATEGORIZATION OF CHANGES IN WATER LEVEL BETWEEN NOVEMBER 2014 AND NOVEMBER 15

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			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		
KASHMIR REGION	ANANTNAG	1	1.00	1.00			1	0	0	0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	1	0
	BANDIPORA	1			0.15	0.15	0	0	0	1	0	0	0.00	0.00	0.00	100.00	0.00	0.00	0	1
	BARAMULLA	6	0.90	2.10	0.31	1.60	2	0	0	3	1	0	33.33	0.00	0.00	50.00	16.67	0.00	2	4
	BUDGAM	2	0.50	0.50	1.15	1.15	1	0	0	1	0	0	50.00	0.00	0.00	50.00	0.00	0.00	1	1
	KUPWARA	10	0.31	3.00			6	4	0	0	0	0	60.00	40.00	0.00	0.00	0.00	0.00	10	0
	PULWAMA	3	0.12	0.08	0.40	0.40	2	0	0	1	0	0	66.67	0.00	0.00	33.33	0.00	0.00	2	1
	SRINAGAR	2	0.18	0.27			2	0	0	0	0	0	100.00	0.00	0.00	0.00	0.00	0.00	2	0
	Total	25	0.12	3.00	0.15	1.60	14	4	0	6	1	0	56.00	16.00	0.00	24.00	4.00	0.00	18	7
JAMMU REGION	JAMMU	79	0.03	3.01	0.01	6.63	44	1	0	32	1	1	55.70	1.27	0.00	40.51	1.27	1.27	45	34
	KATHUA	31	0.01	2.55	0.03	4.03	21	1	0	8	0	1	67.74	3.23	0.00	25.81	0.00	3.23	22	9
	RAJOURI	27	0.07	1.05	0.05	4.40	16	0	0	8	2	1	59.26	0.00	0.00	29.63	7.41	3.70	16	11
	REASI	8	0.22	1.57	0.15	0.47	4	0	0	4	0	0	50.00	0.00	0.00	50.00	0.00	0.00	4	4
	SAMBA	35	0.01	4.02	0.04	1.04	11	1	1	22	0	0	31.43	2.86	2.86	62.86	0.00	0.00	13	22
	UDHAMPUR	19	0.15	0.82	0.01	7.38	2	0	0	13	2	2	10.53	0.00	0.00	68.42	10.53	10.53	2	17
	Total	199	0.01	4.02	0.01	7.38	98	3	1	87	5	5	49.25	1.51	0.50	43.72	2.51	2.51	102	97
TOTAL J&K	224	0.01	4.02	0.01	7.38	112	7	1	93	6	5	50.00	3.13	0.45	41.52	2.68	2.23	120	104	

Table 12. CATEGORIZATION OF CHANGES IN WATER LEVEL BETWEEN JANUARY 2015 AND JANUARY 16

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			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		
KASHMIR REGION	ANANTNAG																			
	BANDIPORA																			
	BARAMULLA																			
	BUDGAM																			
	KUPWARA																			
	PULWAMA																			
	SRINAGAR																			
	Total																			
JAMMU REGION	JAMMU	82	0.01	3.66	0.01	5.02	43	2	0	35	1	1	52.44	2.44	0.00	42.68	1.22	1.22	45	37
	KATHUA	31	0.03	6.68	0.09	0.20	26	1	1	3	0	0	83.87	3.23	3.23	9.68	0.00	0.00	28	3
	RAJOURI	29	0.01	6.49	0.10	1.77	19	1	1	8	0	0	65.52	3.45	3.45	27.59	0.00	0.00	21	8
	REASI	9	0.08	1.69	0.08	1.24	4	0	0	5	0	0	44.44	0.00	0.00	55.56	0.00	0.00	4	5
	SAMBA	34	0.02	11.24	0.01	3.26	7	1	1	22	3	0	20.59	2.94	2.94	64.71	8.82	0.00	9	25
	UDHAMPUR	20	0.02	2.33	19.00	2.97	12	2	0	5	1	0	60.00	10.00	0.00	25.00	5.00	0.00	14	6
	Total	205	0.01	11.24	0.01	5.02	111	7	3	78	5	1	54.15	3.41	1.46	38.05	2.44	0.49	121	84

7.6. DECADAL FLUCTUATION OF WATER LEVEL

7.6.1. May 2015 with respect to mean of May 2005 – May 2014

The water level fluctuation for the month of May 2015 Vs. (Mean of May 2005 – May 2014) has been worked out in respect of 122 observation wells. It is observed that a total of 92 wells (75.40%) have shown rise and 30 wells (24.59%) have shown decline in water level (especially in Kandi areas of Outer plains). Categorisation of changes in water level between May 2015 to decadal mean (May 2005-May 2014) is given in table 13.

Out of 92 number of wells showing rise, 54 wells (44.26%) have shown rise less than 2 m, 21 wells (17.21%) have shown rise from 2-4 m and 17 (13.93%) wells have shown rise of > 4 m. Out of 30 wells showing fall, 16 wells (13.11%) have shown fall in water level in the range of 0-2 m, 07 wells (5.74%) have shown fall between 2-4 m and 07 wells (5.74%) have shown fall of >4 m bgl.

All of the areas monitored have shown rise as well as decline in water levels in all ranges in Jammu Region. In Jammu district, the rise in range of 0-2m was found in the interior and extreme northern areas, 2-4m was observed in major parts whereas in western parts rise of more than 4m was recorded. In Samba district, the rise of 0-2 m and 2-4m was observed in small stretch and in a few areas rise of more than 4m was also observed. In Kathua district, rise of 0-2 m was observed in major portions. Decline in water levels was observed in all the districts in all ranges especially in northern parts of all districts and in southern areas of Jammu district (Figure 17).

7.6.2. August 2015 with respect to mean of August 2005 – August 2014

The water level fluctuation for the month of August 2015 Vs. (Mean of August 2005 – August 2014) has been worked out in respect of 126 observation wells. It is observed that a total of 81 wells (64.28%) have shown rise and 45 wells (35.71%) have shown decline in water level. Categorisation of changes in water level between August 2015 to decadal mean (August 2005-August 2014) is given in table 14.

Out of 81 number of wells showing rise, 69 wells (54.76%) have shown rise less than 2 m, 12 wells (9.52%) have shown rise from 2-4 m whereas none of the wells has shown rise of > 4 m. Out of 45 wells showing fall, 43 wells (34.13%) have shown fall in water level in the range of 0-2 m, 01 well (0.79%) has shown fall between 2-4 m and 01 well (0.79%) has shown fall of >4 m bgl.

Major portions in Jammu Region have shown rise within 0-2m range. Rest of the area also shows decline in the range of 0-2m with a few exceptions where fall of more than 2m was also observed. Rise in the range of 0-2m was observed in major portions of Jammu especially

northern areas, Samba and Kathua districts except its eastern parts where decline in all ranges was registered. A few areas in Jammu especially in southern and western parts have registered decline of 0-2m while in small portions fall of 2-4m was also recorded (Figure 18).

7.6.3. November 2015 with respect to mean of November 2005 – November 2014

The water level fluctuation for the month of November 2015 w.r.t. (mean of November 2005 to November 2014) has been worked out in respect of 124 observation wells. It is observed that a total of 82 wells (66.12%) have shown rise and 42 wells (33.87%) have shown decline in water levels. Categorisation of changes in water level between November 2015 to decadal mean (November 2005-November 2014) is given in table 15.

Out of 82 number of wells showing rise, 73 wells (58.87%) are showing rise less than 2 m, 7 wells (5.65%) have shown rise from 2-4 m and 2 wells (1.61%) have shown rise of more than 4 m. Out of 42 wells, which are showing fall, 37 wells (29.84%) have shown fall in water levels in the range of 0-2 m, 02 wells (1.61%) have shown fall between 2-4 m and 03 wells (2.42%) have shown fall of >4 m.

Rise in water levels was observed in major portions of all the districts of Jammu Region. A few isolated areas have shown rise in water levels above 2m. Rise in the range of 0 – 2 m is shown in all districts and almost entire Samba district. In Jammu, rise and decline in the range of 0-2m is equally found with southern parts showing decline whereas northern parts showing rise. Entire Samba district has registered rise in the range of 0-2m rise except a few patches, where decline in the same range was recorded. In Kathua district, majority of the area has registered 0-2m rise in water levels with a few exceptions in northern areas where rise in the range of 2-4 and above 4m was observed. The decline of 0-2m was also observed in eastern and southern patches of district (Figure 19).

7.6.4. January 2016 with respect to mean of January 2006 – January 2015

The water level fluctuation for the month of January 2016 w.r.t. (mean of January 2006 to January 2015) has been worked out in respect of 124 observation wells. It is observed that a total of 81 wells (65.32%) have shown rise and 43 wells (34.67%) have shown decline in water levels. Categorisation of changes in water level between January 2016 to decadal mean (January 2006-January 2015) is given in table 16.

Out of 81 number of wells showing rise, 71 wells (57.26%) have shown rise less than 2 m, 8 wells (6.45%) have shown rise from 2-4 m and 2 wells (1.61%) have shown rise of more than 4 m. Out of 43 wells showing fall in water levels, 42 wells (33.87%) have shown fall in the range of 0-2 m, 1 well (0.81%) has shown fall between 2-4 m and none of the wells have shown fall of >4 m.

Rise in water levels was observed in major portions of all the districts of Jammu Region. Rise of 0-2m has been registered in all the northern areas of Jammu, entire Samba with a few exceptions and major portions of Kathua district. Rise of more than 2m was registered in a few patches of Jammu and northern portions of Kathua district. Decline in the range of 0-2m was observed in a few patches of all the districts, especially in southern and western parts of Jammu and small areas in the eastern and southern areas of Kathua district (Figure 20).

Table 13. CATEGORISATION OF CHANGES IN WATER LEVEL BETWEEN MAY 2015 TO DECADAL MEAN (MAY 2005-MAY 2014)

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	38	0.01	16.19	0.18	11.91	19	4	5	4	3	3	50.00	10.53	13.16	10.53	7.89	7.89	28	10
Kathua	27	0.21	7.97	0.13	10.50	11	4	4	6	1	1	40.74	14.81	14.81	22.22	3.70	3.70	19	8
Rajouri	23	0.44	3.84	0.85	0.85	15	7	0	1	0	0	65.22	30.43	0.00	4.35	0.00	0.00	22	1
Reasi	8	0.59	10.45	9.17	9.17	4	2	1	1	0	0	50.00	25.00	12.50	12.50	0.00	0.00	7	1
Samba	19	0.17	12.52	0.54	10.40	2	3	6	3	2	3	10.53	15.79	31.58	15.79	10.53	15.79	11	8
Udhampur	7	0.94	4.03	1.20	3.55	3	1	1	1	1	0	42.86	14.29	14.29	14.29	14.29	0.00	5	2
TOTAL	122	0.01	16.19	0.13	11.91	54	21	17	16	7	7	44.26	17.21	13.93	13.11	5.74	5.74	92	30

Table 14. CATEGORISATION OF CHANGES IN WATER LEVEL BETWEEN AUGUST 2015 TO DECADAL MEAN (AUG. 2005-AUGUST 2014)

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	39	0.01	3.81	0.21	3.16	22	4	0	12	1	0	56.41	10.26	0.00	30.77	2.56	0.00	26	13
Kathua	28	0.06	3.49	0.16	4.50	16	3	0	8	0	1	57.14	10.71	0.00	28.57	0.00	3.57	19	9
Rajouri	23	0.01	1.77	0.03	1.04	12	0	0	11	0	0	52.17	0.00	0.00	47.83	0.00	0.00	12	11
Reasi	8	0.16	0.95	0.08	0.40	3	0	0	5	0	0	37.50	0.00	0.00	62.50	0.00	0.00	3	5
Samba	21	0.10	2.45	0.26	1.18	12	5	0	4	0	0	57.14	23.81	0.00	19.05	0.00	0.00	17	4
Udhampur	7	0.12	1.68	0.41	1.19	4	0	0	3	0	0	57.14	0.00	0.00	42.86	0.00	0.00	4	3
TOTAL	126	0.01	3.81	0.03	4.50	69	12	0	43	1	1	54.76	9.52	0.00	34.13	0.79	0.79	81	45

Table 15. CATEGORISATION OF CHANGES IN WATER LEVEL BETWEEN NOVEMBER 2015 TO DECADAL MEAN (NOV. 2005-NOV. 2014)

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	37	0.02	2.25	0.01	2.27	18	3	0	15	1	0	48.65	8.11	0.00	40.54	2.70	0.00	21	16
Kathua	29	0.09	3.98	0.01	2.93	19	3	0	6	1	0	65.52	10.34	0.00	20.69	3.45	0.00	22	7
Rajouri	22	0.08	1.76	0.06	5.03	16	0	0	5	0	1	72.73	0.00	0.00	22.73	0.00	4.55	16	6
Reasi	8	0.09	1.96	0.03	0.47	5	0	0	3	0	0	62.50	0.00	0.00	37.50	0.00	0.00	5	3
Samba	21	0.18	14.97	0.10	0.51	15	1	2	3	0	0	71.43	4.76	9.52	14.29	0.00	0.00	18	3
Udhampur	7			0.72	6.98				5	0	2	0.00	0.00	0.00	71.43	0.00	28.57	0	7
TOTAL	124	0.02	14.97	0.01	6.98	73	7	2	37	2	3	58.87	5.65	1.61	29.84	1.61	2.42	82	42

Table 16. CATEGORISATION OF CHANGES IN WATER LEVEL BETWEEN JANUARY 2016 TO DECADAL MEAN (JAN. 2006-JAN. 2015)

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	38	0.01	2.46	0.03	1.66	16	3	0	19	0	0	42.11	7.89	0.00	50.00	0.00	0.00	19	19
Kathua	29	0.02	4.58	0.21	0.41	22	3	1	3	0	0	75.86	10.34	3.45	10.34	0.00	0.00	26	3
Rajouri	23	0.02	5.98	0.04	1.56	10	1	1	11	0	0	43.48	4.35	4.35	47.83	0.00	0.00	12	11
Reasi	8	0.02	0.37	0.22	1.09	5	0	0	3	0	0	62.50	0.00	0.00	37.50	0.00	0.00	5	3
Samba	19	0.02	3.12	0.15	0.74	14	1	0	4	0	0	73.68	5.26	0.00	21.05	0.00	0.00	15	4
Udhampur	7	0.01	0.77	0.28	2.08	4	0	0	2	1	0	57.14	0.00	0.00	28.57	14.29	0.00	4	3
TOTAL	124	0.01	5.98	0.03	2.08	71	8	2	42	1	0	57.26	6.45	1.61	33.87	0.81	0.00	81	43

HYDROCHEMISTRY

The quality of shallow ground water in the state of Jammu & Kashmir has been evaluated on the basis of 232 number of water samples collected from shallow aquifers during pre-monsoon season. All the collected samples were analysed by adopting standard methods of analysis (APHA). Chemical analysis data of ground water samples collected during May 2015 monitoring in valley portions of Jammu & Kashmir state is given in Annexure – III & IV.

8.1. Results and Discussions**8.1.1. pH**

In Jammu region water is neutral to alkaline in nature. Most of the samples collected from shallow ground water of Jammu district are alkaline in nature. In Jammu Region, pH values vary between 7.12 (Gudwal) and 9.09 (Bhatta Morh) and in Kashmir Region pH values vary between 7.8 (Sopore Model Town) to 8.65 (Aripathan).

8.1.2. Specific Conductance

Electrical Conductivity of ground water is generally low. Majority of samples (88.1%) are found to have specific conductance less than 750 $\mu\text{S}/\text{cm}$ at 25°C (Table 17). Hence the ground water is fresh and potable. About 11.9 % sample are falls under permissible limit. In Jammu Region, specific conductance varies between 150 and 2300 $\mu\text{S}/\text{cm}$ at 25°C. More than 3000 $\mu\text{S}/\text{cm}$ is not observed in any sample.

In Kashmir Region, specific conductance varies between 180 and 850 $\mu\text{S}/\text{cm}$ at 25°C. Major part of the valley areas are showing EC values <1000 $\mu\text{S}/\text{cm}$.

8.1.3. Chloride

In Jammu Region, the Chloride concentration varies from 3.0 to 298.2 mg/l. In Kashmir valley area the Chloride concentration is less than 200 mg/l. It varies from 7 mg/l to 111.3 mg/l. The Chloride concentrations in all the wells are within the maximum permissible limit 1000 mg/l as prescribed by BIS for drinking water purpose. In majority of samples (99.12%) chloride concentration are less than 250, but at few places high values (but < 300) are also observed. None of the samples has shown Chloride concentration >1000 mg/l (Table 17).

8.1.4. Fluoride

The concentrations of fluoride in majority of the samples (96.10 %) are within acceptable limit of 1 mg/l. In 6 locations (2.58 % of the total samples) the fluoride concentrations varies from 1.01 – 1.50 mg/l and are within permissible limit as prescribed by BIS. At 3 locations (1.29 % of the total samples) namely GaranJagir (Rajouri), Kalal (Rajouri) and Patiari II (Kathua), the fluoride concentration exceeds the maximum permissible limit of 1.5 mg/l. Those samples are having high fluoride concentration, which may be due to Geogenic sources.

8.1.5. Nitrate

Nitrate Concentration in general is low (90% samples), but high values are also reported in some of the samples (10%). The details of samples having Nitrate concentration more than maximum permissible limit of BIS (>45mg/l) are summarized in the table 18. Maximum concentration of Nitrate (287 mg/l) has been reported in the water sample collected from GhoRakwala of Jammu district. It may be due anthropogenic contamination.

Table 17 Ground Water Quality of Hydrograph Stations during May 2015

S.No.	Parameters	No. of samples analysed	Permissible limit	Ranges	No. of Samples	Percentage %
1	Sp. Conductance $\mu\text{s}/\text{cm}$ at 25°C	232	--	<750	188	81.03
				751-2250	42	18.10
				2251-3000	02	0.86
				>3000	00	0.00
2	Chloride (mg/l)	232	250-1000	<250	230	99.13
				251-1000	02	0.86
				>1000	00	0.00
3	Fluoride (mg/l)	231	1.50 mg/l	<1.00	222	96.10
				1.01-1.50	06	2.58
				>1.50	03	01.29
4	Nitrate (mg/l)	232	45 mg/l	<45	208	89.65
				>45	24	10.33
5	Iron (mg/l)	232	1.0 mg/l	< 1.0	185	79.74
				> 1.0	47	20.25

Table 18. Samples having Nitrate concentration more than 45 mg/l as per BIS.

S. No.	District	Location	Nitrate > 45 (mg/l)
1	JAMMU	Chatta	49
2		Rehal	56
3		Laswara	56
4		Kalah	75
5		Jourian	81
6		Nagrota (Sittle)	82.0
7		Jindrah	90.0
8		Poal II	110
9	KATHUA	Jandi	81

S. No.	District	Location	Nitrate > 45 (mg/l)
10		N. Gujroo	96.0
11		Konthal	112
12		Ganguchak	120
13	RAJOURI	Bareri	80
14	REASI	Talwara	71
15	SAMBA	GuraBrahamana	55
16		Kootah	55
17		MahalKalandrian	57
18		Sadoh	65
19		Nud	75
20		Samba	110
21		GhoRakawalan	287
22	UDHAMPUR	Nil	--
23	KASHMIR VALLEY	Magam	74

8.1.6. Iron

Iron concentration ranges from below desirable limit to 10.62 mg/l at Muthi (Jammu). Out of 232 wells analysed high concentration of Iron i.e.greater than 1.0 mg/l has been reported in 185 (79.74 %) wells in parts of Jammu, Kathua, Rajouri, Reasi and Udhampur districts. Rest of wells 47 (20.25 %) is having iron concentration <1.0 mg/l with in desirable limit as per BIS in all the districts of Jammu and Kashmir Region. In Kashmir Region, Iron concentration ranges from 0 – 1.53. Samples, having iron concentration more than maximum permissible limit 1.0 mg/l is found at Binner district Budgam. High concentration of iron > 1.0 mg/l are summarised in the table 19.The iron in the region is due to iron bearing rocks / minerals like Hematite, magnetite and its oxide which forms iron bacteria in anoxic conditions.

Table 19.Samples having Iron concentration more than 0.3 mg/l of BIS

S. No.	District	Location	Iron >1.00 (mg/l)
1	JAMMU	Senth	1.06
2		Batera	1.11
3		Khour	1.18
4		Hazuribag	1.31
5		Gigrial	1.52
6		Kachrial	1.62
7		Sumah	1.64
8		Satwari	1.89
9		Baradow	1.89
10		Devipura	1.97
11		Kana Chak	2.1
12		Sobka	2.15

S. No.	District	Location	Iron >1.00 (mg/l)	
13		Badso	2.19	
14		Rangoora	2.36	
15		Purkhoo	2.59	
16		Jindrah	2.64	
17		Nagbani	3.03	
18		Nikowal	3.3	
19		ShamaChak	3.56	
20		Upralakanhal	4.68	
21		Gajansoo	5.69	
22		Kotkatwal	5.83	
23		Sidhra	8.65	
24		Nagrota (Sittle)	10.52	
25		Muthi	10.62	
26		KATHUA	Ramkot	1.41
27			Lakri	1.53
28	Kothian		2.14	
29	Sagoon		2.49	
30		N. Panjgrahian	2.61	
31		Nagri	4.12	
32		Kathua	5.23	
33		Phinter	9.50	
34	RAJOURI	Salote	2.18	
35		Jabah	4.68	
36	REASI	Talwara	2.27	
37		Dadua	3.30	
38		Riasi	5.11	
39		Katra	5.40	
40	SAMBA	Nil	--	
41	UDHAMPUR	Salabra	1.01	
42		Badola	2.36	
43		Sunal	2.59	
44		Ratti	3.54	
45		Talpad	5.62	
46		Jallow	6.59	
47		Seen Thakaran	7.13	
48	KASHMIR VALLEY	Binner	1.53	

8.1.7. Total Hardness

High concentration of carbonates, bicarbonates of calcium and magnesium, in ground water causes hardness. It causes scaling in water supply lines. High concentration of hardness in ground water is social economic problem; hence it is also an important water quality parameter. Maximum concentration of Total Hardness 770 mg/l(GhoRakwala of Jammu district) and minimum 50mg/l(Kalal of Rajouri district) are observed in the water sample collected from shallow ground water samples.

Classification of Hardness

As per the classification of hardness, majority of samples 42.6.0% falls under hard category and 38.4 % wells fall in very hard category. Rest Samples 0.9 and 18.1 sample are soft and moderately hard in Category. In Kashmir Valley 42.9 % falls in hard and 52.4% very hard in nature. The percentage wise data is summarized in table given in table 20. In Jammu Region samples collected from Jammu District, value of Total Hardness varies from 90-720 mg/l. Similarly for Kathua, Rajauri, Reasi, Samba & Udhampur Districts total hardness values vary from 55-430 mg/l, 50-280 mg/l, 85-345mg/l, 105-770 mg/l and 65-210 mg/l respectively. In Kashmir Region, hardness value varies from 105-290 mg/ which is within the desirable limit.

As per the BIS norms 200 and 600 mg/l is the acceptable and maximum permissible limit respectively for drinking water purposes. On perusal of the Table 20, it is clear that all samples are within the maximum permissible limit (i.e. 600 mg/l), except few locations where high value of total Hardness > 600 mg/l is observed viz. (MahalKalandrian, 610mg/l, Palli640mg/l, GhoRakawalan770mg/l in Samba district and Suchetgarh670mg/l, Nandpur720mg/l in Jammu district. District Wise Range of Hardness during May 2015 is summarised in table 21.

Table 20 Ground water samples summarised as per classification of Hardness

S.No	District	No of Samples	Soft (0-60) mg/l	Moderate (61-120) mg/l	Hard (121-180) mg/l	Very Hard more than 180 mg/l
1	Jammu	80	00	05 (6.25%)	38 (47.50%)	37 (46.25%)
2	Kathua	34	01(2.94%)	05 (14.70%)	13 (38.23%)	15 (44.11%)
3	Rajauri	35	01(2.85%)	14 (40.00%)	16 (45.71%)	04 (11.42%)
4	Reasi	09	00	2 (22.22%)	04 (44.44%)	3 (33.33%)
5	Samba	34	00	1 (2.94%)	12 (35.29%)	21 (61.76%)
6	Udhampur	19	00	11 (57.89%)	07 (36.84%)	01 (5.26%)
7	Kashmir Valley	21	00	01 (4.76%)	09 (42.85%)	11 (52.3%)
	Total	232	02	39	99	92
	Percentage	100%		6.6%	41.2%	50.4%

Table 21 District Wise Range of Hardness during May 2015

S.No	District	Range of Total Hardness(as CaCO₃) mg/l
1	Jammu	90-720
2	Kathua	55-430
3	Rajauri	50-280
4	Reasi	85-345
5	Samba	105-770
6	Udhampur	65-210
7	Kashmir Valley	105-290

RECOMMENDATIONS

1. Ground water in Jammu And Kashmir State is fresh and potable in most of the areas. Water supply in this state is mainly dependant on ground water whether it is spring source, shallow ground water or deep ground water. Ground water is the main source for surface water bodies in the form of base flow in lean periods. Proper protection measures need to be taken to avoid contamination of ground water.
2. Even though salinity is not a major concern in the state, there are problems of ground water contamination like iron (Fe) (in Tertiary belt and in Kashmir valley) marshy gases (in shallow and deep aquifers of Kashmir valley), Fluoride in localized areas like in parts of Doda dist. Nitrate contamination, Bacteriological contaminations, ground water pollution is due to pesticides/ fertilizers in agriculture and horticulture. The quality surveillance needs to be increased by State Government Organisations. Ground water quality shall be monitored once in a year for all major elements, trace metals and bacteriological contaminations.
3. Most of the ground water is hard to very hard category causing gastro-intestinal problems. This type of water may be treated properly before supplying the water for drinking purposes.
4. Deeper aquifers in both Jammu region and Kashmir valley can be developed for mitigating the water supply requirements. Micro-level planning is required to develop these aquifers based on the available data of aquifer geometry, parameters and water resources. Groundwater from deeper aquifers in Kashmir valley consists of iron and marshy gasses which need to be treated properly before supplying the water. It is better to identify the iron free aquifers through scientific ground water exploration techniques couples with modern techniques of geophysics so that iron problem can be mitigated. Tube wells shall be constructed by tapping only iron free aquifers and avoiding iron rich aquifers through cement sealing and putting gravel pack only around the iron free aquifers.
5. The reality of climate change is the most significant long term threat to water resources. In hilly region water supply is still based on springs, where discharges of springs are drastically being reduced. Systematic enumeration/inventory of springs including its quality, snow water harvesting techniques and other available techniques is required to develop ground water resources on sustainable basis need to be adopted.
6. Fast developing urban & industrial areas need special attention/quality surveillance by the State government authorities. Proper monitoring for trace elements in industrial areas like Bari-Brahmana, Gangyal and other industrial areas located in Kashmir valley shall be taken

up. Monitoring network stations shall be established all along the nalas and drains carrying industrial effluents.

7. As the water supplies in Jammu city and parts of areas in Srinagar city are ground water based, proper well head protection measures need to be taken to avoid bacteriological contamination like coliform bacteria and E-coli.
8. There is lack of proper sewage and sanitation in all over the state resulting into ground water and surface water contaminations. This issue need to be addressed immediately by the authorities. Village sewages shall be disposed off properly after proper treatment. In water logging areas, where ground water is being contaminated by polluted surface water, proper drainage shall be created for avoiding the water logging conditions.
9. Ground water contamination by improper disposal of domestic and industrial solid wastes is of another concern. Special efforts shall be made to address this problem.
10. There is an urgent need to take-up comprehensive studies on ground water quality of both shallow and deep ground waters analysing major elements, heavy metals, pesticides, microbial contamination is the need of the hour. Areas identified in this report where higher concentrations of heavy metals, nitrates and fluorides need to be given special attentions.
12. The existing data base on quality with different organizations like CGWB, PHED, State pollution control board, academic institutions like Jammu university and Kashmir university need to be integrated and a comprehensive data base need to be established.
13. Scientific research projects on ground water contamination especially geo-genic contamination like Iron, gasses and fluoride need to be taken up immediately
14. Proper management strategies need to be drawn up to combat the problems of geo-genic contamination. Cost effective community level treatment plants need to be established. The treatment plants as recommended in this report shall be constructed with trained manpower as in charges so that these treatment plants may work efficiently for longer periods.
16. As the ground water is hard to very hard type and consists of iron, proper treatment shall be followed before using this water for irrigation through modern irrigation methods like sprinkler and drip irrigation systems. This type of water may choke the sprinklers and drips.

Figure 33

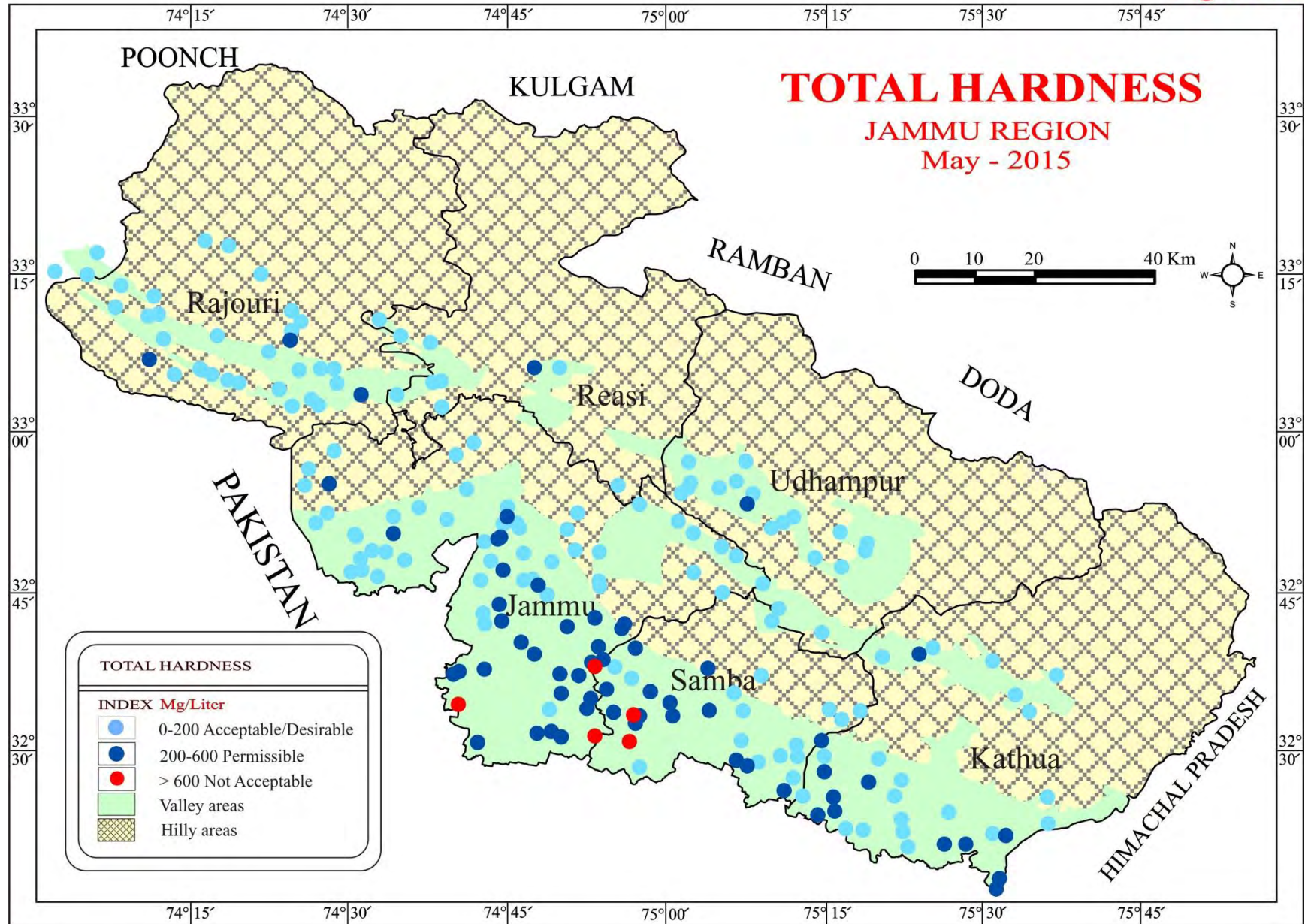


Figure 34

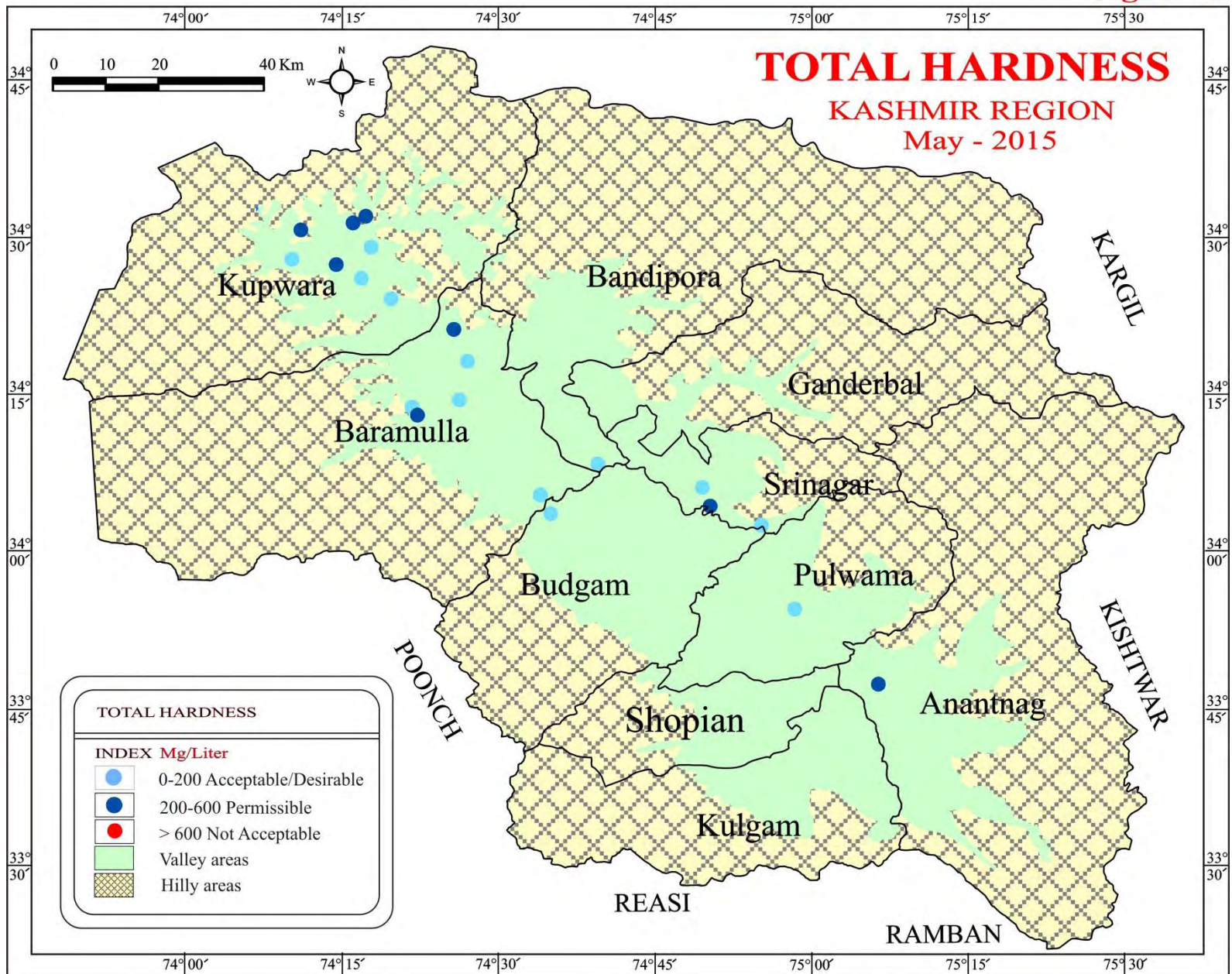


Figure 39

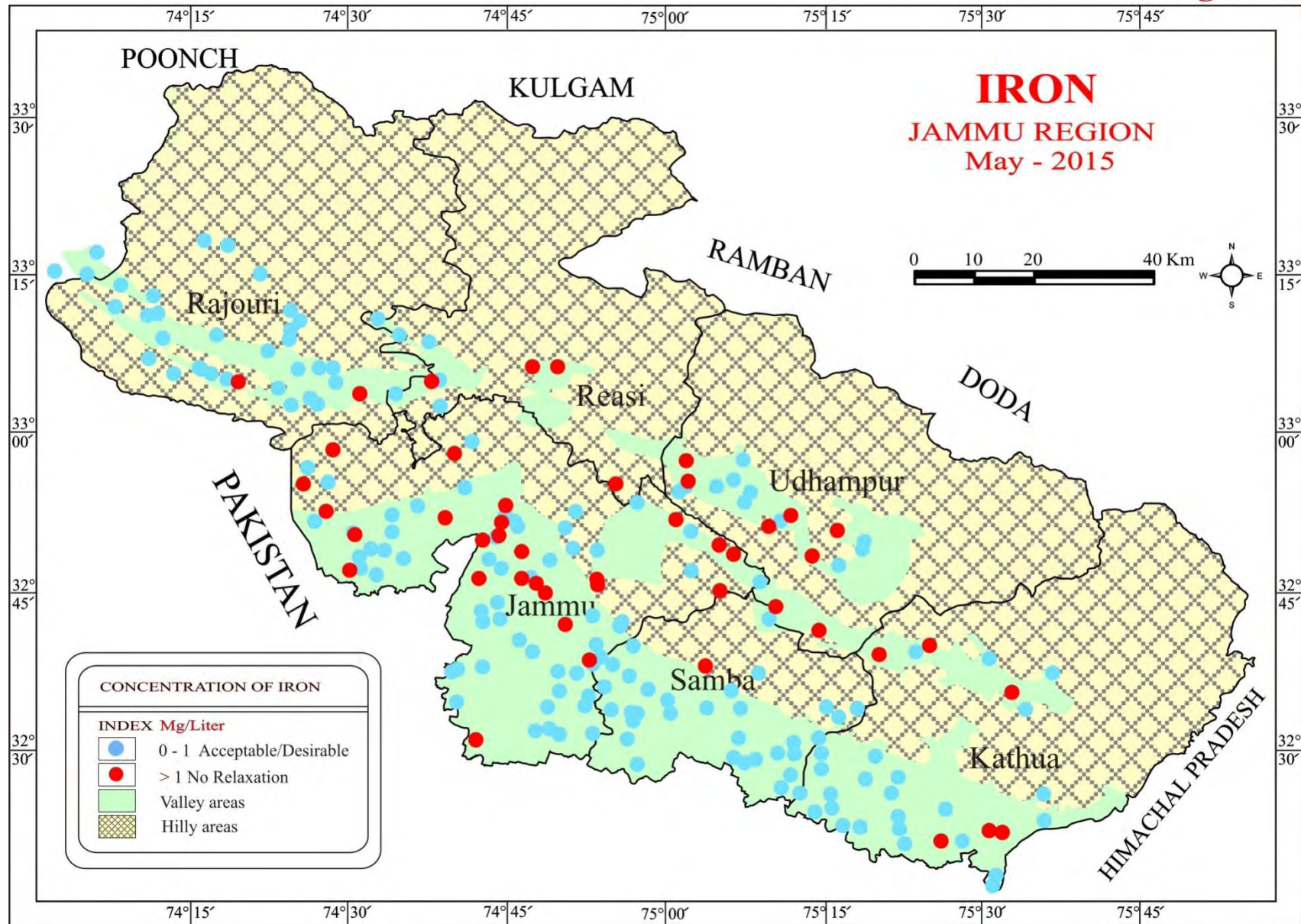
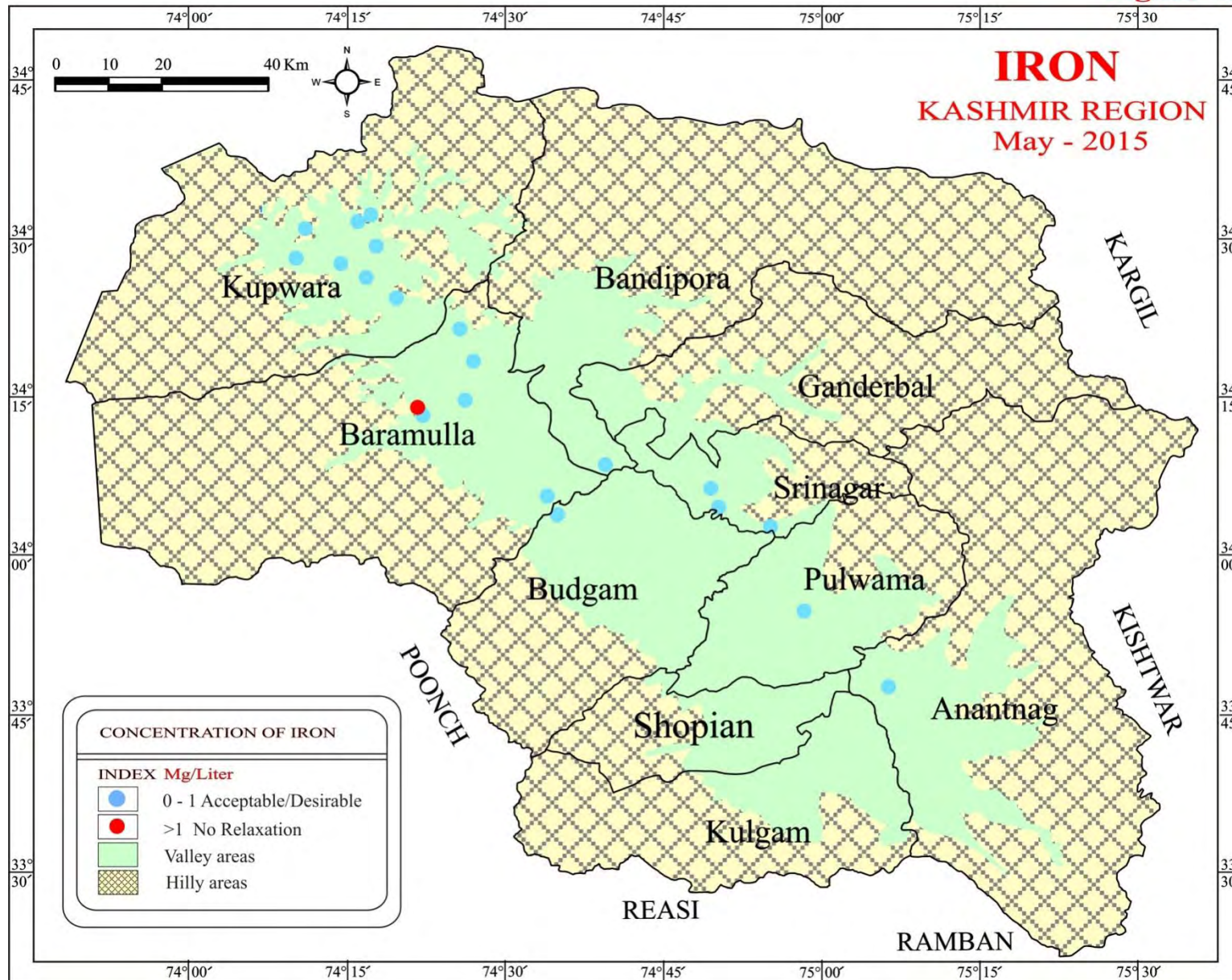


Figure 40



Depth to Water Level Data for all Seasons (KASHMIR REGION)

S. No.	Location	Longitude	Latitude	Structure	May-15	Aug-15	Nov-15
ANANTNAG DISTRICT							
1	Rambarpora	75.1044	33.7875	Dug well	13.29	11.23	11.70
BANDIPORA DISTRICT							
2	Dusilpora	74.6131	34.1697	Dug well		1.68	2.88
3	Mirgund Silk Centre	74.6533	34.1408	Dug well	0.85	1.52	1.70
BARAMULA DISTRICT							
4	Aripanthan	74.5778	34.0608	Dug well	1.49	3.45	3.70
5	Bomai	74.4214	34.3564	Dug well	0.59	1.39	1.39
6	Sangrama	74.4303	34.2433	Dug well	1.65	1.35	1.07
7	Sopore Model Town	74.4436	34.305	Dug well	0.21	0.70	15.79
8	Waripora	74.5611	34.0906	Dug well	1.95	1.78	4.10
9	Handipora (Zambodzpora)	74.3633	34.2192	Dug well	0.78	3.38	3.98
10	Ranji	74.5028	34.2231	Dug well		1.98	
BUDGAM DISTRICT							
11	Binner	74.3553	34.2319	Dug well	1.24	2.12	1.52
12	Badran	74.5764	34.0764	Dug well		3.43	3.75
KUPWARA DISTRICT							
13	Gulgam	74.2194	34.5369	Dug well		3.71	3.51
14	Chowgal	74.3206	34.4058	Dug well	0.60	1.58	1.02
15	Dolipora	74.1619	34.4692	Dug well	1.58	4.38	1.78
16	Drugmulla	74.2889	34.4889	Dug well	2.74	2.45	2.10
17	Guse	74.2797	34.5386	Dug well	1.77	12.62	13.02
18	Handwara Almustafa colony	74.1356	34.3878	Dug well			
19	Khanpora	74.2731	34.4386	Dug well	2.26	0.54	1.84
20	Kupwara Main Chowk	74.2592	34.5281	Dug well	1.52	1.81	1.31
21	Langate	74.1408	34.3756	Dug well	0.88	1.39	0.84
22	Magam	74.2328	34.4608	Dug well	1.18	2.44	1.35
23	Trehgam	74.1753	34.5167	Dug well	2.24	3.21	4.00
PULWAMA DISTRICT							
24	Gandhasibhat	75.0444	33.8561	Dug well		1.00	2.20
25	Pampora	74.9222	33.9936	Dug well			
26	Tral	75.0347	33.9139	Dug well		15.08	15.16
27	Sambura-Kokapura	74.97	33.9078	Dug well	2.42	5.21	5.46
SRINAGAR DISTRICT							
28	Zewan	74.9167	34.0422	Dug well	2.10	2.50	2.93
29	Rainawari	74.8219	34.1031	Dug well	8.80	8.70	9.43
30	Regal Chowk, Srinagar	74.8347	34.0728	Dug well	2.14	2.44	2.26

Depth to Water Level Data for all the four Seasons (JAMMU REGION)

S. No.	Location	Longitude	Latitude	Structure	May-15	Aug-15	Nov-15	Jan-16
JAMMU DISTRICT								
1	AgreChak	74.72	32.62	Dug well	2.49	1.59	2.02	2.86
2	Akhnoor (Batera)	74.75	32.86	Dug well	12.60	10.66		13.97
3	Alla	74.84	32.52	Dug well	3.01	2.28	2.62	3.14
4	Arnia	74.80	32.52	Dug well	8.65	7.18	7.87	7.72
5	Badsoo	75.02	32.85	Dug well	0.89	0.2	1.82	1.70
6	Bakore	74.56	32.81	Dug well	4.47	2.52	3.13	3.94
7	Baradow	74.44	32.91	Dug well	4.67	5.01	5.83	6.18
8	Batera	74.75	32.85	Dug well	7.59	5.35	6.12	8.14
9	Bega	74.67	32.61	Dug well	2.59	2.05	2.26	2.56
10	Bera	74.68	32.62	Dug well	2.36	1.69	2.09	2.69
11	Bhagwanachak	74.58	32.86	Dug well	26.63	26.40	24.39	28.47
12	Bishnah	74.86	32.61	Dug well	1.89	1.25	1.79	2.49
13	Chatta	74.93	32.69	Dug well	3.83	3.76	4.24	5.10
14	Chowkichowra	74.65	33.03	Dug well	0.95	0.32	0.20	1.95
15	Devipur	74.66	32.86	Dug well	5.36	4.10	5.99	7.37
16	Dhanpur	74.54	32.81	Dug well	4.83	3.33	3.75	5.02
17	DharamKhu	74.76	32.86	Dug well	25.88	19.46	23.89	19.87
18	Dhora	75.14	32.61	Dug well		1.88	2.63	
19	Garhi (Jammu)	74.77	32.79	Dug well				2.93
20	Gajansoo	74.71	32.76	Dug well	3.06	1.94	1.60	3.04
21	Gho-Manhasan	74.74	32.72	Dug well	4.44	1.04	3.90	1.77
22	Gigrial	74.48	32.80	Dug well	4.32	2.40	2.63	2.96
23	Greater Kailash	74.93	32.69	Dug well	6.38	4.30	5.32	6.33
24	HamirpurKohna	74.55	32.77	Dug well	2.27	2.19	2.94	3.23
25	HamirpurSidhar	74.53	32.78	Dug well	2.81	2.16	2.42	2.22
26	Hazuribag	74.81	32.74	Dug well	6.17	4.58	5.95	6.80
27	Jagati	74.90	32.81	Dug well	0.01	1.22	2.00	1.45
28	Jaswan	74.73	32.79	Dug well	2.12	3.68	4.79	4.50
29	Jhiri	74.74	32.83	Dug well	5.62	1.51	3.68	2.48
30	Jindrah	75.09	32.81	Dug well	12.50	10.86	12.83	11.27
31	Jogwan	74.44	32.93	Dug well	5.31	2.64	3.18	6.33
32	Jourian	74.58	32.83	Dug well	4.66	1.91	2.49	3.95
33	Kachrial	74.47	32.87	Dug well	3.33	0.32	0.21	1.49
34	Kalah	74.47	32.91	Dug well	2.03	1.84	1.78	2.56
35	Kaluchak	74.89	32.66	Dug well	3.62	2.59	3.52	4.02
36	Kamila	75.07	32.61	Dug well		4.46	4.80	4.92
37	Kana Chak	74.72	32.82	Dug well	4.00	1.96	3.03	3.50
38	Kangar	74.85	32.84	Dug well	7.74	2.96	11.01	13.26
39	KarnaileChak	74.82	32.79	Dug well	6.23	5.80	6.50	7.50

S. No.	Location	Longitude	Latitude	Structure	May-15	Aug-15	Nov-15	Jan-16
40	Katcha-PindDansal	74.86	32.87	Dug well	2.62	2.20	3.17	1.43
41	Khairi (Raipur)	74.86	32.81	Dug well	2.90	1.18	3.56	5.44
42	Khour	74.52	32.83	Dug well	4.56	1.73	2.72	3.79
43	KotKaswal	75.11	32.80	Dug well	1.03	0.4	2.20	2.25
44	KotheySaini	74.88	32.58	Dug well	3.83	3.30	3.64	4.02
45	KotliCharkan	74.83	32.62	Dug well	1.61	1.93	2.60	2.96
46	Kunihala	75.03	32.90	Dug well	1.62	1.56	2.23	1.81
47	Lalyal	74.77	32.66	Dug well	3.19	2.92	3.19	3.27
48	Lam	74.51	32.83	Dug well	2.13	0.95	1.53	1.62
49	Laswara	74.84	32.59	Dug well	1.57	0.94	1.46	1.86
50	Leherian	74.69	32.90	Dug well	7.97	7.36	5.10	8.90
51	Lower Barnai	74.79	32.76	Dug well	4.54	3.42	4.47	5.37
52	Makwal	74.72	32.69	Dug well	2.40	2.05	3.30	2.50
53	Marh	74.75	32.78	Dug well	5.39	1.71	2.21	2.04
54	Marjholi	74.77	32.85	Dug well	26.10	23.42	24.47	26.34
55	MothlianKalan	75.07	32.66	Dug well		5.46	4.66	5.45
56	Miran Sahib	74.79	32.65	Piezometer	6.56	6.12	6.13	6.49
57	Muthi	74.80	32.75	Dug well	2.13	0.61	1.58	1.90
58	Nagbani	74.78	32.76	Dug well	4.03	2.04	3.03	3.89
59	Nagrota (Sittlei)	75.07	32.62	Dug well	3.07	2.40	3.67	3.55
60	Nandpur	74.89	32.52	Dug well	3.30	1.58	2.16	2.68
61	Nikowal	74.71	32.51	Dug well	2.94	2.99	4.57	4.85
62	Pallanwala	74.45	32.85	Dug well	1.61	1.03	1.23	1.88
63	Palatan	74.45	32.84	Dug well	2.22	1.41	1.71	2.06
64	Pangli Colony	74.52	32.79	Dug well	2.47	1.07	2.65	2.68
65	PataKhu	74.77	32.84	Dug well	19.63	17.64	17.61	19.99
66	PatyaleChak	74.78	32.76	Dug well	3.64	2.52	3.06	3.65
67	Purkhoo	74.78	32.80	Dug well		14.35	15.14	16.34
68	Poal	74.82	32.53	Dug well	2.82	2.00	2.35	2.67
69	Rangoora	74.90	32.75	Dug well	0.89	1.96	0.86	0.96
70	Rehal	74.88	32.56	Dug well	4.18	2.80	3.69	4.65
71	Sajwal	74.59	32.79	Dug well	2.57	1.42	2.38	2.66
72	Salehar	74.82	32.56	Dug well	3.02	2.25	2.67	3.20
73	Sandhwan	74.71	32.71	Dug well	3.28	2.37	3.22	3.10
74	Satwari	74.85	32.69	Dug well	9.16	7.18	8.59	9.65
75	SeiKhurd	74.72	32.51	Dug well	3.03	1.78	3.35	3.80
76	Senth	74.51	32.77	Dug well	2.14	1.24	2.11	2.08
77	Shame Chak	74.74	32.83	Dug well	4.61	2.91	4.01	4.58
78	Sidhra	74.89	32.76	Dug well	1.94	1.45	2.85	3.50
79	Sobka	74.75	32.88	Dug well	25.51	17.67	19.16	22.24
80	Sohanjana	74.74	32.70	Dug well	3.16	2.90	3.15	3.36
81	Suchetgarh	74.68	32.57	Dug well	1.51			

S. No.	Location	Longitude	Latitude	Structure	May-15	Aug-15	Nov-15	Jan-16
82	Suchetgarh-II	74.68	32.57	Dug well	2.22	0.75	1.91	2.65
83	Sugetar	74.96	32.88	Dug well	2.07	0.40	2.24	1.20
84	Sumah	74.67	32.96	Dug well	3.00	3.07	3.24	3.24
85	Surinsar	75.04	32.77	Dug well	1.40	0.30	1.15	0.97
86	TandaSheoda	74.70	32.98	Dug well	3.62	1.80	1.55	3.80
87	Taryai	74.61	32.87	Dug well	31.52	32.86	32.40	33.49
88	Trikuta Nagar	74.89	32.70	Dug well	2.93	1.61	2.54	
89	Upperlakanhal	74.88	32.63	Dug well	2.83	1.58	2.10	2.88
KATHUA DISTRICT								
90	Barni	75.59	32.42	Dug well	6.37	3.69	5.54	6.15
91	Bhagwal	75.37	32.45	Dug well	22.39	5.91	10.24	17.32
92	Billawar	75.61	32.61	Dug well	0.79		2.24	0.24
93	Chakhariya	75.37	32.39	Dug well	2.30	1.53	1.44	2.03
94	ChannKhatrian	75.25	32.49	Dug well	6.02	1.26	3.62	5.58
95	Chan ranga	75.33	32.48	Dug well	9.49	6.67	5.27	6.83
96	ChapkiKalan	75.31	32.45	Dug well	16.06	5.30	5.21	10.38
97	Feruchak	75.28	32.38	Dug well	5.34	1.86	5.32	3.21
98	Ganguchak	75.26	32.40	Dug well	2.70	2.18	2.08	2.02
99	Jandi	75.25	32.46	Dug well	5.05	3.15	3.97	4.63
100	Karol Krishna	75.24	32.40	Dug well	7.61	7.75	6.35	7.86
101	Kathua	75.53	32.36	Dug well	2.36	1.23	0.66	1.02
102	KerianGandyal-II	75.52	32.30	Dug well	3.32	3.17	2.53	3.20
103	KerianRamnagar	75.51	32.28	Dug well	2.96	2.52	2.70	3.10
104	Khanpur	75.36	32.43	Dug well	2.02	1.40	1.47	1.62
105	Khukhial	75.47	32.35	Dug well	1.66	1.17	2.40	1.41
106	Konthal	75.26	32.42	Dug well	4.74	3.69	4.09	4.49
107	Kotepunnu	75.38	32.35	Dug well	2.29	1.50	1.84	1.94
108	Kothian	75.51	32.37	Dug well	2.35	0.07	0.16	0.93
109	Lakhanpur	75.59	32.38	Dug well	3.82	5.49	2.98	3.10
110	Lakri	75.42	32.66	Dug well	2.74	2.35	3.10	2.72
111	Londi	75.21	32.43	Dug well	5.28	3.74	4.47	5.35
112	MahiChak	75.42	32.42	Dug well		15.44	15.60	21.50
113	Mandli	75.51	32.64	Dug well	2.19	0.27	2.53	2.01
114	Mukandpur	75.37	32.37	Dug well	3.92	3.71	3.90	3.97
115	Nagri	75.43	32.35	Dug well	2.80	1.51	1.80	1.95
116	Nagrota-Gujaroo	75.39	32.65	Dug well	6.54	1.80	5.90	6.47
117	Pallan	75.57	32.56	Dug well	3.54	0.35	1.00	1.10
118	Pansar	75.31	32.37	Dug well	5.75	5.49	5.36	5.38
119	Patyari	75.27	32.55	Dug well	7.00	2.45	3.51	6.57
120	Phinter	75.54	32.58	Dug well	3.06	2.33	4.78	6.17
121	Ramkot	75.34	32.64	Dug well	5.72	0.85	5.18	5.90
122	Sallan	75.35	32.63	Dug well		2.88	3.47	4.00

S. No.	Location	Longitude	Latitude	Structure	May-15	Aug-15	Nov-15	Jan-16
RAJOURI DISTRICT								
123	Bagnoti	74.30	33.14	Dug well	0.91	3.40	8.85	5.12
124	Bakhar	74.43	33.09	Dug well	0.56	0.92	1.43	2.20
125	Banpari	74.46	33.03	Dug well	1.93	1.85	1.48	2.50
126	Bareri	74.19	33.10	Dug well	1.26	1.90	2.44	2.70
127	BhattaMohra	74.20	33.20	Dug well	1.98	1.36	1.40	1.89
128	ChanniParat	74.46	33.09	Dug well	4.07	3.33		1.46
129	Chittiar	74.28	33.29	Dug well	1.61	1.48	0.70	1.51
130	ChowkiHanda	74.19	33.17	Dug well	2.55	1.12	1.52	1.84
131	DarhalQuila	74.15	33.22	Dug well	2.07	2.15	2.48	3.20
132	Dharamsal	74.41	33.13	Dug well	2.30	0.84	3.27	3.51
133	DhanuKanal	75.01	32.96	Dug well		0.35	0.83	0.60
134	DhokBaniar	74.42	33.03	Dug well	2.38	0.27	2.44	2.76
135	Dyala	74.37	33.24	Dug well	1.40	2.17	2.13	2.51
136	Gagrote	74.27	33.09	Dug well	1.84	0.99	2.98	4.42
137	Jhangar	74.05	33.24	Dug well	4.95	4.29	5.05	4.95
138	Kalal	74.23	33.08	Dug well	1.75	1.69	1.65	3.55
139	Kalsian	74.14	33.19	Dug well	2.00	1.84	-0.05	1.15
140	Kangri (Grid Station)	74.40	33.06	Dug well	2.47	1.47	2.20	3.47
141	Lam	74.13	33.25	Dug well		2.19	2.3	3.14
142	Laroka	74.10	33.24	Dug well	1.82	1.25	0.65	1.12
143	Lower Kharak	74.42	33.17	Dug well	0.52	0.54	0.55	0.66
144	Marchola	74.48	33.09	Dug well	2.11	2.26	3.50	4.64
145	Naunihal	74.21	33.18	Dug well	0.87	0.75	1.85	3.12
146	Panja	74.42	33.18	Dug well	1.10	1.24	1.43	1.42
147	Pukharni	74.11	33.27	Dug well		1.24	0.84	1.08
148	Potha	74.32	33.28	Dug well	1.86	1.00	1.25	1.37
149	RumliDara	74.22	33.14	Dug well	1.76	1.35	3.05	3.76
150	Seri	74.29	33.08	Dug well	2.49	2.10	2.65	3.55
151	Sial	74.32	33.07	Dug well	1.04	0.52	0.50	0.80
152	Siot	74.38	33.12	Dug well	1.42	2.03	1.44	2.56
153	Solki	74.43	33.16	Dug well	1.10	1.07	1.55	2.44
154	ThandaPaani	74.49	33.07	Dug well	0.85	0.80	8.49	
155	Bajabain	74.41	33.05	Dug well	3.03	1.14	1.70	2.08
156	Jabah	74.33	33.07	Dug well	1.38	1.07	2.65	
157	Ding	74.28	33.09	Dug well	0.96	2.65	1.75	2.27
158	Narian	74.28	33.50	Dug well	2.90	3.12	6.30	3.30
159	Salote	74.52	33.05	Dug well	1.30	0.99	1.98	2.51
160	Ainpur	74.45	33.04	Dug well	1.74	1.05	1.53	2.24
REASI DISTRICT								
161	Thangrot	74.59	33.14	Dug well	1.04	0.61	1.11	3.52
162	Aliyah	74.55	33.17	Dug well	1.62	1.49	1.81	2.05

S. No.	Location	Longitude	Latitude	Structure	May-15	Aug-15	Nov-15	Jan-16
163	Bhamla	74.58	33.05	Dug well	1.14	1.35	1.70	3.59
164	Dadua	74.64	33.07	Dug well	2.74	1.69	0.20	3.17
165	GaranJagir	74.65	33.07	Dug well	2.38	1.90		2.94
166	Katra	74.93	32.91	Dug well	2.07	1.55	2.46	2.90
167	Nanora	74.63	33.13	Dug well	2.88	1.76	2.25	2.19
168	Riasi	74.08	33.09	Dug well	24.08	25.12	25.58	25.10
169	Talwara	74.79	33.09	Dug well	4.10	3.15	4.18	5.00
SAMBA DISTRICT								
170	BassiKalan	74.90	32.64	Dug well	3.58	2.53	3.14	3.72
171	Birpur	74.95	32.54	Dug well	11.39	9.02	10.70	12.16
172	Channi	74.92	32.63	Dug well	7.54	6.14	6.06	7.34
173	ChanniMansar	75.16	32.70	Dug well	1.56	0.70	1.96	1.93
174	Daboh	75.11	32.59	Dug well	4.33	2.46	3.09	3.71
175	Didyal	74.96	32.47	Dug well	1.77	0.73	1.37	
176	Gho-Rakwalan	74.95	32.55	Dug well	3.35	2.60	2.83	3.17
177	Gho-Brahamna	74.96	32.55	Dug well	5.98	10.13	7.39	7.68
178	Gudwal	75.01	32.55	Dug well	2.23	1.75	2.20	2.62
179	Gura	74.96	32.55	Dug well	10.82	9.13	6.01	12.03
180	Kainthpur	74.98	32.59	Dug well	3.35	2.75	3.07	3.56
181	Khairi (Bishnah)	74.91	32.59	Dug well	3.38	2.68	2.13	2.51
182	Mahal Shah Kalandrian	74.94	32.51	Dug well	3.74	3.93	3.92	7.41
183	MaheenCharkan	74.95	32.66	Dug well	7.73	6.55	8.06	9.53
184	MajuaLaxmi	74.92	32.56	Dug well	6.56	1.75	2.50	2.43
185	Nud	75.15	32.61	Dug well	3.10	1.51	2.30	2.88
186	Palli	74.89	32.63	Dug well	1.87	1.32	1.83	1.79
187	Patli	74.95	32.61	Dug well	6.90	5.20	5.85	6.80
188	Raiyan	75.12	32.51	Dug well	21.74	18.73	16.88	18.24
189	Sadoh	75.13	32.47	Dug well		7.55	7.31	7.54
190	Sagoon	75.09	32.74	Dug well	3.12	1.93	5.22	2.33
191	Samba	75.12	32.56	Dug well	16.00	14.30	14.38	15.22
192	Supwal	75.07	32.56	Dug well	6.16	2.08	2.55	
193	Swankha More	75.01	32.57	Dug well	18.32	17.29	17.71	18.27
194	DulmeChak	75.18	32.43	Dug well	3.52	2.67	3.17	3.58
195	Jasath	75.20	32.50	Dug well	15.25	7.00	6.49	8.80
196	Kootah	75.24	32.51	Dug well	26.35	23.82	24.53	26.08
197	LaleChak	75.20	32.45	Dug well	1.57	1.32	1.79	2.60
198	Lokli	75.27	32.54	Dug well	3.97	1.80	2.96	4.36
199	Madun	75.16	32.48	Dug well		2.67	2.45	2.46
200	Naran	75.15	32.50	Dug well	5.79	3.92	4.57	5.36
201	Nauni	75.30	32.56	Dug well	3.03		2.01	2.58
202	Nilcha	75.25	32.56	Dug well	9.10	5.90	6.80	8.15
203	Pangdour	75.11	32.48	Dug well	3.35	3.18	3.40	3.36

S. No.	Location	Longitude	Latitude	Structure	May-15	Aug-15	Nov-15	Jan-16
204	Phalora	75.14	32.48	Dug well	3.20	1.67	2.15	2.10
205	Raghu chak	75.20	32.49	Dug well	2.98	0.74	1.49	1.66
206	Sanoora	75.18	32.49	Dug well	1.09	1.56	0.84	0.88
207	Nagrota	75.07	32.62	Dug well		5.13	6.25	6.32
208	Uttarbani	75.06	32.65	Dug well		3.04	3.57	4.00
209	Painthi	75.16	32.59	Dug well		2.55	7.23	8.00
UDHAMPUR DISTRICT								
210	Badola	75.03	32.94	Dug well	2.30	1.52	3.34	2.88
211	BattalBallian	75.13	32.88	Dug well	7.78	2.06	12.20	4.77
212	Birmah	75.11	32.91	Dug well	1.13	1.3	1.10	1.95
213	Dalsar	75.31	32.82	Dug well	1.34	0.20	0.73	0.54
214	Dehari	75.27	32.78	Dug well	0.76	0.90	5.67	2.10
215	Eastern Mand	75.02	32.90	Dug well	1.10	1.07	2.08	3.37
216	Garhi (Udh)	75.08	32.91	Dug well	1.08	1.67	1.22	0.95
217	Jallow	75.23	32.80	Dug well	0.50	0.58	2.31	3.67
218	Jhakkar	75.12	32.95	Dug well	3.74	0.60	4.56	4.52
219	Kotli Pain Megaini	75.42	32.91	Dug well		0.70	1.10	0.93
220	Kuperlah	75.18	32.85	Dug well	1.40	0.99	3.00	3.16
221	Manwall	75.15	32.76	Dug well	6.11	5.15	7.28	7.40
222	NagrotaPanjarain	75.27	32.84	Dug well	1.93	1.38	1.51	1.80
223	Phangyal	75.14	32.90	Dug well	1.63	1.80	3.49	5.12
224	Ramnagar	75.31	32.81	Dug well	5.03	4.40	5.42	5.35
225	Ritti	75.16	32.84	Dug well	0.37	0.50	2.02	0.78
226	Salabra	75.18	32.72	Dug well	1.57	0.95	2.16	1.67
227	Seen Thakaran	75.04	32.91	Dug well	1.82	2.40	2.97	3.27
228	Sunal	75.24	32.68	Dug well	1.54	0.80	1.90	2.85
229	Talpad	75.20	32.86	Dug well	1.80	0.65	0.98	1.10
230	Kahpotha	75.04	32.83	Dug well	2.34	0.72	2.32	1.82
231	Upper Ban	75.04	32.83	Dug well		0.75	3.48	5.85

ANNEXURE – III

Result of Chemical Analysis of water samples of National Hydrograph Stations collected during May 2015 JAMMU REGION

S. No.	Long	Lat	Location	pH	EC (μ S/cm)	Concentration (mg/l)											
						TH	Ca	Mg	Na	K	Fe	CO ₃	HCO ₃	Cl	S	N	F
DSITRICT JAMMU																	
1	74.85	32.69	Satwari	8.63	720	370	84	39	26.9	5.03	1.89	60	354	32.0	0	2	0
2	74.79	32.65	Miran Sahib	7.89	830	375	80	43	28.5	1.2	0.28	0	451	35.5	5	14	0.82
3	74.72	32.62	AgreChak	7.8	1140	400	80	49	118.5	8	0.16	0	525	99.4	78	17	1.06
4	74.68	32.62	Bera	8.31	570	270	64	27	8.7	1.4	0.46	48	214	14.2	5	12	0.33
5	74.67	32.61	Bega	8.05	1440	380	92	36	49.5	177	0.5	0	732	71.0	5	9	0.58
6	74.68	32.57	Suchetgarh	7.89	2900	670	76	117	177.0	269.00	0.49	0	1098	255.6	43	116	0.32
7	74.71	32.51	Nikowal	7.9	700	370	36	68	19.5	1.4	3.3	0	470	21.3	0	2	0.34
8	74.89	32.66	Kaluchak	7.96	850	380	28	75	20.9	9.7	0	0	439	56.8	0	2	0.11
9	74.88	32.58	KotheySaini	8.43	1140	500	92	66	105.6	3.63	0	42	543	113.6	52	6	0.16
10	74.88	32.56	Rehal	7.72	1360	520	116	56	172.0	23	0	0	525	14.2	408	56	1.15
11	74.82	32.53	Poal II	9	2200	260	20	51	270.0	172	0	84	378	220.1	209	110	0.29
12	74.80	32.52	Arnia-II	7.83	1700	400	76	51	122.0	475	0	0	854	92.3	423	4	0.25
13	74.82	32.56	Saleahar	7.82	480	200	58	13	15.6	4.5	0	0	244	14.2	14	5	0.31
14	74.84	32.59	Laswara	8.6	2300	490	72	75	150.0	370	0	0	903	142.0	292	56	0.41
15	74.86	32.61	Bishnah	7.7	620	275	54	34	45.7	4.7	0	0	415	24.9	3	2.3	0.06
16	74.88	32.63	Upralakanhal	7.63	550	235	50	27	16.3	1.38	4.68	0	256	24.9	0	35	0.18
17	74.93	32.69	Greater Kailash	8.16	440	205	50	19	11.4	2.34	0	0	268	10.7	0	1.2	0.21
18	74.93	32.69	Chatta	8.16	640	245	52	28	34.2	11	0	0	299	32.0	3	49	0.34
19	74.89	32.70	Trikuta Nagar	7.57	840	405	118	27	31.4	1.3	0	0	488	42.6	0	19	0.26
20	74.89	32.52	Nandpur	7.65	1950	720	220	41	155.0	315	0	0	927	106.5	394	174	0.11
21	74.84	32.52	Allah	8.47	1130	350	76	39	40.0	133	0	120	329	21.3	72	40	0.16
22	74.83	32.62	KotliCharkan	8.04	850	350	104	22	62.9	22.06	0	0	537	39.1	8	14	0.11
23	74.77	32.66	Lalyal	8.72	870	310	44	49	49.8	89	0	72	329	63.9	28	29	0.1
24	74.74	32.70	Sohanjana	7.49	840	310	92	19	43.8	13.6	0	0	420.9	56.8	0	1.4	0.17
25	74.72	32.69	Makwal	8.4	720	155	48	9	41.7	14.5	0.38	48	134.2	10.65	35	27	0.19

S. No.	Long	Lat	Location	pH	EC (μ S/cm)	Concentration (mg/l)											
						TH	Ca	Mg	Na	K	Fe	CO3	HCO3	Cl	S	N	F
26	74.82	32.79	KarnaileChak	7.87	1260	180	40	19	223.0	157.5	0	0	451.4	10.65	458	4	0.47
27	74.67	32.96	Sumah	8.12	290	135	18.0	21.9	4.7	2.3	1.64	0	171	7.1	0	0.04	0.25
28	74.69	32.90	Leherian	8.24	370	160	24.0	24.3	9.6	3.0	0.11	0	189	7.1	10	11	0.08
29	74.53	32.78	HamirpurSidhar	8.17	420	145	24.0	20.7	38.1	1.3	0.11	0	195	17.8	30	16	0.08
30	74.48	32.96	Gigrial	8.4	320	130	12.0	24.3	25.6	1.8	1.52	30	110	10.7	30	1.3	0.1
31	74.44	32.91	Baradow	8	360	145	36.1	13.4	22.0	9.2	1.89	0	116	14.2	52	43	0.14
32	74.44	32.93	Jogwan	8.2	430	145	38.1	12.2	21.9	9.0	0.12	0	134	24.9	22	44	0.13
33	74.47	32.91	Kalah	8.04	770	215	26.1	36.5	69.5	1.9	0.12	0	171	63.9	74	75	0.33
34	74.47	32.87	Kachrial	8.11	300	140	28.1	17.0	6.5	1.2	1.62	0	116	7.1	46	3.7	0.07
35	74.45	32.85	Palanwala	8.24	380	130	14.0	23.1	37.2	3.9	0.11	0	122	17.8	75	16	0.13
36	74.58	32.86	Bhagwanchak	8.3	360	145	42.1	9.7	30.5	1.4	0.74	0	140	10.7	69	13	0.36
37	74.66	32.86	Devipura	8	360	175	20.0	30.4	3.8	1.6	1.97	0	55	7.1	118	8.6	0.06
38	74.52	32.83	Khour	8.16	410	145	24.0	20.7	25.3	3.0	1.18	0	110	35.5	49	15	0.12
39	74.74	32.83	Jhiri	8	440	210	30.1	32.8	9.7	6.6	0.12	0	195	17.8	49	4	0.14
40	74.51	32.77	Senth	8.26	330	135	20.0	20.7	24.1	1.7	1.06	0	177	3.6	37	0.7	0.16
41	74.58	32.83	Jourian	8.1	920	225	48.1	25.5	67.4	27.1	0.11	0	116	63.9	149	81	0.09
42	74.51	32.83	Lam	8.25	340	160	16.0	29.2	23.8	1.7	0.11	0	183	46.2	0	0.75	0.08
43	74.75	32.86	Akhnoor	8.06	440	210	28.1	34.0	5.6	3.7	0.11	0	177	10.7	54	13	0.21
44	74.56	32.81	Bakore	7.96	440	180	32.1	24.3	23.9	2.8	0.23	0	159	42.6	33	14	0.08
45	74.72	32.82	Kana Chak	8.2	310	140	30.1	15.8	4.1	2.3	2.1	0	134	14.2	12	12	0.05
46	74.52	32.79	Pangli Colony	8.12	380	145	34.1	14.6	9.3	3.8	0.11	0	146	14.2	26	3	0.22
47	74.54	32.81	Dhanpur	8.21	370	140	40.1	9.7	9.3	3.8	0.11	0	140	17.8	22	2.4	0.24
48	74.61	32.87	Taryai	8.22	290	135	20.0	20.7	4.5	2.3	0.35	0	165	10.7	1	0.05	0.2
49	74.77	32.84	PataKhu	8.29	330	180	26.1	28.0	7.1	2.7	0.11	0	159	14.2	37	12	0.13
50	74.80	32.75	Muthi	8.27	890	245	28.1	42.6	54.8	43.3	10.62	0	244	60.4	127	1.2	0.3
51	74.77	32.85	Marjholi	8.2	480	185	30.1	26.8	9.1	2.4	0.35	0	159	46.2	3	11	0.18
52	74.78	32.76	Nagbani	8.4	370	135	20.0	20.7	16.6	2.5	3.03	18	153	10.7	4	0	0.14
53	74.78	32.80	Purkhoo	8.31	430	160	20.0	26.8	17.4	2.1	2.59	6	183	17.8	0	25	0.11

S. No.	Long	Lat	Location	pH	EC (μ S/cm)	Concentration (mg/l)											
						TH	Ca	Mg	Na	K	Fe	CO3	HCO3	Cl	S	N	F
54	74.74	32.72	GhoManhasan	8.25	560	230	28.1	38.9	21.6	2.0	0.12	0	171	39.1	72	11	0.19
55	74.71	32.71	Sandhwan	8.3	370	145	18.0	24.3	10.3	2.2	0.39	6	153	14.2	1	17	0.21
56	74.71	32.76	Gajansoo	8.29	650	175	26.1	26.8	53.6	7.1	5.69	0	195	74.6	33	0.3	0.2
57	74.75	32.78	Marh	8.34	650	250	36.1	38.9	24.6	1.8	0.26	0	165	39.1	90	27	0.26
58	74.79	32.76	Lower Barnai	8.3	440	160	28.1	21.9	9.3	33.4	0.67	0	171	14.2	58	2.2	0.23
59	74.59	32.79	Sajwal	8.11	300	155	24.0	23.1	3.5	6.7	0.37	0	177	7.1	14	0	0.49
60	74.55	32.77	HamirpurKohna	8.3	520	200	28.1	31.6	17.5	25.9	0.16	18	104	28.4	88	30	0.15
61	74.75	32.88	Sobka	8.1	240	130	16.0	21.9	3.5	27.0	2.15	0	110	10.7	59	6	0.14
62	74.75	32.85	Batera	8.23	340	180	60.1	7.3	6.1	2.0	1.11	0	146	17.8	38	13	0.14
63	74.73	32.79	Jaswan	8.2	300	150	26.1	20.7	4.2	2.1	0.28	0	143	7.1	27	7.8	0.23
64	74.86	32.81	Khairi (Raipur)	7.88	290	140	26.1	18.2	6.9	1.4	0.26	0	122	17.8	26	5.1	0.2
65	74.85	32.84	Kangar	8.24	280	160	20.0	26.8	2.9	1.2	0.19	0	146	7.1	29	9.3	0.14
66	74.81	32.74	Hazuribag	8.24	270	155	26.1	21.9	2.5	1.8	1.31	0	140	10.7	27	4.9	0.15
67	74.74	32.83	ShamaChak	8.25	550	270	18.0	54.7	23.5	8.9	3.56	0	165	56.8	88	32	0.07
68	74.70	32.98	TandaSheeda	8.07	290	160	20	27	4.8	5.7	0.35	0	159	21.0	16	1.0	0.16
69	74.65	33.03	ChowkiChowra	8.75	550	125	14	22	78.0	1.9	0.49	6	214	14.0	91	2.0	0.54
70	74.89	32.76	Sidhra	8.67	460	190	32	27	22	1	8.65	6	122	36.0	51	38.0	0.10
71	75.07	32.62	Nagrota (Sittle)	8.76	1010	295	26	56	72.0	50	10.52	18	232	78.0	129	82.0	0.63
72	74.90	32.81	Jagati	8.2	210	90	26	6	10.0	1.5	0.12	0	104	18.0	2	1.0	0.28
73	74.96	32.88	Sugetar	8.6	630	120	16	20	88.0	3.9	0.16	18	208	36.0	77	1.0	0.00
74	75.09	32.81	Jindrah	8.21	470	165	30	22	30.0	3.6	2.64	0	134	22.0	21	90.0	0.23
75	75.11	32.80	Kotkatwal	8.21	290	100	12	17	26.0	0.51	5.83	0	128	35.0	0	2.3	0.30
76	75.03	32.90	Kunihala	8.09	265	105	34	5	14.4	0.4	0.23	0	92	35.0	3	10.0	0.44
77	75.02	32.85	Badso	8.16	230	100	32	5	10.0	1.3	2.19	0	122	14.0	2	1.3	0.22
78	74.86	32.87	Dansal	8.2	530	185	27	30	43.0	0.95	0.26	0	134	53.0	76	19.0	0.63
79	74.90	32.75	Rangoora	8.41	390	145	20	23	21.0	2.50	2.36	6	146	39.0	2	14.0	0.39
80	75.04	32.77	Surinsar	8.52	430	130	14	23	43.0	2.00	0.11	6	128	39.0	48	14.0	0.21

DSITRICT KATHUA																	
S. No.	Long	Lat	Location	pH	EC (μ S/cm)	Concentration (mg/l)											
						TH	Ca	Mg	Na	K	Fe	CO3	HCO3	Cl	S	N	F
81	75.34	32.64	Ramkot	8.29	480	180	24	29	27.0	7.00	1.41	0	183	25.0	59	1.0	0.23
82	75.39	32.65	N. Gujroo	8.24	1010	210	20	39	120.0	11.00	0.58	0	134	209.0	2	96.0	0.20
83	75.42	32.66	Lakri	8.28	260	95	14	15	18.0	1.10	1.53	0	133	14.0	0	7.0	0.27
84	75.51	32.64	Mandli	8.76	550	115	6	24	81.0	3.00	0.83	12	134	64.0	81	0.4	0.27
85	75.54	32.58	Phinter	8.33	400	185	12	38	12.0	1.80	9.50	6	160	39.0	0	29.0	0.33
86	75.57	32.56	Pallan	8.49	690	170	24	27	87.0	2.20	0.12	6	201	103.0	28	22.0	0.44
87	75.61	32.61	Billawar	8.19	150	55	12	6	10.0	1.20	0.16	0	70	14.0	0	0.0	0.24
88	75.09	32.74	Sagoon	8.47	260	110	18	16	8.5	1.50	2.49	12	122	14.0	0	1.0	0.25
89	75.27	32.84	N. Panjgrahian	8.56	290	85	8	16	31.0	2.70	2.61	6	134	14.0	15	5.0	0.23
90	75.59	32.42	Barni	8.18	290	140	36	12	9.3	1.01	0	0	189	3.6	0	8	0.29
91	75.37	32.45	Bhagwal	7.98	410	190	62	9	14.4	1.8	0	0	226	14.2	7	14	0.39
92	75.37	32.39	Chakhariya	8.12	230	100	22	11	14.2	4.7	0.03	0	128	17.8	0	9	0.3
93	75.31	32.45	Challan	7.58	790	285	66	29	61.8	11.7	0	0	317	67.5	61	19	0.24
94	75.25	32.49	Chan Khatrian	7.98	270	135	42	7	8.9	0.9	0	0	153	21.3	0	2	0.34
95	75.33	32.48	Chanranga	8.23	300	135	42	7	12.2	1.42	0	0	189	7.1	0	2	0.28
96	75.31	32.45	ChapkiKalan	8.3	360	180	44	17	14.7	2.40	0	0	238	14.2	0	5	0.25
97	75.24	32.40	Karol Krishna	8.12	540	215	28	35	49.6	3.9	0.96	0	226	63.9	47	5	0.71
98	75.53	32.36	Kathua	7.88	930	275	60	30	107.0	11	5.23	0	159	177.5	133	4	0.9
99	75.52	32.30	KerianGandyal	7.8	680	385	74	49	21.8	31.8	0	0	372	35.5	87	34	0.86
100	75.51	32.28	KerianRamnagar	7.61	660	255	96	4	8.5	4.9	0	0	329	3.6	0	6	0.35
101	75.36	32.43	Khanpur	8.08	250	135	26	17	9.7	1.31	0	0	140	14.2	17	6	0.28
102	75.47	32.35	Khukhial	8.53	900	350	100	24	51.4	77.1	0.26	0	476	49.7	76	27	0.01
103	75.26	32.42	Konthal	7.99	820	280	56	34	73.8	3.3	0	0	146	92.3	100	112	1.15
104	75.38	32.35	Kotepanu	8.08	240	130	22	18	14.9	2.8	0.22	0	153	10.7	24	1	0.15
105	75.51	32.37	Kothian	7.89	310	155	42	12	8.6	1.56	2.14	0	134	17.8	21	23	0.26
106	75.59	32.38	Lakhanpur	7.94	340	180	46	16	14.2	4.22	0	0	146	21.3	41	29	0.3
107	75.21	32.43	Londi	8.15	300	165	24	26	16.4	2.89	0.42	0	195	10.7	23	7	0.13

S. No.	Long	Lat	Location	pH	EC (μ S/cm)	Concentration (mg/l)											
						TH	Ca	Mg	Na	K	Fe	CO3	HCO3	Cl	S	N	F
108	75.37	32.37	Mukandpur	8.08	540	185	26	29	39.3	66.25	0.92	0	177	39.1	137	16	0.75
109	75.43	32.35	Nagri	8.07	350	235	26	41	29.6	36	4.12	0	183	17.8	153	14	1.1
110	75.44	32.40	Patiari - II	7.9	210	145	26	19	5.7	14	0	0	104	10.7	65	9	2.8
111	75.31	32.37	Pansar	8.36	550	185	12	38	69.2	8.5	0	0	305	21.3	61	3	0.26
112	75.28	32.38	Feruchak	8.12	300	140	30	16	20.8	0.92	0	0	165	3.6	36	11	0.36
113	75.26	32.40	Ganguchak	7.88	1360	430	56	71	200.0	43	0	0	317	195.3	277	120	0.31
114	75.25	32.46	Jandi	8.26	1310	300	32	54	140.0	122	0	0	293	99.4	303	81	0.42
DSITRICT RAJOURI																	
115	74.48	33.09	Marchola	9.09	1120	70	10	11	225.0	5	0.00	12	421	46.0	139	1.0	0.68
116	74.46	33.09	ChanniParat	8.54	390	120	14	21	43.0	1.8	0.00	6	177	21.0	30	6.0	0.23
117	74.49	33.07	ThandaPanni	8.24	380	140	24	19	26.0	0.8	0.00	0	98	35.0	57	11.0	0.23
118	74.46	33.03	Banpari	8.42	510	145	14	27	58.0	2.7	0.00	6	128	46.0	76	25.0	0.18
119	74.42	33.03	DhokBanjar	8.61	290	125	16	21	30.0	0.7	0.00	6	140	21.0	34	7.0	0.17
120	74.40	33.06	Kangri (Grid Station)	8.41	290	110	20	15	20.0	0.45	0.00	6	159	11.0	0	9.0	0.25
121	74.33	33.07	Jabah	8.56	390	135	20	21	31.0	1.01	4.68	6	177	14.0	31	1.0	0.62
122	74.32	33.07	Sail	8.6	350	120	14	21	31.0	1	0.00	6	116	39.0	31	1.0	0.95
123	74.29	33.08	Seri	8.28	450	120	20	17	49.0	1.08	0.00	0	128	35.0	65	6.2	0.31
124	74.27	33.09	Gagrote	8.48	540	150	22	23	50.0	10	0.00	6	165	28.0	82	6.2	0.36
125	74.28	33.09	Ding	8.54	390	120	20	17	37.0	1.8	0.00	6	140	36.0	20	14.0	0.15
126	74.23	33.08	Kalal	8.1	930	50	14	4	187.0	3	0.64	0	310	36.0	149	1.0	2.75
127	74.22	33.14	RumliDara	8.28	310	130	18	21	14.0	0.5	0.00	0	159	14.0	10	1.0	0.22
128	74.19	33.10	Bareri	8.21	990	280	42	43	107.0	5	0.00	0	140	184.0	76	80.0	0.00
129	74.21	33.18	Nouniyal	8.6	550	175	20	30	47.0	1.3	0.14	6	183	35.0	53	24.0	0.28
130	74.19	33.17	ChowkiHanda	8.56	360	145	14	27	19.0	0.5	0.00	6	146	21.0	30	0.4	0.31
131	74.14	33.19	Kalsian	8.43	290	105	16	16	19.0	0.5	0.00	6	128	25.0	1	1.0	0.40
132	74.05	33.24	Jhangar	8.42	310	125	16	21	19.0	0.5	0.09	6	146	25.0	6	0.3	1.20
133	74.10	33.24	Laroka	8.94	460	160	20	27	31.0	2.8	0.00	6	177	21.0	44	6.0	0.24
134	74.11	33.27	Phukarni	8.7	1150	80	18	9	227.0	2.5	0.00	6	476	35.0	137	5.0	0.00

S. No.	Long	Lat	Location	pH	EC (μ S/cm)	Concentration (mg/l)											
						TH	Ca	Mg	Na	K	Fe	CO3	HCO3	Cl	S	N	F
135	74.15	33.22	DarhalQuilla	8.73	340	115	14	19	24.0	3.00	0.00	6	116	25.0	25	12.0	0.48
136	74.20	33.20	BhattaMorh	9.09	160	70	10	11	7.4	0.45	0.00	12	55	18.0	2	5.0	0.54
137	74.28	33.50	Narina	8.46	250	105	22	12	11.0	1.2	0.00	6	110	18.0	8	3.0	0.24
138	74.28	33.29	Chittiar	8.26	340	140	24	19	16.0	0.80	0.00	0	134	21.0	17	22.0	0.23
139	74.32	33.28	Potha	8.26	260	110	24	12	10.0	2.90	0.00	0	98	25.0	1	23.0	0.27
140	74.37	33.24	Dyala	8.25	460	145	19	17	39.0	2.14	0.00	0	134	28.0	61	23.0	0.16
141	74.42	33.18	Panja	8.65	425	135	54	0	37.0	2.20	0.00	6	201	25.0	1	14.0	0.25
142	74.43	33.16	Solki	8.7	430	165	20	28	23.0	1.50	0.38	6	220	14.0	1	13.0	0.29
143	74.42	33.15	Lower Kharak	8.04	360	140	20	10	19.0	0.50	0.00	0	153	39.0	1	1.0	0.27
144	74.41	33.13	Dharamsal	8.84	860	255	20	50	82.0	2.40	0.00	6	354	57.0	39	25.0	0.14
145	74.30	33.14	Bagnoti	8.57	465	100	22	11	62.0	4.40	0.00	6	116	21.0	102	5.0	0.27
146	74.38	33.12	Siot	8.6	410	130	18	21	38.0	0.80	0.00	6	165	35.0	21	3.0	0.20
147	74.43	33.09	Bakhar	8.05	490	200	36	27	28.0	2.20	0.00	0	153	50.0	45	27.0	0.24
148	74.52	33.05	Salote	8.3	520	205	22	36	29.0	0.50	2.18	6	275	25.0	2	2.0	0.33
149	74.45	33.04	Ainpur	8.56	270	115	14	19	13.0	0.50	0.00	6	122	25.0	0	5.0	0.21
DSITRICT REASI																	
150	74.58	33.05	Bhamla	8.27	580	85	22	7	96.0	1.3	0.19	0	171	89.0	19	13.0	0.15
151	74.64	33.07	Dadua	8.54	390	165	36	18	21.0	2.6	3.30	12	165	25.0	30	3.2	0.08
152	74.65	33.07	GaranJagir	8.5	250	95	16	13	15.0	0.6	0.00	6	122	3.0	3	0.1	1.60
153	74.63	33.13	Nanora	8.28	630	185	28	28	61.0	3.7	0.00	0	165	74.0	50	37.0	0.10
154	74.59	33.14	Thangrot	8.25	450	165	24	26	25.0	1.5	0.00	0	207	25.0	28	5.0	0.01
155	74.55	33.17	Aliyah	7.73	290	140	28	17	6.3	0.6	0.00	0	165	11.0	0	6.0	0.23
156	74.93	32.91	Katra	8.23	440	190	12	39	12.0	1.3	5.40	0	207	25.0	0	15.0	0.14
157	74.79	33.09	Talwara	8.05	720	345	60	47	6.0	8.5	2.27	0	354	14.0	1	71.0	0.62
158	74.83	33.09	Riasi	8.16	260	125	22	17	4.8	1.02	5.11	0	146	7.0	4	2.3	0.23
DSITRICT SAMBA																	
159	74.90	32.64	BassiKalan	7.89	850	390	48	66	91.6	4.4	0	0	500	63.9	86	4	0.87
160	74.89	32.63	Palli	7.72	1460	640	140	71	54.7	48.3	0	0	781	99.4	3	45	0.39

S. No.	Long	Lat	Location	pH	EC (μ S/cm)	Concentration (mg/l)											
						TH	Ca	Mg	Na	K	Fe	CO3	HCO3	Cl	S	N	F
161	74.91	32.59	Khairi (Bishnah)	8.01	630	300	48	44	57.7	7.37	0	0	390	35.5	27	45	0.3
162	74.95	32.54	Birpur	8.1	450	220	52	22	3.6	7.3	0	0	275	7.1	0	5	0.25
163	74.95	32.66	MaheenCharkan	8.7	640	285	90	15	32.7	5.11	0.64	48	281	35.5	0	7.2	0.23
164	74.92	32.63	Channi	8.1	1050	200	28	32	240.0	2.5	0	0	610	63.9	118	13	0.74
165	74.95	32.61	Patli	8.13	380	160	50	9	10.9	4.4	0	0	207	10.7	2	2	0.15
166	75.01	32.57	Swankha	7.6	720	280	78	21	38.8	1.9	0.14	0	342	42.6	0	35	0.16
167	75.07	32.56	Supwal	7.7	720	290	70	28	44.5	21.7	0	0	378	53.3	27	1.6	0.07
168	75.01	32.55	Gudwal	7.12	890	590	84	92	54.4	80.9	0	0	488	63.9	288	26	0.41
169	74.96	32.47	Didyal	8.25	730	175	28	26	89.9	1.4	0.09	0	378	32.0	2	16	0.71
170	74.94	32.51	MahaKalandrian	7.75	1250	610	64	109	96.7	52.8	0	0	354	106.5	386	57	0.12
171	74.92	32.56	MajuaLaxmi	8.32	900	340	100	22	70.4	1.2	0	84	268	85.2	3	14	0
172	74.95	32.55	GhoRakawalan	7.87	2200	770	136	105	220.0	23.5	0	0	756	298.2	6	287	0.43
173	74.96	32.55	Ghobrahmna	7.46	720	250	80	12	28.4	3.7	0	0	342	14.2	4	14	0.2
174	74.98	32.59	Kainthpur	8.35	2100	530	88	75	255.0	138	0	204	506	234.3	150	23	0.35
175	74.96	32.55	GuraBrahamana	8.37	580	270	16.0	55.9	33.1	1.6	0.11	96	43	35.5	52	55	0.31
176	75.16	32.70	Chhani Mansar	8.22	270	105	18	15	17.0	0.6	0.12	0	146	14.0	2	0.0	0.28
177	75.11	32.59	Daboh	8.17	290	125	24	16	24.2	2.2	0.81	0	140	24.9	19	13	0.32
178	75.18	32.43	DulmeChak	8.06	1480	320	52	46	111.0	256	0	0	104	103.0	628	6	0.28
179	75.20	32.50	Jasath	7.96	440	175	42	17	23.2	1.6	0.5	0	171	35.5	11	32	0.25
180	75.24	32.51	Kootah	8.16	580	215	62	15	33.9	9.61	0	0	244	39.1	2	55	0.19
181	75.20	32.45	LaleChak	7.95	350	145	28	18	29.5	2.96	0.31	0	153	32.0	38	4	0.21
182	75.27	32.54	Lokli	7.96	240	125	34	10	5.7	1.64	0.07	0	140	10.7	2	9	0.23
183	75.25	32.56	Nilcha	7.95	280	130	40	7	6.5	1.82	0.05	0	140	14.2	7	5	0.19
184	75.15	32.61	Nud	7.93	610	200	44	22	51.2	26.3	0	0	159	56.8	72	75	0.22
185	75.11	32.48	Pangdour	8.05	420	220	38	30	26.8	3.96	0	0	214	28.4	52	18	0.37
186	75.30	32.56	Nauni	8.13	420	190	38	23	21.4	2.2	0.86	0	201	46.2	3	8	0.21
187	75.14	32.48	Phalora	7.66	660	150	14	28	119.5	2.3	0	0	372	49.7	23	17	0.49
188	75.20	32.49	Raghuchak	8.05	290	140	46	6	15.4	2.3	0	0	189	17.8	0	1.2	0.23

S. No.	Long	Lat	Location	pH	EC (μ S/cm)	Concentration (mg/l)											
						TH	Ca	Mg	Na	K	Fe	CO3	HCO3	Cl	S	N	F
189	75.12	32.51	Raiyan	8.03	240	125	26	15	13.5	1.5	0	0	159	14.2	0	10	0.29
190	75.13	32.47	Sadoh	7.94	540	250	38	38	35.4	1.4	0	0	299	14.2	11	65	0.33
191	75.12	32.56	Samba	7.9	680	170	50	11	73.2	7.5	0.03	0	153	39.1	67	110	0.1
192	75.18	32.49	Sanoora	8.01	230	145	20	23	9.1	1.5	0.09	0	140	39.1	0	1.1	0.24
DSITRICT UDHAMPUR																	
193	75.02	32.90	Eastern Mand	8.61	320	90	12	15	32.0	1	0.14	6	147	14.0	14	1.0	0.27
194	75.04	32.91	Seen Thakaran	8.44	350	135	30	15	21.0	0.9	7.13	6	116	29.0	31	11.0	0.18
195	75.03	32.94	Badola	8.76	330	150	34	16	8.2	1.2	2.36	6	92	32.0	18	32.0	0.23
196	75.08	32.91	Garhi (Udh)	8.27	490	160	28	22	40.0	1	0.12	0	128	43.0	63	21.0	0.26
197	75.13	32.88	BattalBallian	7.92	460	210	34	30	10.0	1.2	0.12	0	128	28.0	74	14.0	0.18
198	75.14	32.90	Phangyal	8.41	380	170	30	23	10.0	1.7	0.12	6	116	43.0	9	30.0	0.14
199	75.18	32.85	Kuperlah	8.43	300	135	34	12	7.5	0.6	0.12	12.00	140	14.0	6	0.0	0.21
200	75.16	32.84	Ratti	8.05	260	110	20	15	10.0	0.7	3.54	0	116	18.0	12	0.0	0.23
201	75.27	32.78	Dehari	8.24	590	100	6	21	92.0	3	0.12	0	299	21.0	26	2.3	0.67
202	75.31	32.81	Ramnagar	9.08	520	175	42	17	37.0	4.4	0.28	12	146	32.0	66	21.0	0.18
203	75.23	32.80	Jallow	8.55	590	110	14	18	86.0	6.1	6.59	12	214	57.0	22	21.0	0.48
204	75.20	32.86	Talpad	8.12	910	65	8	11	182.0	2.6	5.62	0	409	21.0	95	0.2	0.45
205	75.04	32.83	KahPathala	8.39	280	95	24	9	21.0	0.8	0.21	30	79	21.0	21	0.2	0.23
206	75.11	32.91	Birhma	8.25	260	115	28	11	10.0	1.6	0.12	0	122	18.0	13	0.2	0.28
207	75.12	32.95	Jakhar	8.36	240	110	38	4	6.3	1.2	0.12	6	134	7.0	0	1.0	1.00
208	75.31	32.82	Dalsar	8.36	240	95	20	11	13.0	0.91	0.23	6	116	14.0	3	1.0	0.37
209	75.18	32.72	Salabra	8.22	250	115	20	16	9.0	0.32	1.01	0	140	11.0	4	0.0	0.35
210	75.15	32.76	Manwall	8.2	250	105	24	11	11.0	0.71	0.12	0	98	25.0	4	13.0	1.10
211	75.24	32.68	Sunal	8.49	390	145	20	23	39.0	1.80	2.59	12	189	28.0	16	15.0	0.12

ANNEXURE – IV

Result of Chemical Analysis of water samples of National Hydrograph Stations collected during May 2015 KASHMIR REGION

S.No.	Long	Lat	Location	pH	EC (μ S/cm)	Concentration (mg/l)												
						TH	Ca	Mg	Na	K	Fe	CO ₃	HCO ₃	Cl	S	N	F	
DISTRICT ANANTNAG																		
212	75.10	33.79	Rambarpora	8.44	410	225	68	13	6.0	1.55	0.1	30	189	10.4	15	5.7	0.02	
DISTRICT BANDIPORA																		
213	74.65	34.14	Mirgund	8.4	750	130	14	23	110.5	1.82	0.1	111	31	90.5	32	2.6	0.27	
DISTRICT BARAMULLA																		
214	74.43	34.24	Sangrama	8.15	460	190	36	24	28.7	3.04	0.02	0	153	45.2	49	20	0.43	
215	74.44	34.31	Sopore Model Town	7.8	400	180	52	12	20.8	2.51	0.37	0	214	20.9	20	3.6	0.65	
216	74.42	34.36	Bomai	8.4	590	210	34	30	56.2	3.8	0.07	18	110	69.6	99	20	0.66	
217	74.36	34.22	Hadipora (Zambodzpora)	8.01	570	215	40	28	42.6	3.18	0.2	0	122	7.0	190	5		
218	74.58	34.06	Aripanthan	8.65	580	170	44	15	76.6	26.8	0.31	0	329	13.9	51	35	0.54	
219	74.56	34.09	Waripora	7.93	180	130	26	16	3.9	1.8	0.08	0	92	10.4	45	5.4	0.68	
DISTRICT BUDGAM																		
220	74.27	34.44	Khanpora	8.23	310	175	42	17	6.3	0.7	0.13	0	189	7.0	23	0.6	0.69	
221	74.36	34.23	Binner	8.13	330	145	32	16	50.0	3.6	1.53	0	177	78.1	0	5	0.68	
DISTRICT KUPWARA																		
222	74.32	34.41	Chowgal	8.25	260	135	38	10	5.5	2.51	0.19	0	171	7.0	0	1.5	0.61	
223	74.29	34.49	Drugmulla	7.92	360	165	48	11	16.4	1.3	0.09	0	153	31.3	19	17	0.67	
224	74.26	34.53	Kupwara Main Chowk	8.27	850	260	52	32	82.1	1.5	0.24	0	299	111.3	27	13	0.7	
225	74.28	34.54	Guse	8.29	630	215	66	12	53.1	1.6	0.03	0	201	69.6	65	2.3	0.72	
226	74.18	34.52	Trehgam	8.28	590	290	38	47	44.8	2.1	0	0	305	87.0	0	26	0.6	
227	74.16	34.47	Dolipura	8.23	330	155	48	9	8.2	1.4	0.43	24	18	7.0	99	8.5	0.62	
228	74.23	34.46	Magam	7.99	650	240	92	2	39.3	1.56	0	0	98	80.0	72	74	0.58	
DISTRICT PULWAMA																		
229	74.97	33.91	Sambura	8.25	290	105	28	9	25.2	0.85	0.27	0	128	24.4	17	5.3	0.07	
DISTRICT SRINAGAR																		
230	74.83	34.07	Regal Chowk	8.33	470	210	32	31.6	38.9	5.0	0.04	42	159	38.3	44	1.32	0.61	
231	74.82	34.10	Rainawari	8.14	510	190	32	27	29.4	19.6	0.03	0	177	34.8	47	45	0.65	
232	74.92	34.04	Zeewan	8.14	450	190	36	24	14.9	1	0.39	0	146	34.8	18	45	0.39	

