AQUIFER MAPPING AND

GROUNDWATER MANAGEMENT PLAN,

BANSWARA DISTRICT

RAJASTHAN

(4536.1 sq.km)

CENTRAL GROUND WATER BOARD

MINISTRY OF JAL SHAKTI

DEPARTMENT OF WATER RESOURCES

RIVER DEVELOPMENT & GANGA REJUVANATION

GOVERNMENT OF INDIA

Western Region, Jaipur

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Report Complied and Prepared

Gyan Prakash Tiwari

Assistant Hydrogelogist

CGWB W.R. Jaipur

Supervision

Sh. Vipin Malik

Scientist-C and OIC

NAQUIM

AQUIFER MAPPING AND MANAGEMENT PLAN
BANSWARA DISTRICT, RAJASTHAN
(4536.1 sq.km)

CONTRIBUTORS		
Authors		
Gyan Prakash Tiwari	**:**	Assistant Hydrogeologist
Supervision		
Sh. Pramod kumar Tripathi	**:**	Regional Director
Dr. R.K. Kushwaha	:	Scientist-E
Sh. Vipin Malik		Scientist-C

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GYAN PRAKASH TIWARI
Assistant Hydrogeologist
CGWB WR, Jaipur.

NAQUIM Studies Banswara District, Rajasthan

The broad objective of the study was to establish the geometry of the underlying aquifer systems in horizontal and vertical domain and characterize them on the themes of quality, quantity and sustainability of groundwater in aquifer.

Intensive studies were carried out to prepare block wise aquifer maps and aquifer management plans of the district to facilitate the suitable development and management of ground water resources based on data generated in-house, data gap analysis, data acquired from State Govt. Departments and field activities & surveys. All the available data was later brought on GIS platform and conforming to an integrated approach, block wise GIS maps on various relevant themes were prepared along with the aquifer management plans of Banswara District.

- Banswara district is located in the extreme southern part o Rajasthan. It is bounded in the North by Dungarpur and Pratapgarh districts, in the west by Dungarpur district, in the East by state of Madhya Pradesh and South by state of Gujarat and. It stretches between 23º03' 22.98" to 23º 55' 31.36" north latitude and 73º 57' 12.92'' to 74º 46' 22.15'' east longitude covering area of 4,536.1sq.km. Major part of the district has systematic drainage system, as whole region is the part of 'Mahi River Basin'. The drainage system belongs to the Mahi river basin. Its main tributaries are Anas, Chap, Haran, and Kagdi & Nal. There are scattered ranges of Aravalis in the eastern half of the district. Minimum elevation (113m) is found in Anandpuri block whereas highest elevation is reached (581m) in Kushalgarh block.
- The mean annual rainfall of the area during the study period was 934.8 mm and the frequency of occurrence of drought in district is about Normal 64%.
- Geologically the district geology includes Bhilwara Super Group, Aravalli meta-sediments, post-Aravalli intrusive and Younger flows. The Aravalli Super Group of formation consists in parts of Ghatol, Garhi, Banswara, Aandpuri and Sajjangarh blocks. The meta-sediments are comprised of quartzite, mica schist, conglomerates, quartz-chlorite schist, phyllites, dolomitic marble and gneisses.The post-Aravalli intrusive is granites, pegmatite, quartz veins and Amphibollite. The eastern and southeastern part covering Kushalgarh, part of Banswara and Chhoti Sarwan block, is occupied by Deccan trap basalt. (BGC) is the major water bearing formation covering major portion (24.5 %) of the district area.
- The water level in the district varied from 2.00 to 40.00 mbgl during Pre-Monsoon, 2022 and 2.00 to 10.00 mbgl during Post Monsoon, 2022 as recorded from NHS monitoring points.

- 3D and 2D aquifer disposition diagram shows two aquifer systems in the district. Water in Aquifer I occur under phreatic condition in the weathered hard crystalline and sedimentary rocks. Aquifer II is composed of compact rocks with isolated and scattered factures and joints.
- The major Groundwater related issues in the district are Over Exploitation of Groundwater, Low Yield Potential Aquifers, Erratic Rainfall and Drought, Declining Water Level Trend (2011-2022), Limited sub surface storage availability and Poor Quality of Groundwater.
- With a Normal drought frequency of 64 % in addition with the hard rock terrain the erratic distribution of rainfall years is a major problem in the area. This, along with withdrawal of more groundwater than the natural recharge has resulted in the decline in water levels. The analysis of decadal water level trend (2011–2022) indicates that the district has significant areas that had undergone a declining water level trend over the years. The long term depleting nature of water level causes reduction in storage, which in turn leads to water scarcity.
- Management of ground water is a colossal challenging problem in its severity, pervasiveness and importance. To increase the water use efficiency, source sustainability, plans of rain water harvesting and artificial recharge have been envisaged in the district.
- Artificial recharge is a difficult task in the district as the country rock is composed exclusively of hard rocks, water level gradient is steep and storage capacity is low. Under such condition there is likelihood that recharged water will reappear as base flow. Any induced water application will create localized mound with no change in trend of declining water level in adjacent areas. Thus, Rain Water Harvesting is the only possible through construction of bunds, anicuts, and rooftop harvesting structures.
- The management plan had been proposed for all the 11 blocks of the District. Total volume of sub surface storage space available for artificial recharge is 114.57 mcm and total non-committed surplus surface water available in the district is 217.06 mcm, which can be utilized to bring down the Stage of Ground Water Development.

- The management plan comprises two components namely Supply-Side Management and Demand Side Management.
- As a part of **Supply Side Management**, three types of Intervention are suggested –
  - Catchment Area Treatment.
  - Construction of Water Conservation Structures including Mini percolation Tanks, Percolation tanks, Mini Storage Tanks, Pacca Check Dams, Anicuts etc.

- Construction of Farm Ponds (help in salinity affected area to reclaim the land for normal cultivation and reducing the salinity over the time).

- As a part of **Demand side Management**, measures should be taken to reduce the groundwater draft, such as transformation from traditional water intensive flood irrigation system to micro-irrigation / pressure irrigation practices, changing the cropping pattern from water intensive crops to less water consuming crops as well as adopting other advanced innovative technologies, etc. and all these should be implemented in befitting manner.

By implementing the interventions which requires efforts from Stakeholders with an important step of capacity building in all the blocks, ***Stage of Ground Water Extraction will improve from 64.84 % to 51.46 %.***

Recommendations

- Planning for the development and management of ground water in any area in the state must address the factors like low rainfall, limited ground water storage availability, ground water salinity in many areas, excessive fluoride, high nitrate concentration, deep water levels. These aspects should be taken as a core consideration for planning and implementing ground water development and management programs. A holistic approach taking all aspects into consideration shall therefore, need to be adopted.
- Agricultural and urban runoff tainted with chemical pesticides and fertilizers are the sources of waste water from domestic and agriculture sites. Effluents from industries, mining sites etc. are also responsible for huge amount of waste water generation. Considering wastewater as a resource, it can be cleaned to such standards that it can be reused in a number of ways, e.g. for flushing toilets, laundry machines or for irrigation of crops.

- In terms of the critical issues for the drinking water such as source sustainability, water quality management and better operation and maintenance, it is important that strong grassroots awareness is generated. Thus, IEC activities and capacity building activities needs to be aggressively propagated to establish the institutional framework for participatory ground water management.

- Farmers should be trained for adopting more efficient irrigation techniques and water conservation practices and boosting recharge. Awareness among stakeholders & their participation for ground water recharge and conjunctive use of available resource. Farmers should be trained for adopting more efficient irrigation techniques and water conservation practices and boosting recharge.

- As it is peek time to move from source to resource much effort has to be made in the direction of preserving catchments, more plantations to conserve more water and multi-disciplinary approach to save more water viz. Diversification in agriculture (horticulture, vegetables, green houses, agro-forestry, fodder crops, Diversification of Livelihoods (Agriculture, Animal Husbandry, Self Employment), limiting extensive groundwater withdrawals which will in turn require limiting agricultural electricity subsidies provided by state governments and rationing of power.

- Sustainable management of the area is required to be taken off to improve the quality and quantity of the groundwater and regular monitoring is therefore recommended.

- In domestic waste water for gardening, recharge and promotion economic use of water in bathing, cleaning, cooking, leakage from domestic taps, pipelines for water supply to urban areas be checked. Considering wastewater as a resource, it can be cleaned to such standards that it can be reused in a number of ways – e.g. for flushing toilets, laundry machines or irrigation for crops.

- Effective solid waste disposal mechanism needs to be properly developed. This can utilized for manufacturing biogas.
- Paving of surface for providing civic amenities in the towns & cities has led to reduced infiltration and increased run-off during the rainy season. Rainwater harvesting structures should therefore be constructed to intercept and recharge the roof-top run-off from individual house-holds in feasible areas. Local municipal bodies should encourage such a provision.
- Since ground water abstraction structures are individually owned, operated and managed, it is difficult to have an account of ground water abstraction by volume. Voluntary registration of structures needs to be encouraged so as to obviate the requirement for enactment and enforcement of any legal measures.

AQUIFER MAPPINGANDMANAGEMENTPLAN

BANSWARA DISTRICT, RAJASTHAN

(4536.1 sq.km)

CONTENTS

PART A

PART B

Block wise Aquifer Maps and Management Plans of

11 Blocks of Banswara District

List of Figures

14.	Geology Map of District
15.	Aquifer System of district
16.	Depth to Water Level – Pre-monsoon (May 2022)
17.	Depth to Water Level – Post-monsoon (November 2022)
18.	Decadel Fluctuation of Ground water-Pre Monsoon 2022
19.	Field Photograph Showing Measuring Water level
20.	Index of Aquifer disposition
21.	3D representation of Aquifer Disposition in District
22.	3D representation of Aquifer Disposition in District
23.	Aquifer Disposition 2D cross section (a) Anandpuri to Danpura
24.	Aquifer Disposition 2D cross section (b)Narawali to Nagda Bari
25.	Sections lines of both the 2D sections represented above
26.	Pre-Monsoon Electrical Conductivity
27.	Pre-Monsoon fluoride
28.	Transformation of Nitrates
29.	Pre-MonsoonNitrates
30.	Categorization of assessment unit(GWRA 2022)
31.	Graph showing Ground Water Availability and Draft (as on March 2022)
32.	Graph showing stages of GW exploration
33.	Graph showing stages of GW exploration

List of Table

List of Annexure

Banswara district at a Glance

SALIENT INFORMATION		Banswara District
Longitude		**73° 18' 29.57'' to 74° 51' 11.73'' East Longitudes**
Latitude		**23º03' 22.98" to 23º 55' 31.36" North Latitudes**
Geographical Area Sq.km		**4536.08**
Potential area in sq.km		**3979.96**
Population (2011)		**1797485**
Geomorphology		
Geomorphic Unit		**Dissected plateaus, Valley fills, Buried valley, Intermontane Valley, Piedmont Zone, Denudatinal Strructural Hills, Linear Ridge and valley fills**
Geology		**Hard Rock**
		Granite/Gneiss/Phyllite/Schist/Basalt
Basin/Sub-Basin		**Mahi**
LANDUSE,AGRICULTURE, IRRIGATION & CROPPING PATTERN		
Geographical Area in ha.		**453608**
Forest Area in ha.		**91554**
Actual sown area in ha.		**233526**
Gross Sown Area in ha.		**373099**
Area sown more than once in ha.		**139573**
Area under Irrigation (Net) in ha		
	Surface Water	**9865**
	Ground Water	**127993**
	Other sources	**5544**
Net irrigated Area in ha		
Wheat		**88715**
Jawar		**2**
Pulses		**37597**
Rice		**775**
Hydrogeology		

Monitoring Stations		
	CGWB	**29**
	SGWD	**122**
GROUNDWATERRESOURCE &EXTRACTION (as on GWRA 2022)		
Ground Water Recharge Worthy Area(ha)		**3979.96**
Command (ha)		**147476**
Non-Command (ha)		**2175.82**
Hilly Area (ha)		**140941**
Total Geographical Area (ha)		**435980**
Rainfall (ha)		**5544**
Canals (ha)		**9466**
Surface Water Irrigation (ha)		**30956**
Ground Water Irrigation(ha)		**257525**
Tanks and Ponds(C+NC)		**798**
Total Annual Ground Water Recharge (ham)		**22504.45**
Natural Discharge (C+NC)(ham)		**2045.86**
Natural Discharge (ham)		**2250.47**
Annual Extractable Groundwater Resource (ham)		**20253.98**
	Domestic Draft(ham)	**2044.77**
	Industrial Draft(ham)	**16.1**
	Irrigation Draft (ham)	**11073.3**
Existing Gross Ground Water Draft for All uses (ham)		**13134.17**
Provision for domestic and industrial requirement Supplyto2025(ham)		**2044.77**
Net Annual Ground Water Availability for Future Use (ham)		**7252.44**
Stage of Ground Water Development%		**64.85**
Category		**Safe**
Total		**29840**
Area of Blocks(Sq.Km.) Total 5 blocks		**4359.8**
Hilly Area sq.km		**54810**
Potential Area (Sq.Km)		**365058**
Normal Annual RF(mm)		**934.8**
Water level (m) Nov 2022		**34.72**

Trend(m/yr)	**-2.86**
Volume of Subsurface Storage Space available for Artificial Recharge (MCM)	**98.84**
Surplus Surface water Availability (MCM)	**200.13**
Catchment Area Treatment(ha)	**4547.00**
Water utilized in catchment area treatment(MCM)	**2.03**
Water Conservation Structures	
No .of existing village ponds (2.5 to 7.5 ha)	**246**
Proposed No. of Structures	

Percolation Tank		**4627**
Pacca Check Dams		**2425**
Anicut		**1287**
Mini StorageTanks		**63**
Total Volume of water utilized in catchment area and WC Structured mcm		**2.03**
1farm pond in3 ha land: capacity1200cum	Water utilized by farm Ponds (mcm)	**0**
DEMAND SIDE MANAGEMENT		
Area Irrigated through Ground Water(ha)		**26999**
Micro irrigation techniques		
Irrigation Area(ha) proposed for irrigation through Sprinkler		**3387.3**
Water Saving by use of Sprinklers (MCM)		**1.66**
Crop Change		
Area under Wheat Crop(ha)		**83228**
Cropping Area(ha) proposed for change in crop		**16794.8**
Water Saving by Change in Cropping Pattern(MCM)		**10.79**
EXPECTEDB ENEFITS		
Net Ground Water Availability (MCM) GWRA 2022		**202.53**

Net Ground Water Availability after Suppl yside Intervention	**211.54**
Existing Ground Water Draft for All Purposes (MCM)	**131.34**
GW draft after Supply Side Interventions(MCM)	**131.34**
GW draft after Demand Side Interventions(MCM)	**108.86**
Present stage of Ground Water Development (%)	**64.85**
Projected Stage of Ground Water Development after Supply Side interventions (%)	**51.46**

Report on National Aquifer Mapping and Management
District Banswara, Rajasthan (4536.1 sq.km)

1. Introduction

The increasing water scarcity has become one of the most challenging problems for developing country like India. Groundwater is a precious natural water resource considered as a readily available and safe source of water for domestic, agriculture and industrial uses. Our growing dependability on ground water has started diminishing this resource. The most significant change in the groundwater scenario in India is that the share of bore well irrigation went up from a mere 1 percept during 1960-61 to 60 percent during 2006-07 as per Indian Agricultural Statistic, 2008. About 85% of the rural drinking water supply is also met from ground water sources. Thus, a need was felt for scientific management of groundwater resources and the need has turned to urgency in the present times. There has been a paradigm shift from groundwater development to groundwater management over the last decade. The importance of groundwater for national development has deemed it necessary to be more specific; more general "groundwater management" has become"aquifer management" to answer the specific queries on availability and sustainability.

1.1 Purpose and Scope

Aquifer mapping is a scientific process wherein a combination of geological, geophysical, hydrological and chemical fields and laboratory analyses has been applied to characterize the quantity, quality, and sustainability of ground water in aquifers. Aquifer mapping is expected to improve our understanding of the geological framework of aquifer, their hydrologic characteristics, and water level in aquifer and how they change over time and space and the occurrence of natural and anthropogenic contaminants that affect the portability of groundwater. Results of these studies will contribute significantly to resource management tools such as long term aquifer monitoring network and conceptual and quantitative regional groundwater flow models to be used by planners, policy makers and other stake holders. Aquifer mapping at appropriate scale can help to prepare, implement, and monitor the efficacy of various management interventions aimed at long term sustainability of our precious groundwater recourses, which in turn will help to achieve drinking water scarcity, improved irrigation facilities and sustainability of water resource in the state.

Under the National aquifer Programme, it is proposed to generate Aquifer Maps on 1:50,000 scale, which basically aims at characterizing the aquifer geometry, behaviour of groundwater levels and status of groundwater development in various aquifer system to facilitate planning of their suitable management. The major activities involved in this process include compilation of

existing data, identification of data gaps, generation of data for feeling data gaps and preparation of different aquifer layers.

To get a clear 3D hydro geological geometry of the aquifer system and water level behaviour, it was felt to generate more data through Groundwater Exploration, VES and to establish more numbers of monitoring stations for better understanding of the groundwater regime behaviour in terms of both quantity and quality.

1.2 Approach & Methodology

The Rajasthan state comprises 34 districts attempts to integrate the geological, Geophysical, hydrological and chemical field and laboratory analyses are applied to characterize the quality, quantity and sustainability of groundwater in aquifer. Under the National aquifer Programme, it is proposed to generate Aquifer maps on 1:50000 scale, which basically aims at characterizing the aquifer geometry, behaviour of groundwater levels and status of groundwater development in various aquifer system to facilitate planning of their suitable management. The major activities involved in this process include compilation of existing data, identification of data gaps, generation of data for feeling data gaps and preparation of different aquifer layers. The flow chart is as follows

- **Compilation of Existing Data/ Identification of Data Gap & Principal Aquifer Units**
  - Compilation of Existing ground water data from different sources
  - Identification of Data Gaps
  - Analysis & identification of principal aquifers
- **Generation of Data**
  - Surface and sub-surface geophysical surveys
  - Exploratory drilling & determination of aquifer parameters
  - Generation of additional water quality parameters
  - Well Inventory
- **Aquifer Map Preparation**
  - **1:50,000 scale.**1:10,000scaleinidentifiedpriorityareas
  - Analysis of data base and preparation of thematic Layers in GIS platform
  - Preparation of Aquifer Maps
- **Aquifer Management Plan**

- Preparation of District wise and Block wise Aquifer Management Plan

➢ **IEC Activities**

- Capacity Building, Awareness and Sharing of AMP's
- Tier II and Tier III trainings
- Public Interaction Programs
- Sharing of AMP's with SGWCC, Line Departments, District Administration etc

➢ **Implementation of Aquifer Management Plan**

- Through Convergence in various schemes ABHY, PMKSY, MGNREGA etc.
- Participatory Ground water Management

1.3 Study Area

Banswara district is located in the extreme southern part o Rajasthan. It is bounded in the North by Dungarpur and Pratapgarh districts, in the west by Dungarpur district, in the East by state of Madhya Pradesh and South by state of Gujarat and. It stretches between 23º03' 22.98" to 23º 55' 31.36" north latitude and 73º 57' 12.92'' to 74º 46' 22.15'' east longitude covering area of 4,536.1sq.km. Major part of the district has systematic drainage system, as whole region is the part of 'Mahi River Basin' shown Fig: 1. Banswara district is administratively divided into Eleven Blocks. The following table summarizes the basic statistics of the district at block level. (Based on Census 2011) Table No.1

Table1-ADMINISTRATIVE UNITS OF BANSWARA DISTRICT, RAJASTHAN

Banswara district is administratively divided into Eleven Blocks. The following table summarizes the basic statistics of the district at block level. (Based on Census 2011) Table No.1

S. No.	Block Name	Population (Based on 2011census)	Area (sq km)	% of District Area	Households
1	Anandpuri	144642	337.4	7.4	29313
2	Bagidora	119228	308.19.	6.7	24377
3	Banswara	156695	516.75	11.3	32004
4	ChhotiSarwan	91114	383.37	8.4	18819
5	Garhi	168385	461.85	10.1	34515
6	Ghatol	287101	778.4	17.1	62132
7	Kushalgarh	187136	651.8	14.3	36603
8	Sajjangarh	181430	392.29	8.4	36210
9	Arthoona	110096	248.7	8.6	22371
10	GangatTalai	109955	214.15	4.7	21207
11	Talwara	109761	243.18	5.3	21874

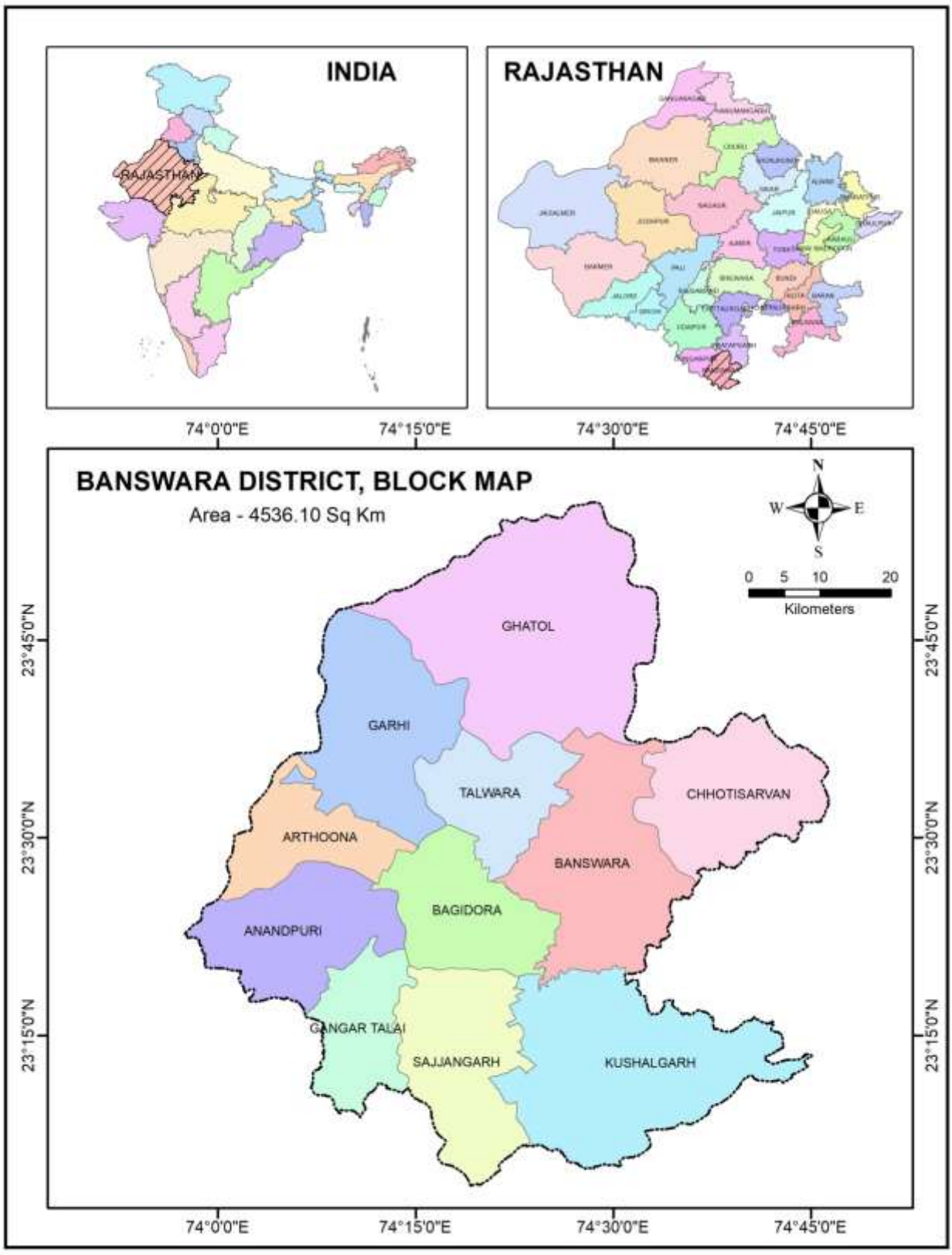


Figure 1: Index map of Banswara District

1.4 Physiographic

Topographically Banswara district represents a rugged terrain. The eastern part of district is occupied by flat-topped hills of the Deccan trap. The drainage system belongs to the Mahi river basin. Its main tributaries are Anas, Chap, Haran, and Kagdi & Nal. There are scattered ranges of Aravalis in the eastern half of the district. Minimum elevation (113m) is found in Anandpuri block whereas highest elevation is reached (581m) in Kushalgarh block as shown in Figure 2 and 3

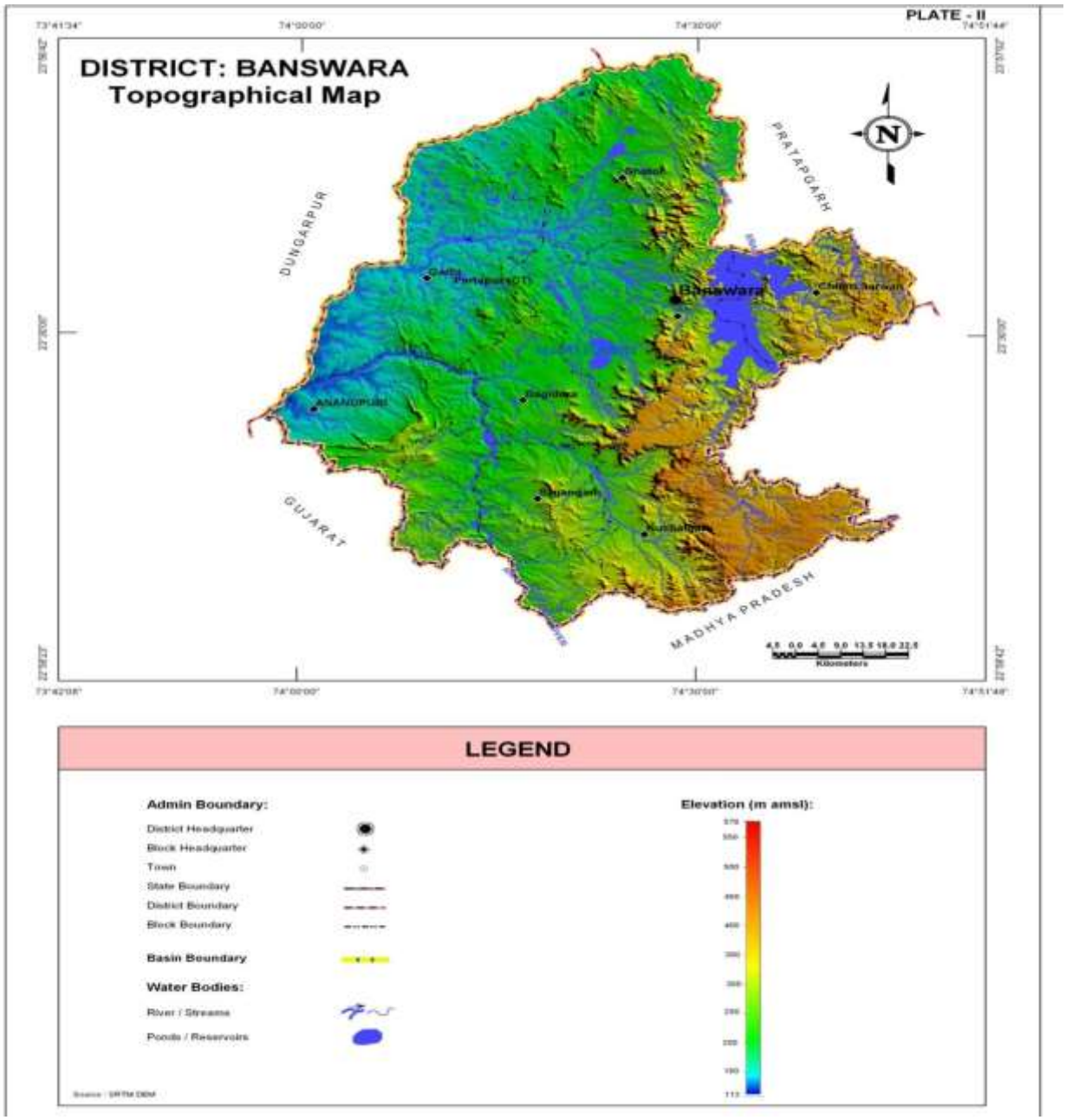


Figure 2: Topography Map

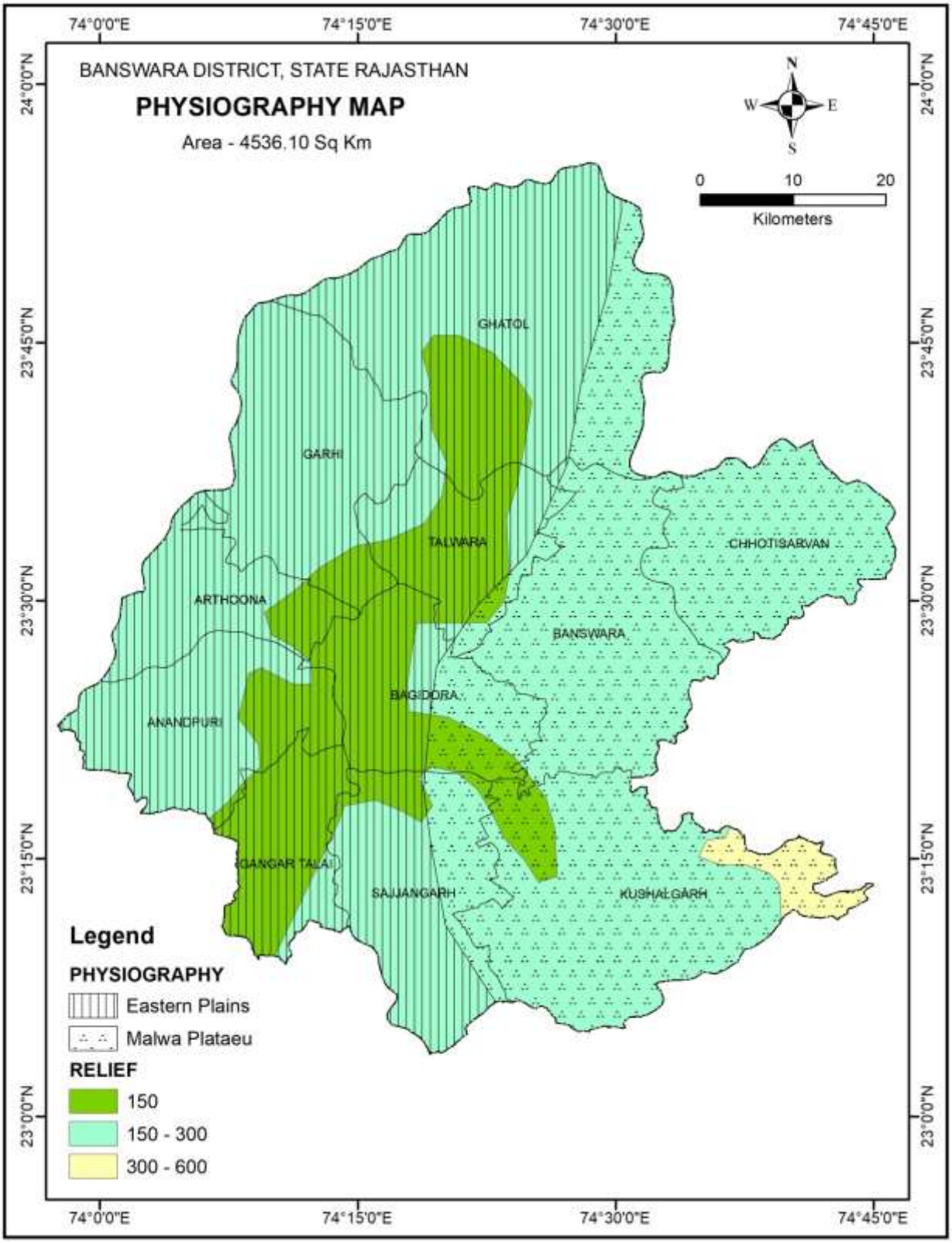


Figure 3: Physiography Map

1.5 Mahi River and Mahi Dam

Mahi River Basin is located in south-eastern part of Rajasthan extending between 23° 03' 03.45" and 24° 35' 46.46" North latitudes and longitudes 73° 18' 29.57'' to 74° 51' 11.73'' East. It lies south of Banas Basin, its eastern edge borders Chambal Basin, and its western edge borders Sabarmati Basin whereas its south edge creates the state border with Gujarat. Mahi River Basin extends over parts of Banswara, Chittorgarh, Dungarpur, Pratapgarh and Udaipur Districts. The total catchment area of the Basin is 16,630 sq km approximately.

.Mahi River originates in the Mahi Kanta hills in the Vindhyachal range, in the western part of Madhya Pradesh, and enters Rajasthan in Banswara District, near Chandangarh. It leaves the State at Salakari village. On an average the river is about 100 - 130 m wide and it flows mostly through rocky terrain. Its banks may be steep, though not very high. The main tributaries of the Mahi River are the Anas, Hiran, Eru and Chap Rivers, in Banswara District. Of these, only the Anas River is perennial. The Jakam and Gomti Rivers are the next most important downstream tributaries of the Mahi River, originating from Chittorgarh and Udaipur Districts, respectively. In Dungarpur District, the last lap of the Mahi River in Rajasthan, the main tributary is the Som River.Another tributary, the Morana seasonal river, also flows through this District.

Mahi Dam is a dam across the Mahi River. It is situated 16 kilometres from Banswara town in Banswara district Rajasthan, India. The dam was constructed between 1972 and 1983 for the purposes of hydroelectric power generation and water supply. It is the longest dam and second largest dam in Rajasthan. It is named after Jamnalal Bajaj. It is the biggest multipurpose project for tribal area of Rajasthan as shown in Fig 4

Fig: 4: Mahi Dam

1.6 Geomorphology

The Geomorphology of Banswara district is characterized by dissected plateaus, valley fills, buried, intermountain Valley, Ppiedmonts' Zone, Denudatinal Structural Hills, Linear Ridge and valley fills. The geomorphology map of Banswara is presented in figure 5 and its details are tabulated in Table No. 2

Origin	**Landform Unit**	**Descriptions**
Denudation	Buried Pediment	Pediment covers essentially with relatively thicker alluvial, colluviums or weathered materials.
	Inter mountain Valley	Depression between mountains, generally broad &linear, filled with colluviums deposits.
	Pedi plain	Coalescence and extensive occurrence of pediment.
	Pediment Zone	Formed by coalescence of several alluvial fans by stream covering large area at foothills, with gentle slope in humid to sub humid region.
Fluvial	Valley Fill	Formed by fluvial activity, usually at lower topographic locations, comprising of boulders, cobbles, pebbles, gravels, sand, silt and clay. The unit has consolidated sediment deposits.
Structural	Plateau	Formed over varying litho logy with extensive, flat, landscapes, bordered by escarpment on all sides .Essentially formed horizontally layered rocky marked by extensive flat top and steep slopes. It may be crisscrossed by lineament.
Hills	Denudation , Structural Hill, Linear Ridge	Steep sided, relict hills undergone denudation, comprising of varying litho logy with joints, fractures and lineaments. Linear to accurate hills showing definite trend-lines with varying litho logy associated with folding, faulting etc. Long narrow low- Lying ridge usually barren, having high runoff may form over varying litho logy with controlled strike.

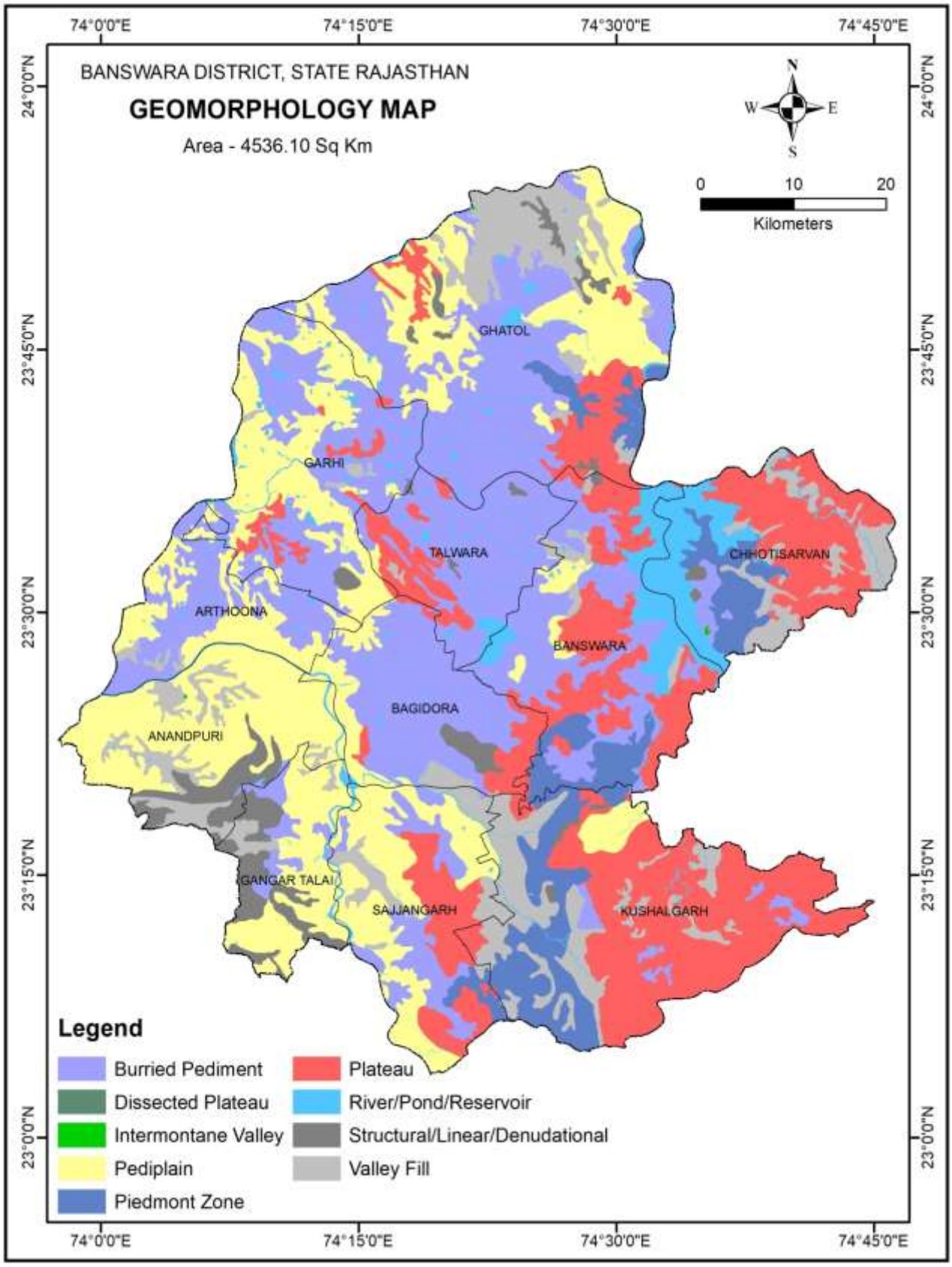


Figure 5: Geomorphology Map

1.7 Climate

The climate of the district is dry except during the period of SW monsoon. The winter season is from November to February and is followed by summer from March to June. Maximum temperature is between 45ºC to 46ºC in summer and minimum temperature is between 8ºC to 12ºC in winter. From mid of September to end of November constitute post monsoon season.Fig: 6 and Table 3. Shows the average variation in temperature of Banswara district.

(a) Temperature: The cold weather season generally starts by mid November when temperature begins to drop rapidly. January is the coldest month of the year with mean daily maximum and minimum temperature being about 29.9 ºC and 2.7 ºC respectively. In association with passing of western disturbances, the district gets affected with the severe cold wave conditions and on such occasion minimum temperature may go down to freezing point of water. The rise in minimum temperature from 2.7 oC in January to 42.5 ºC in June is observed.

The temperature starts rising rapidly from March to June. May is the hottest months of the year. When the area experiences daily mean maximum and minimum temperature of 43.5ºC and 20.3 C respectively. The variation in maximum temperature from January to June is about 29.9ºC and 42.5 ºC. From about April hot westerly dust ladden winds locally known as *'Luh'* begin to blow and the weather becomes very hot under heat wave conditions. In May and June maximum temperature may generally go above 42 ºC. Occasional dust storms and thunderstorms causes drop in temperature.

With the onset of the south-west monsoon currents into the area at the end of June, there is appreciable decline in the day temperature whereas nights temperature remains as high as in summer. The increased moisture content in the air causes the weather sultry and unpleasant. After the withdrawal of monsoon by about mid-September there is decrease in the day temperature, but night temperature drops down steeply from 35.8 to 18.7 ºC. Fig: 6 shows annual average variations of temperature in Banswara District.

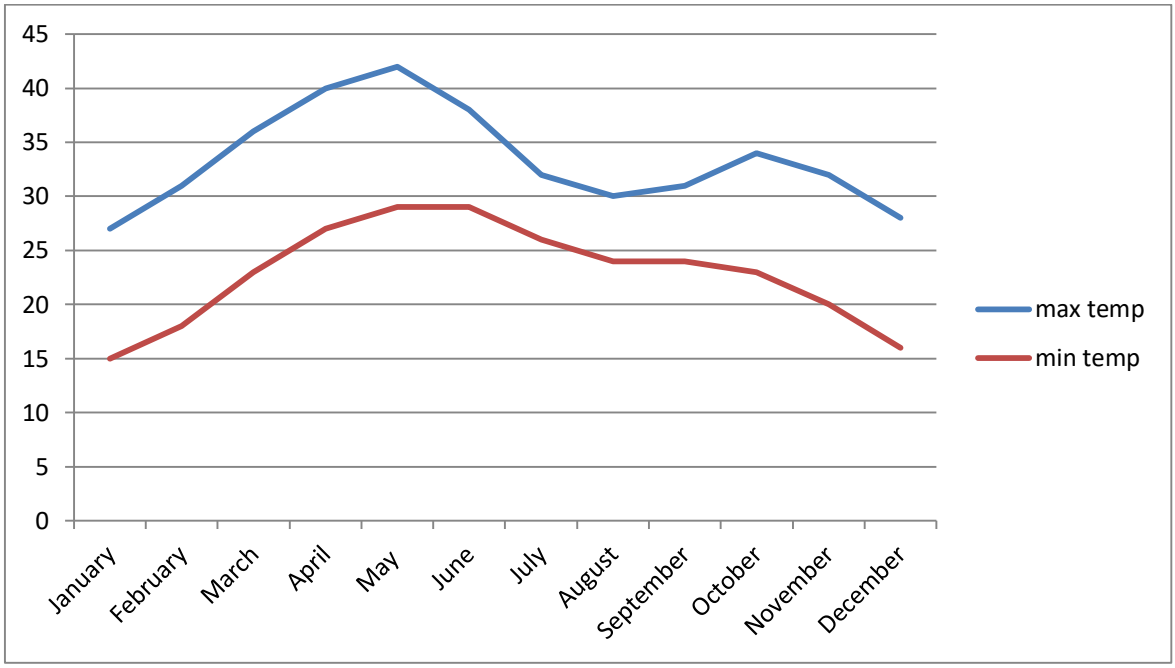


Figure 6: Average temperature Map

Table 3. Shows the average variation in temperature of Banswara district

Month	Maximum temperature	Minimum temperature
January	27	15
February	31	18
March	36	23
April	40	27
May	42	29
June	38	29
July	32	26
August	30	24
September	31	24
October	34	23
November	32	20
December	28	16

B) Variability of Rainfall

Statistical Analysis of rainfall data shows that rainfall in the district is quite erratic (figure 7). The coefficient of variation shows that it varies from 30.6% at Arthoona to 38.4% at Gangartalai the difference between the highest and lowest rainfall recorded is maximum at Banswara Block (1091.3mm) and minimum at Chhotisawan block (988.5 mm). The highest rainfall (2271 mm) was recorded at Chottisarwan Block in the year 2004 and lowest rainfall (365mm) was recorded at Talwara Block year 2007. Block-wise details of analysis are presented in **Table 4.**

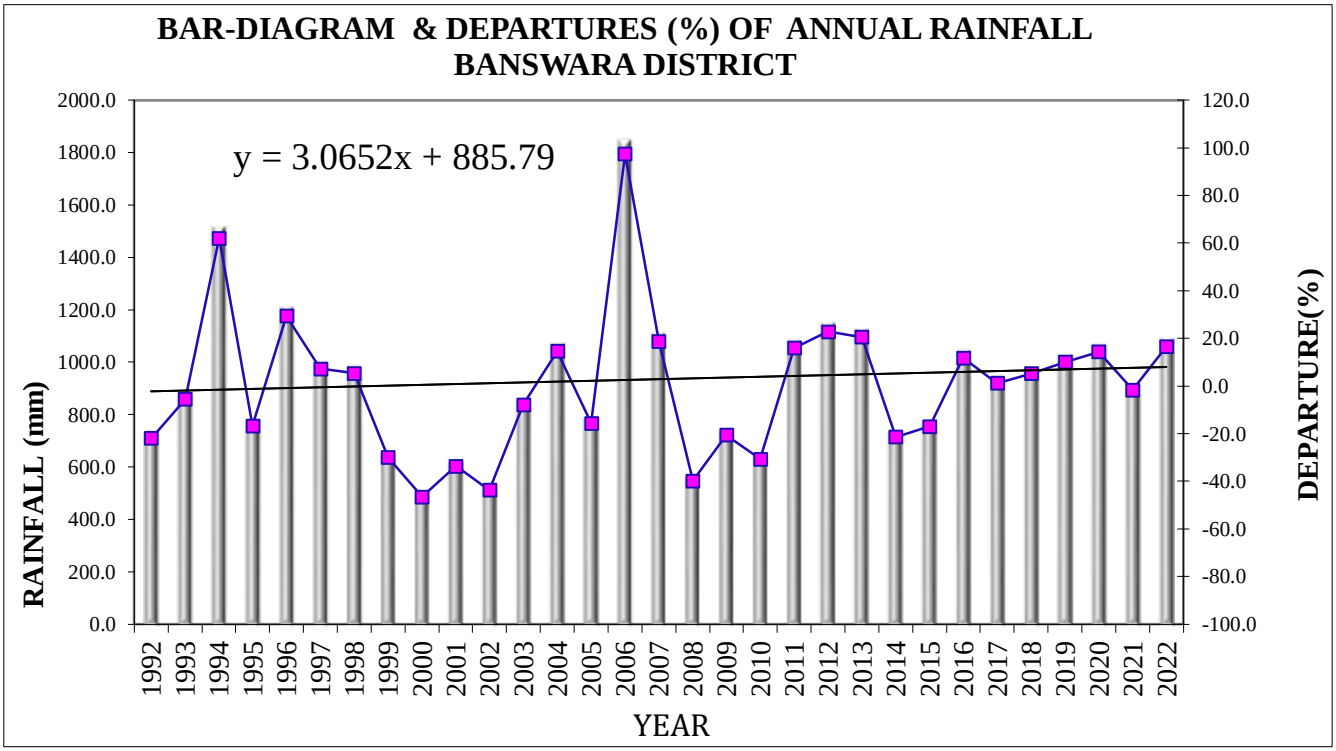


Figure 7: Bar diagram Annual Rainfall v/s Depature

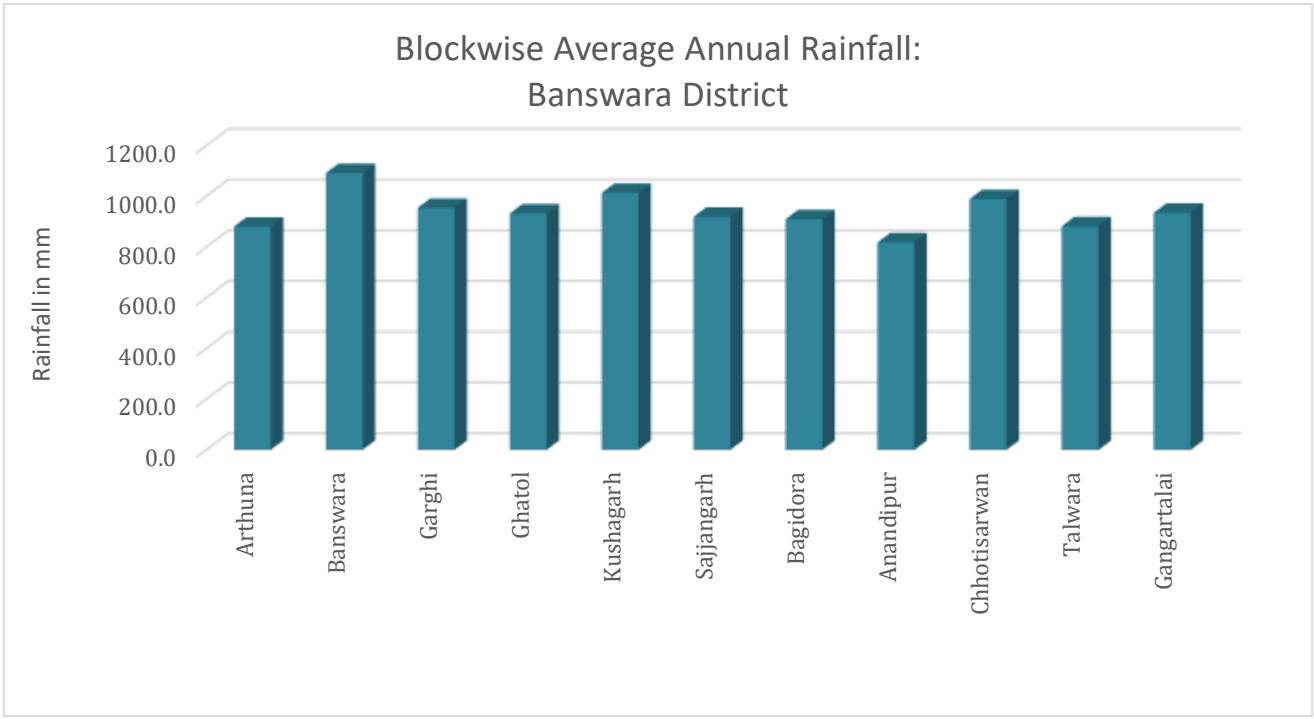


Figure: 8 blockwise average Rainfall of the District

C) Areal Distribution of Rainfall

Rainfall generally decreases from central part of the district to north-western part likewise decreases from central part of the district to south-eastern part. The average annual rainfall from 1992 to 2022 is 934.8 mm**.** The standard deviation of rainfall from 1992 to 2022 is 333.7 mm and coefficient of variation of rainfall is 35. %. It indicates that rainfall in the area is highly variable.

Particulars	Arthuna	Banswara	Garghi	Ghatol	Kushagarh	Sajjangarh	Bagidora	Anandipur	Chhotisarwan	Talwara	Gangartalai	District
Mean Annual rainfall (mm)	**879.8**	**1091.3**	**954.0**	**931.4**	**1012.6**	**918.6**	**908.7**	**818.2**	**988.5**	**881.5**	**898.6**	**934.8**
Highest annual rainfall (mm) with year (mm)	1453 (2016)	2591 (2006)	1567 (2018)	1802 (2006)	1717 (2006)	1904 (2006)	1833 (2006)	1266 (2020)	2271 (2004)	1988 (2006)	1882 (1994)	801.7 (1996)
Lowest annual rainfall (mm) with year	458 (2010)	552 (2000)	523 (2010)	450 (1999)	441 (2001)	469 (1999)	504 (2001)	393 (2000)	388 (2007)	365 (2007)	508 (2008)	185.6 (2002)
Standard deviation (mm)	269.6	415.5	338.6	288.3	358.6	354.2	297.3	234.9	422.3	346.0	344.83	333.7
Coefficient of Variation (%)	30.6	38.1	35.5	31.0	35.4	38.6	32.7	28.7	42.7	39.3	38.4	35.5

Block-wise details of analysis of Rainfall are presented in Table 4

d) Drought Analysis

Drought frequencies and years of occurrence of droughts have been computed using Agricultural Classification. It takes into account negative departure percentages of annual rainfall from mean annual rainfall. It is observed that almost whole of the area had experienced mild and normal droughts for 10 to 20% of year's .Seven Blocks of the district has suffered severe droughts viz. Talwara, Anandipur, Chottisarwan, Garhi, Sajjangarh, Gangar talai, Ghatol in Table **5.**

Table 5: Block-wise Rainfall Analysis of Drought and its Frequency

Blocks	No. of years & Frequency of Drought	Mild (0 to -25%)	Normal (-25% to -50%)	Severe (-50% to -75%)	Most severe (-75% to -100%)
Talwara	No. of Years	11	4	3	Nil
	Frequency %	36.6	13.3	10	0.0
Banswara	No. of Years	7	8	Nil	NIL
	Frequency %	23.3	26.6	0.0	0.0
Anandipur	No. of Years	10	5	1	Nil
	Frequency %	33.3	16.6	3.3	0.0
Bagidora	No. of Years	13	6	Nil	Nil
	Frequency %	43.3	20	0.0	0.0
Chhotisarwan	No. of Years	9	5	3	Nil
	Frequency %	30	16.6	10	0.0
Arthooona	No. of Years	9	8	Nil	Nil
	Frequency %	30	26.6	0.0	0.0
Kushalgarh	No. of Years	9	5	Nil	Nil
	Frequency %	30	16.6	00	0.0

Garhi	No. of Years	5	9	1	Nil
	Frequency %	16.6	30	3.3	0.0
Sajjangarh	No. of Years	11	6	1	Nil
	Frequency %	36.6	20	3.3	0.0
Gangar talai	No. of Years	14	4	1	Nil
	Frequency %	46.6	13.3	3.3	0.0
Ghatol	No. of Years	12	4	1	Nil
	Frequency %	40	13.3	3.3	0.0
Banswara District	**No. of Years**	**110**	**64**	**11**	**Nil**
	Frequency %	**366.3**	**192.9**	**36.5**	**0.0**

1.8 Soils & Land Use

The soil survey was undertaken using soil resource mapping unit to evaluate the land capabili

(a) Soil:

(a) Red soil is a type that typically develops in warm, temperate, and humid climates and comprise approximately 1 of soil 3% of Earth's soils. It contains thin organic and organic-mineral layers of highly leached soil resting on a red layer of alluvium. Red soils contain large amounts of clay andare generally derived from the weathering of ancient crystalline and metamorphic rock.

(b) Black soil is also known cotton soil and internationally it is known as 'Tropical Chernozems'. This is the third largest group in India. This soil is formed from rocks of cretaceous lava.

This soil is black in colour mainly because they are formed by weathering of lava rocks and are high iron, alumina and magnesia content. Black soils are rich in Calcium, Carbonate, Potash and hold moisture, hence it is found sticky when it is wet and cracks when it is dry. Black soil is formed from the volcano eruption, which is very much fertile and best suitable for intensive agriculture. Listed below are the properties of Black soil

- Clayey texture and are highly fertile
- Rich in calcium carbonate, magnesium, potash, and lime but poor in nitrogen and phosphorous
- Highly retentive of moisture, extremely compact and tenacious when wet
- Contractible and develops deep wide cracks on drying
- Calcareous and neutral to mild alkaline in reaction, high in carbon exchange capacity and low in organic matter

(c) Clayey loam Soil is a soil mixture that contains more clay than other types of rock or minerals. A loam is a soil mixture that is named for the type of soil that is present in the greatest amount. The particles of clay are very small, which is one of its most important characteristics. The Soil map of Banswara district is depicted in figure 9

Table 6: Areal extent of various types of soils in Banswara district

SoilType	Area (Ha.)	%ofTotal
Redsoil	13.225	4.18
BlackSoil	181.834	57.44
ClayeyLoamsoil	121.524	38.38

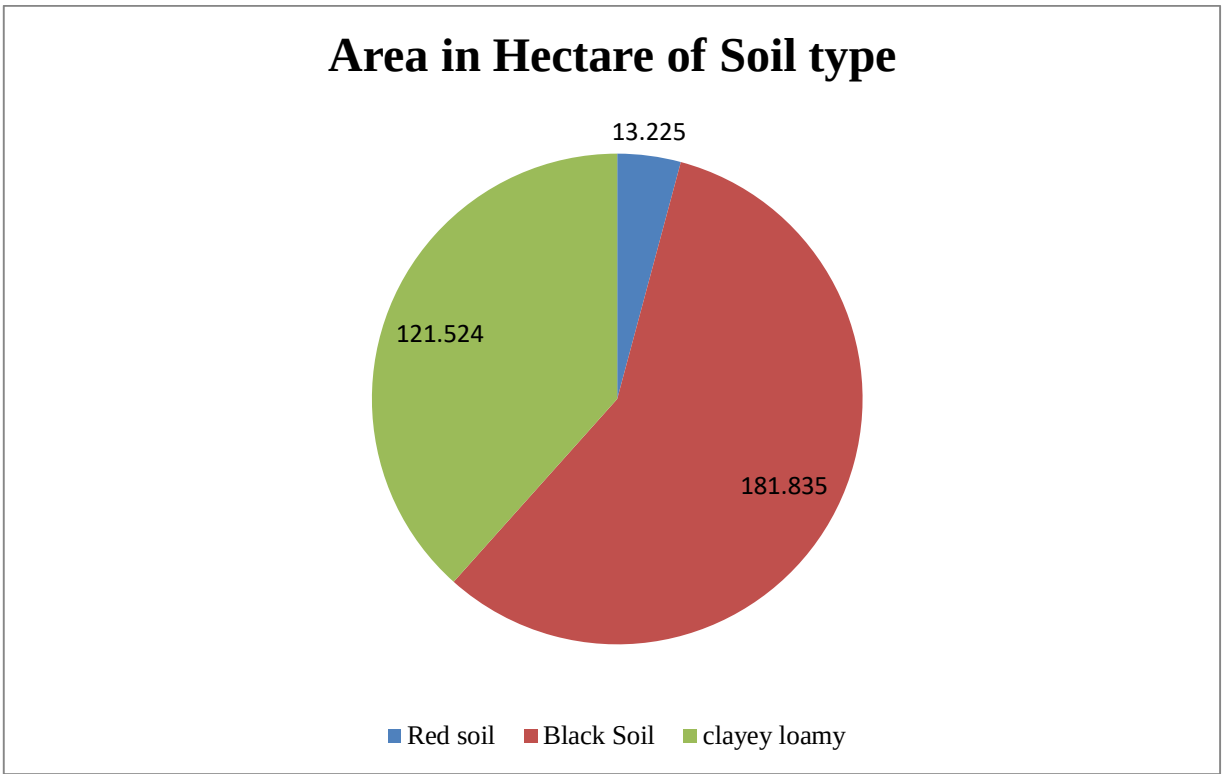


Figure 9: Area in Hectare of Soil type

(b). Land Use

The socio-cultural and economic factors have significantly influenced over land use both in rural and urban areas in the district. Landforms, slope, soils and natural resources are some of the important which control the land use pattern of the district. The land use pattern of district is based on the statistical outline of the district 2019, published by Government of Rajasthan.

Table 7: Land Use Pattern of Banswara District

S.No.	Land Use	Area in hectare	%
1	**Total geographical area**	**453566**	**100**
2	**Forest**	**91554**	**20.1**
3	**Uncultivable Land and Barren land**	**62512**	**13.7**
4	**Land not cultivated including pasture land; grazing land etc.**	**35487**	**7.8**
5	**Fallow and current fallow land**	**30487**	**6.7**
6	**Actual sown area (subtracting double)**	**233526**	**51.4**
7	**Gross sown area**	**373099**	**82.2**
8	**Area sown more than once**	**139573**	**30.7**

Source: District Outline 2019

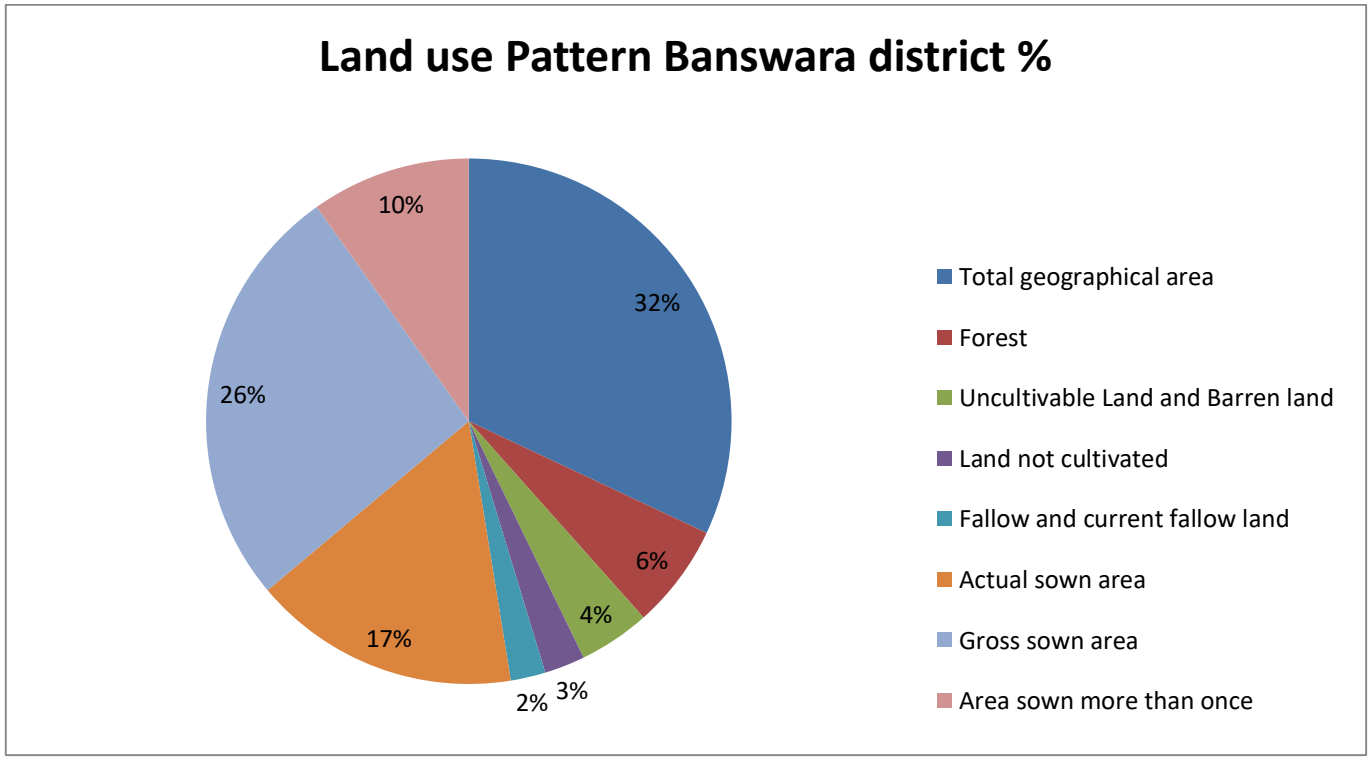


Figure 10: Land use pattern of the distict

(c) Agriculture

Agriculture activity in the district is, by and large, confined to traditional kharif cultivation depending on monsoon rainfall and Rabi cultivation is prevailing in areas where irrigation facilities are available. The major crops grown in the area are given in table no. 3.4 and season-wise crops are presented in table 3.5.

Table 8: Major crops of Banswara District

Food Grain	Jowar, Bajra,Wheat, Barley, Maize,
Cereals	Gram, other kharif cereals,Tur, other rabi cereals
Oil seeds	Rai & Mustard, soyabean
Non-food grains	Cotton, Onion, Redchilli, Tobacco, Potato, Jute.

Table 9: Season-wise crops Pattern of Banswara District

Season	Crops covered
Kharif	Jowar, Bahra, Maize, Cotton, ,Seasum, Castor seed, Sugarcane, Soyabean
Rabi	Wheat, Barley, Gram, Rape Seed Mustard, opium.

(d) Irrigation

The principal means of irrigation in the district are wells/tube wells, though some areas are irrigated by canals, tanks etc. Groundwater is the main source of irrigation and is utilized through dug wells, DCB's, and bore wells. Canals form second most important source of irrigation in the district. The details are furnished in Table 9.

(Area inHa)

Source / Area	**Canal**	**Ponds**	**Tube wells**	**Dug wells**	**Other sources**	**Total**
Net irrigated	242	2	86	708	239	1277
Gross irrigated	63663	4688	4057	16635	22702	111745

(Table-9)

Table 10: Details of area irrigated by different sources (Source: Dte. of Economics &Statistics, Ministry of Agriculture 2020)

In Hectare	**Dugwells**		**Tubwells**		**Canals**		**Ponds**		**Others**		**Total**	
Blocks	Net Irrigated	Gross Irrigated	Net Irrigated	Gross Irrigated	Net Irrigated	Gross Irrigated	Net Irrigated	Gross Irrigated	Net Irrigate	Gross Irrigated	Net Irrigated	Gross Irrigated
Banswara	108	2091	26	1029	32	10201	2	522	24	322	192	14165
Ghatol	155	2551	32	1005	41	9112	0	452	42	451	270	13571
Garhi	143	2432	16	935	35	7565	0	502	32	322	226	11756
Bagidora	65	1828	0	115	25	5565	0	521	16	2648	106	10671
Khushalgarh	25	1022	0	0	15	5289	0	654	15	2509	55	9474
ChhotiSarwan	15	785	0	102	10	3172	0	219	17	6002	42	10280
Gangar talai	15	1165	0	0	10	4196	0	309	12	2201	37	7871
Arthoona	65	1051	0	335	12	3241	0	218	23	2351	100	7196
Anandpuri	30	1020	0	15	13	4369	0	205	15	1546	58	7155
Sajjangarh	42	1624	0	18	22	5244	0	681	22	2246	86	9813
Talwara	45	1066	12	503	27	4709	0	405	21	2104	105	8787
Total	**708**	**16635**	**86**	**3052**	**242**	**62663**	**2**	**4688**	**239**	**22702**	**1277**	**110739**

1.9 Data Adequacy and Data Gap Analysis

The available data of the Exploratory wells drilled by Central Ground Water Board Western Region, Jaipur, Geophysical Survey carried out in the area, Ground water monitoring stations and ground water quality stations monitored by Central Ground Water Board were compiled and analyzed for adequacy of the same for the aquifer mapping studies. In addition to these the data on ground water monitoring stations and ground water quality stations of the State Govt. (GWD) was also utilized for data adequacy and data gap analysis. The data adequacy and data gap analysis were carried out for each of the quadrant of falling in the study area mainly in respect of following primary and essential data requirements:

- Exploratory Wells
- Geophysical Surveys
- Ground Water Monitoring
- Ground Water Quality

After taking into consideration, the available data of Ground Water Exploration, Geophysical survey, Ground Water Monitoring and Ground Water Quality, the data adequacy is compiled and the summarized details of required, existing and data gap of exploratory wells, Ground Water rmonitoring and Ground water quality stations is given below in **(Table-11)**

.

S.NO	Study Aspect	Data Requirement	Data Availability	Data Gap
1.	Ground Water Monitoring Regime	Representative Monitoring Wells distributed all over the Study Area.	CGWB NHS Wells -40 GWD NHS Wells - 293 NAQUIM Key Wells - 59	Adequate data available.
2.	Soil	Soil Map and Soil Infiltration Rate.	Not Available.	Latest GIS based Soil Map and Soil Infiltration rate across the area.
3.	Land Use	Latest land use Pattern in GIS Platform	Not Available.	Latest data in GIS platform required.

4.	Geomorphology	Digitized Geomorphological Map	Available.	
5.	Geophysics			
6	Exploration	Exploratory Wells along with Aquifer Parameters	Exploratory Wells along with Aquifer Parameters are scatter available.	Exploration of deeper aquifers is required in all the blocks of the district.
7.	Recharge Parameters	Recharge parameters of different soil and aquifer types based on	Recharge parameters are given in Ground Water resource estimation.	

(a) Ground Water Monitoring. Central Ground Water Board periodically moniters National Hydrograph Stations in Banswara District, Four times in a year.i.e. May (Pre-monsoon), August, November (Post-monsoon), January. The Location Map of total of 149 hydrograph stations (40CGWB, 293 GWD, and 59 Key well) is given below **Fig: 1.6 and 1.7**

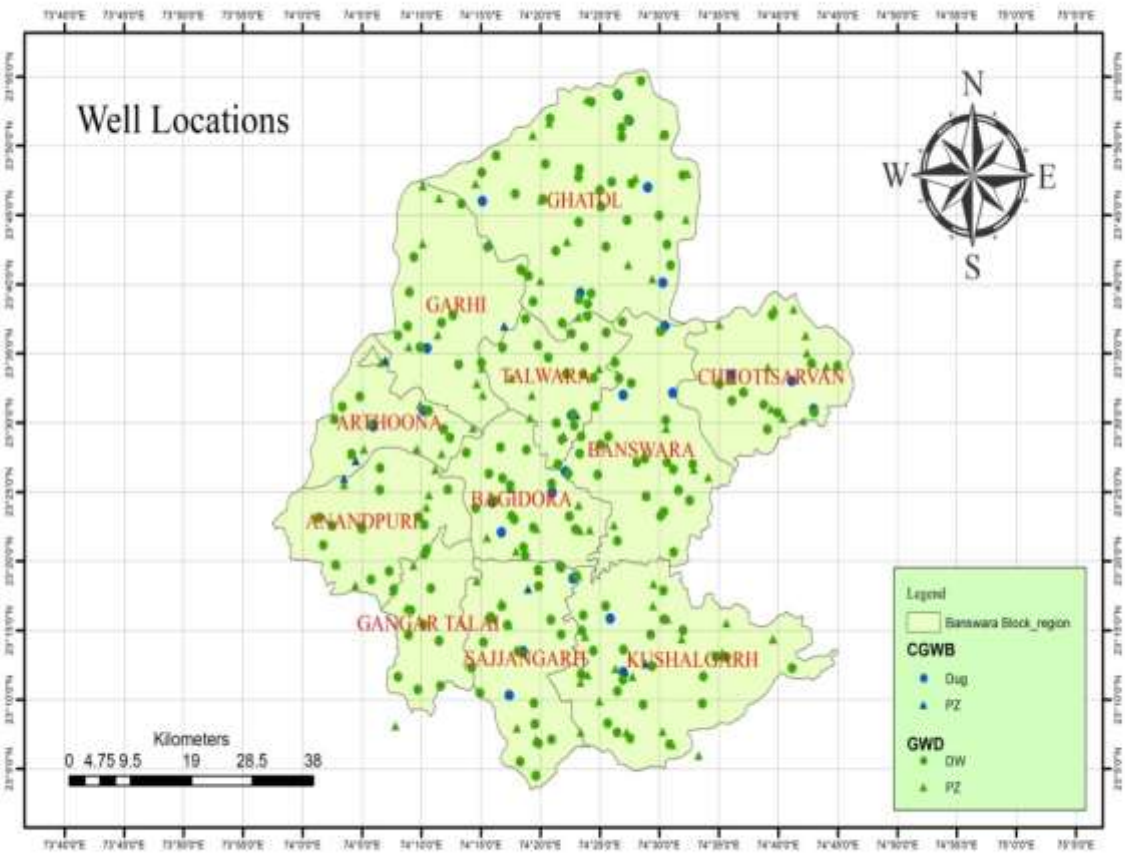


Fig 11 Existing well of CGWB and GWD

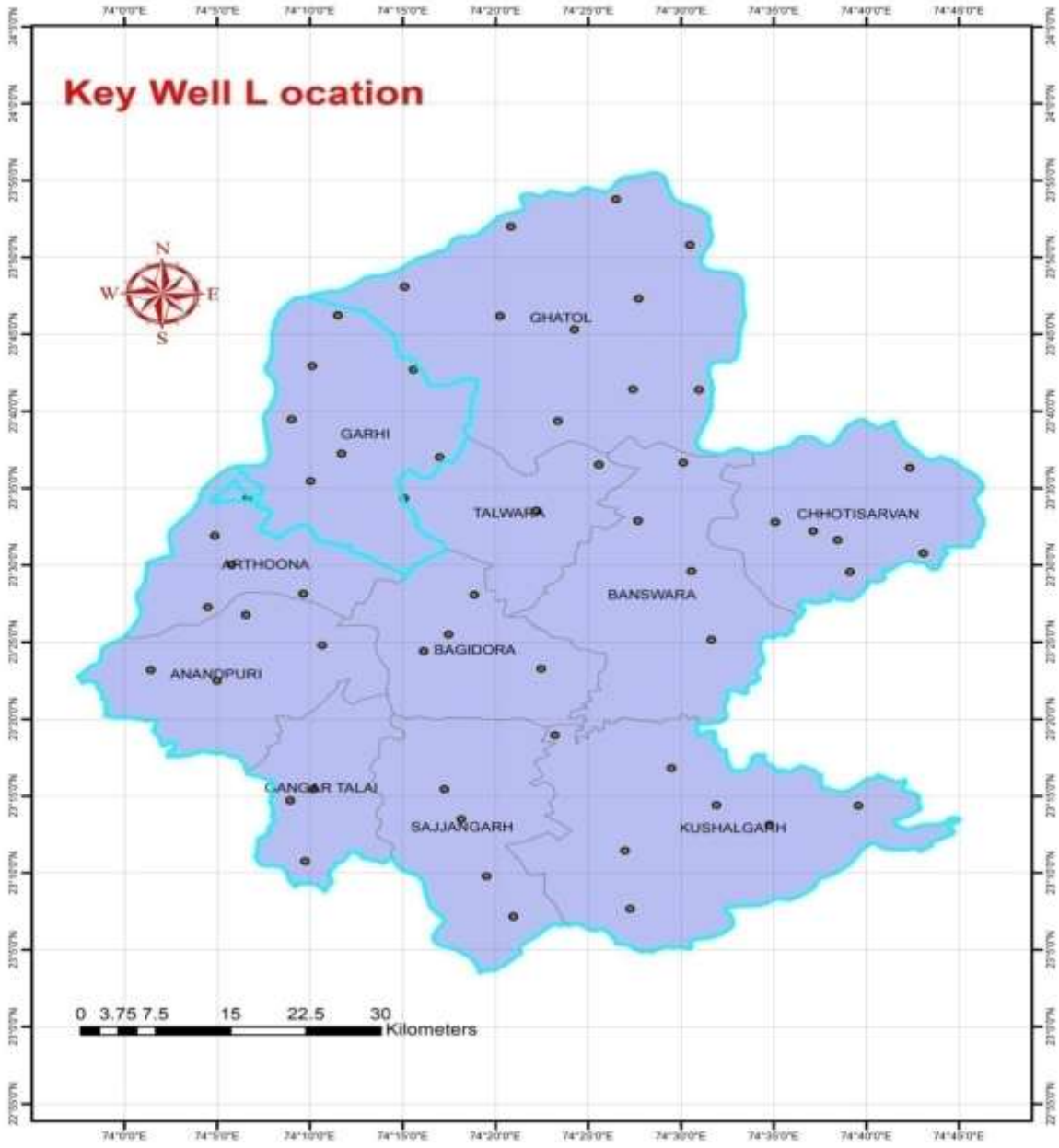


Fig 12 Key Well Locations

2.1 EXPLORATORY AND GROUND WATER MONITORING WELLS

The sub-surface geology of the area is revealed by the boreholes drilled in the district by CGWB and GWD, Rajasthan state. The salient data of boreholes considered for NAQUIM study are given in Table 12.Their locations have been depicted in figure .13

Exploratory wells

Banswara district has well distributed network of large number of exploratory wells In the district owned by and CGWB respectively. The exploratory wells have formed the basis for delineation of subsurface aquifer distribution scenario in three dimensions. Block wise count of wells is summarized in Table.12

	Exploratory wells		
Block Name	CGWB	GWD	Total
Banswara	3	0	3
Ghatol	3	2	5
Garhi	1	2	3
Bagidora	2	2	4
Kushalgarh	0	4	4
ChhotiSarwan	2	2	4
GangarTalai	2	0	2
Arthoona	0	4	4
Anandpuri	0	4	4
Sajjangarh	0	4	4
Talwara	1	3	4
Total	14	27	41

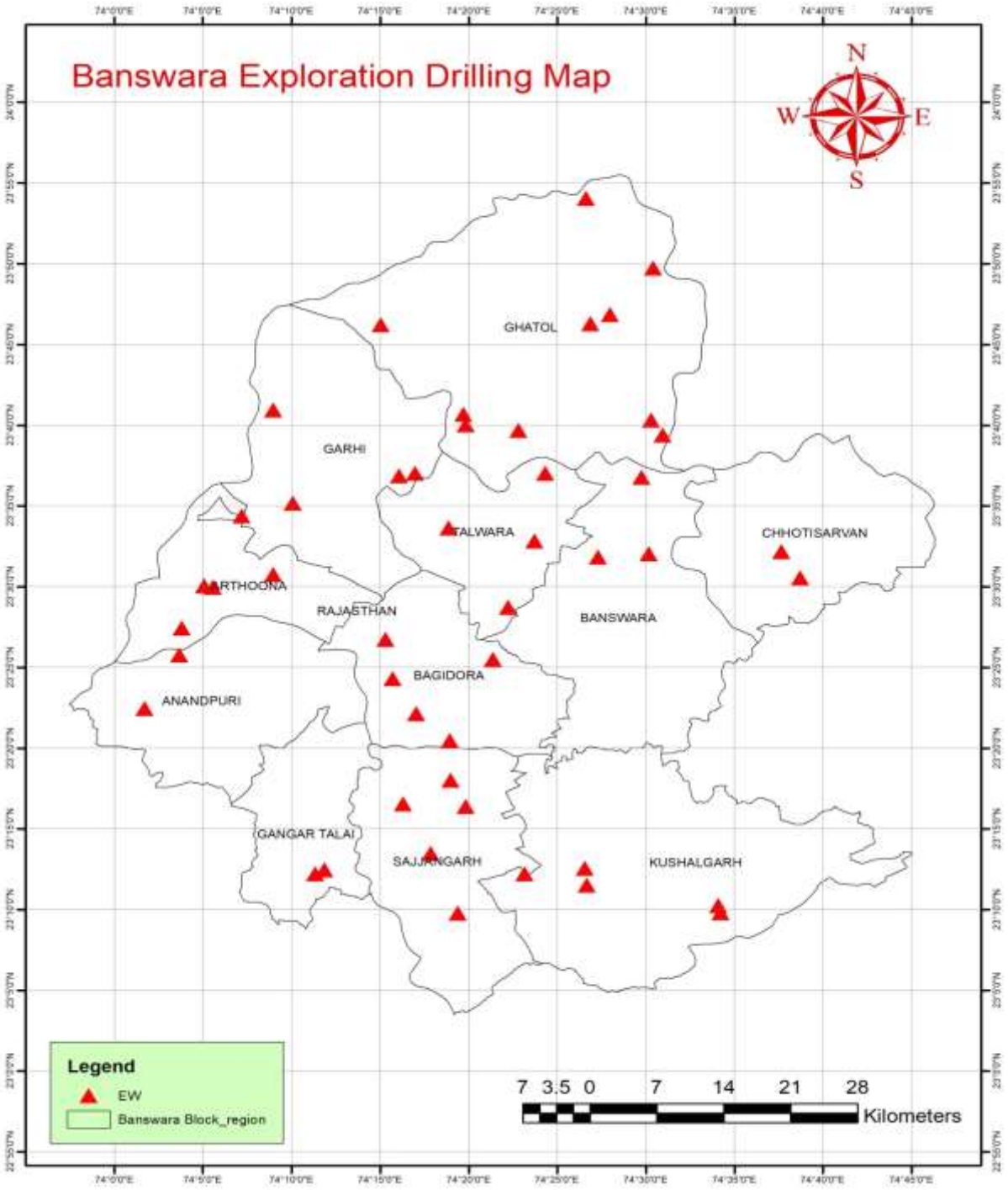


Fig: 13.Exploration location Map

1.10 Hydrogeological Framework

(a) Geology

District geology includes Bhilwara Super Group, Aravalli meta-sediments, post-Aravalli intrusive and Younger flows. The Aravalli Super Group of formation consists in parts of Ghatol, Garhi, Banswara, Aandpuri and Sajjangarh blocks.The meta-sediments are comprised of quartzite,mica schist,conglomerates,quartz-chlorite schist,phyllites,dolomitic marble and gneisses shown in fig1.8.The post-Aravalli intrusive is granites, pegmatite, quartz veins and Amphibollite. The eastern and southeastern part covering Kushalgarh, part of Banswara and Chhoti Sarwan block, is occupied by Deccan trap basalt. The Stratigrahical succession of Banswara district is given in table 13.

BHILWARA SUPERGROUP

The stratigraphy of the Bhilwara Supergroup, as suggested by Gupta et al. (1997) Meta sediments included in the Bhilwara Supergroup consist of mica schist, quartzite, dolomite, marble, chert, fuchsite, quartzite and greywacke. Cross bedding, ripple marks and flute casts are occasionally present in the sediments. Composite gneiss/bimodal gneiss of igneous parentage, migmatite and hornblende and mica bearing schist represent a greater part of the BhilwaraSupergroup. Charnockite, granite, basic granulite and norite are also present.

ARAVALLI SUPERGROUP

A thick pile, chiefly comprising metamorphosed and complexly folded Palaeoproterozoic clastogenic sediments with minor chemogenic and organogenic assemblages and interlayered basic volcanics, overlying the Manglwar Complex and the Sandmata Complex with an erosional unconformity, has been assigned to the AravalliSupergroup. This assemblage of stratified meta sediments and interlayered extrusives, together with synorogenic and late to post-orogenic acidic, basic and ultrabasic intrusives, covers a time span from 2500 Ma to 2000 Ma.

DECCAN TRAP

The Deccan Traps (Cretaceous to Eocene) covering an area of about 10,435 sq km in southeast Rajasthan have developed in two separate geographic sectors, namely, the Kota-Jhalawar sector in the southeast and the Chittorgarh-Banswara sector in the south- southeast.

Chittorgarh-Banswara Sector: The area is characterized by the N-S trending Deccan Traps plateau with prominent scarp on the west. The Deccan Traps overlie the Lower Vindhyan rocks in the north and northeast, but towards the west and south they rest over the rocks of the

Mangalwar Complex and the Aravelli Supergroup. In all, sixteen flows varying in thickness from 11 to 55 m have been identified between 226 and 606 m RL. Out of these, four flows have Pahoehoe characters and the rest Aa-type characters. Fairly widespread unfossiliferous clay bed, as Infra trappean, is present around Kushalgarh (23°12': 74°27') and Barodia whereas fossilliferousPhysa (Bullinus) prinsepii Infra-trappean limestone bed is reported from Ram-ka-Munna in Banswara district.

The Stratigrahical succession of Banswara district is given in Table 13.

Super Group	**Group**	**Formation**
	Recent	Younger Alluvium and surface deposits (Clay and kankar with sand,gravel and rockdebris),Granite and kankar
X X X X X X XUnconformityX X X X X X X		
	DeccanTraps	Basalt and inter trappeanan beds
Post Aravalli Intrusives		Granite,Pegmatite,Quartzveins,Amphibolite
Aravali		Composite gneiss phyllite, schist etc. with quartzite intercalations, limestone basalt,quartzite and local conglomerate.Intrusive quartz veins,pegmatite, granite aplite,talc-serpentine, chlorite schist amphibolite etc.
X X X X X X XUnconformityX X X X X X X		
Bhilwara	BGC	Gneisses,granite and Composite gneisses

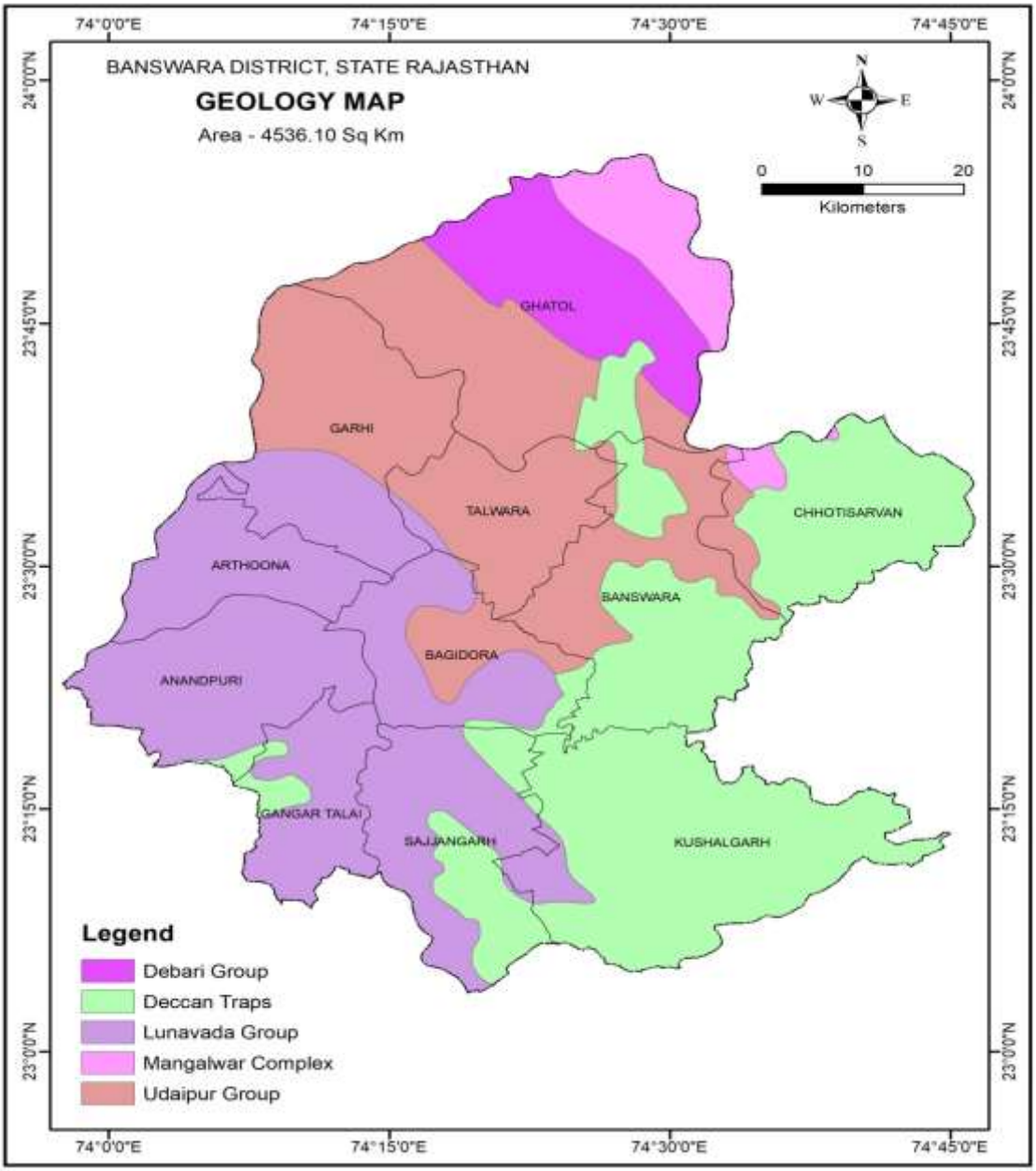


Fig: 14 Geology Map

2. Aquifer System

2.1 Aquifer potential zones their area and their description

In Banswara district, aquifers are formed primarily in weathered, fractured and jointed hardrock formations of Phyllite, Basalt, BGC and Limestone in that order of spatial coverage. Phyllites aquifers occupy about 44% of district area, Basalt about 26% and BGC and limestone together constitute the rest of the aquifers excluding the hill part that has been excluded from aquifer delineation.

Table14: Aquifer potential zones their area and their description

Aquifer in Potential Zone	Area (sq km)	% age of district	Description of the unit/Occurrence
Limestone	144.5	3.2	In general, it is fine to medium grained,grey,red yellowish, Pink or buff in color.
Phyllite	1,969.1	43.9	These include met sediments and represented by Carbonaceous phyllite.
Basalt	1,183.4	26.3	Dark grey,olive green and green color, compact, vesicular, Amygdaloidal and weathered.
BGC	776.5	17.3	Grey to dark colored, medium to coarse grained rocks.
Non Potential Zone(H)	419.5	9.3	Grey to dark colored, medium to coarse grained rocks.
Total	**4,493.0**	**100.0**	

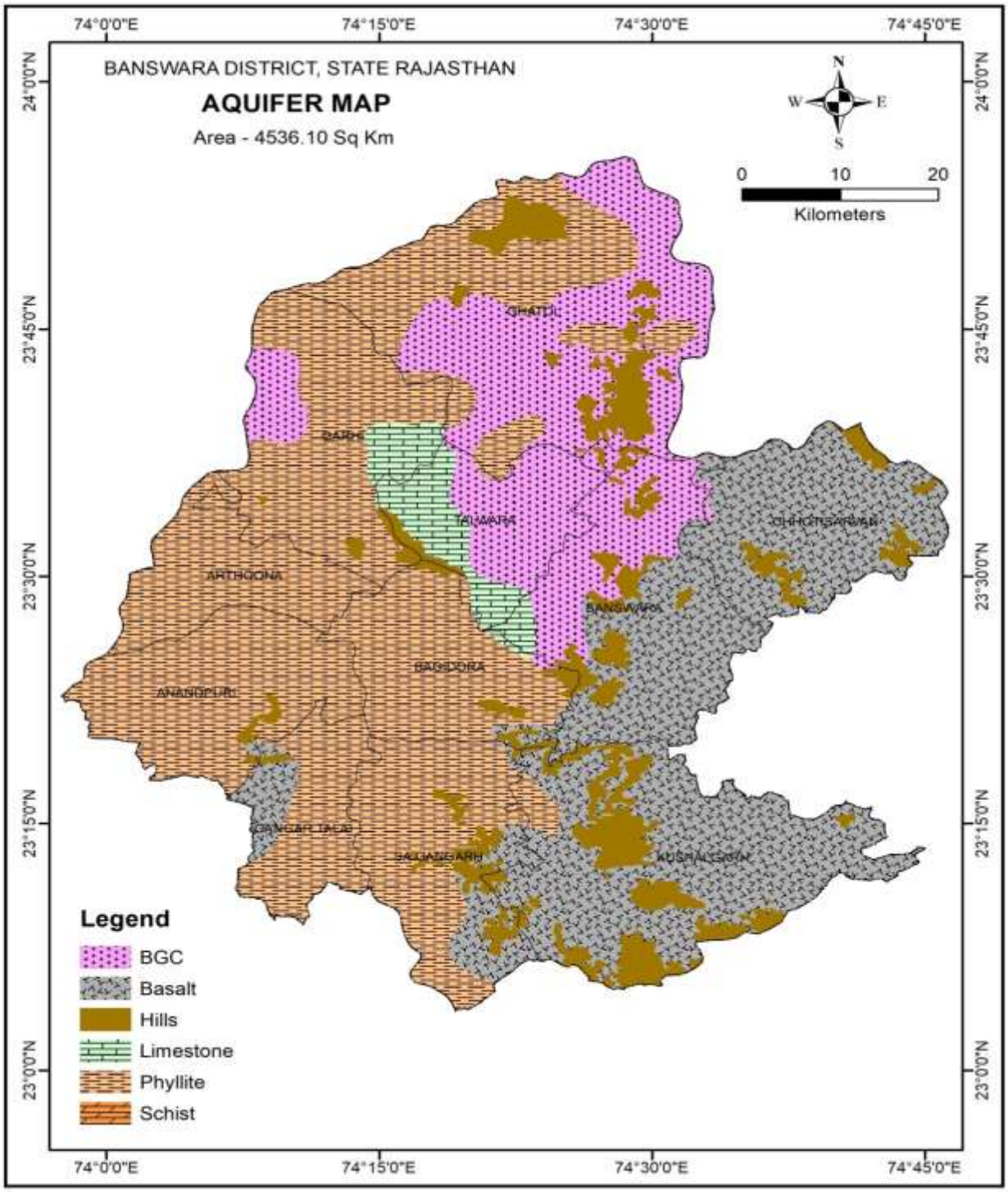


Fig: 15 Aquifer Map

2.2 Water Level Behaviors

(a) Pre Monsoon 2022

Depth to Water Level The depth to water level varies widely depending upon topography, drainage, bedrock geology etc. During Pre-monsoon (May, 2022), depth to water level varied from less than 2m bgl to more than 40m bgl (Fig:16). In general, DTW varies from 5 to10m bgl in greater part of the district. Deep water levels (>10mbgl) have also been observed in parts of Sajjangarh, Anandpuri, Arthoona, Chhotisarwan Block. **Table 15 shows range of Water level**.

Sl.No.	Name of Block	Depth to Ground Water Level Range (mbgl) Pre-monsoon 2022	
		From	To
1	**Ghatol**	1	14.15
2	**Anandpuri**	4.3	28.15
3	**Bagidora**	3.3	14.3
4	**Banswara**	2.9	18.7
5	**Garhi**	1.3	20.03
6	**Gangar talai**	2.1	33.1
7	**Talwara**	1.65	11.9
8	**Sajjangarh**	3.4	35.4
9	**Kushalgarh**	2.9	28.9
10	**Arthoona**	3.7	12.3
11	**Chhoti sarvan**	6.7	33.9

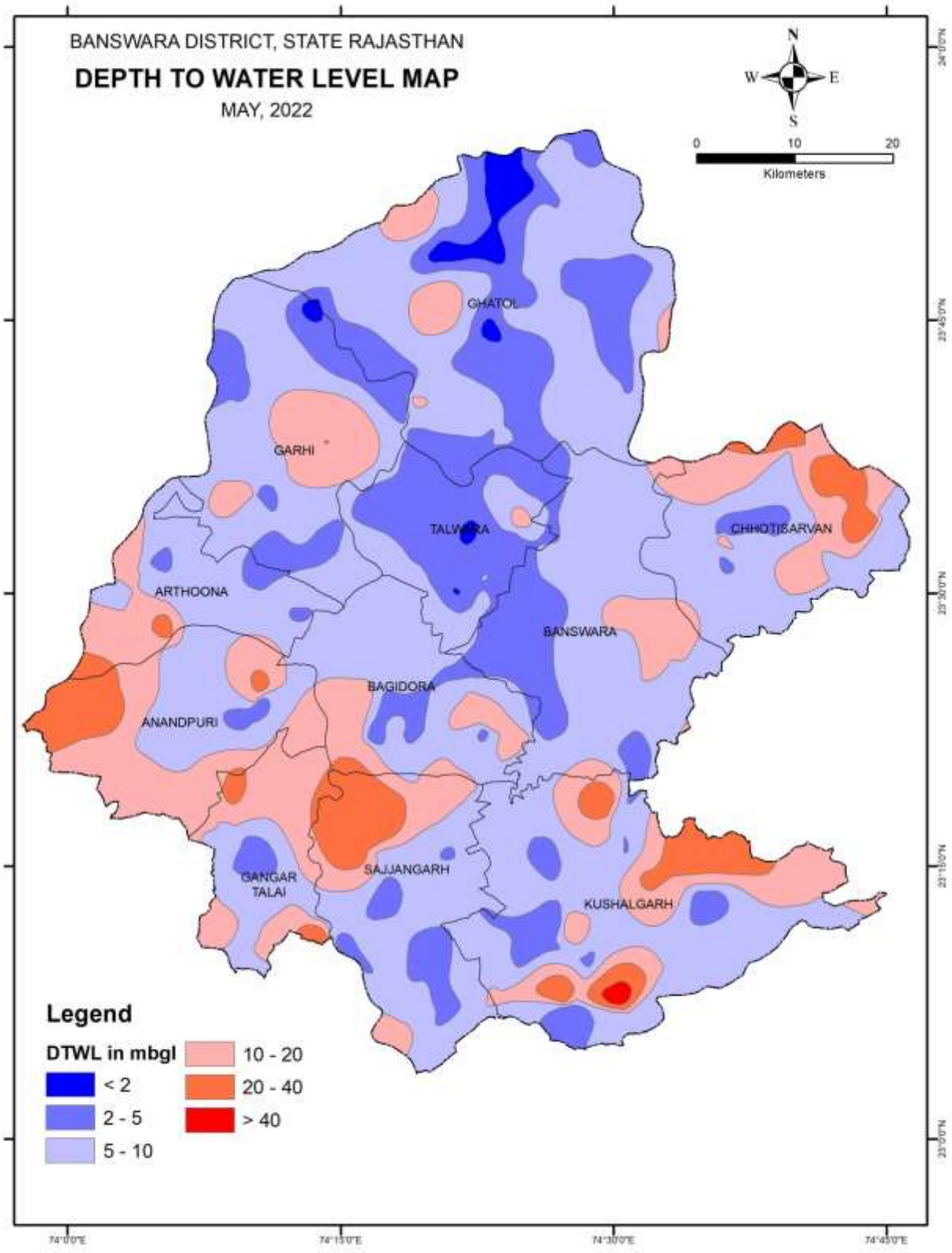


Figure 16: Depth to Water Level – Pre-monsoon (May 2022)

(b) Post Monsoon 2022

Depth to Water Level The depth to water level varies widely depending upon topography, drainage, bedrock geology etc. During Post-monsoon (November, 2022), depth to water level varied from less than 2 m bgl to more than 10 m bgl (Fig.17). In general, DTW varies from 2 to15 m bgl in greater part of the district. Deep water levels (>10mbgl) have also been observed in parts of , Anandpuri, Bagidora, Chhotisarwan, Banswara Block. **Table 16 shows range of Water level**.

Sl.No.	Name of Block	Depth to Ground Water Level Range (mbgl) Post-monsoon 2022	
		From	To
1	**Ghatol**	1.05	7.6
2	**Anandpuri**	1.25	16.
3	**Bagidora**	1.5	15.9
4	**Banswara**	1.5	14.9
5	**Garhi**	1.2	10
6	**Gangar talai**	1.2	6.9
7	**Talwara**	1.15	6.9
8	**Sajjangarh**	0.9	9
9	**Kushalgarh**	1.7	10.5
10	**Arthoona**	1.3	5.8
11	**Chhoti sarvan**	1.6	14.2

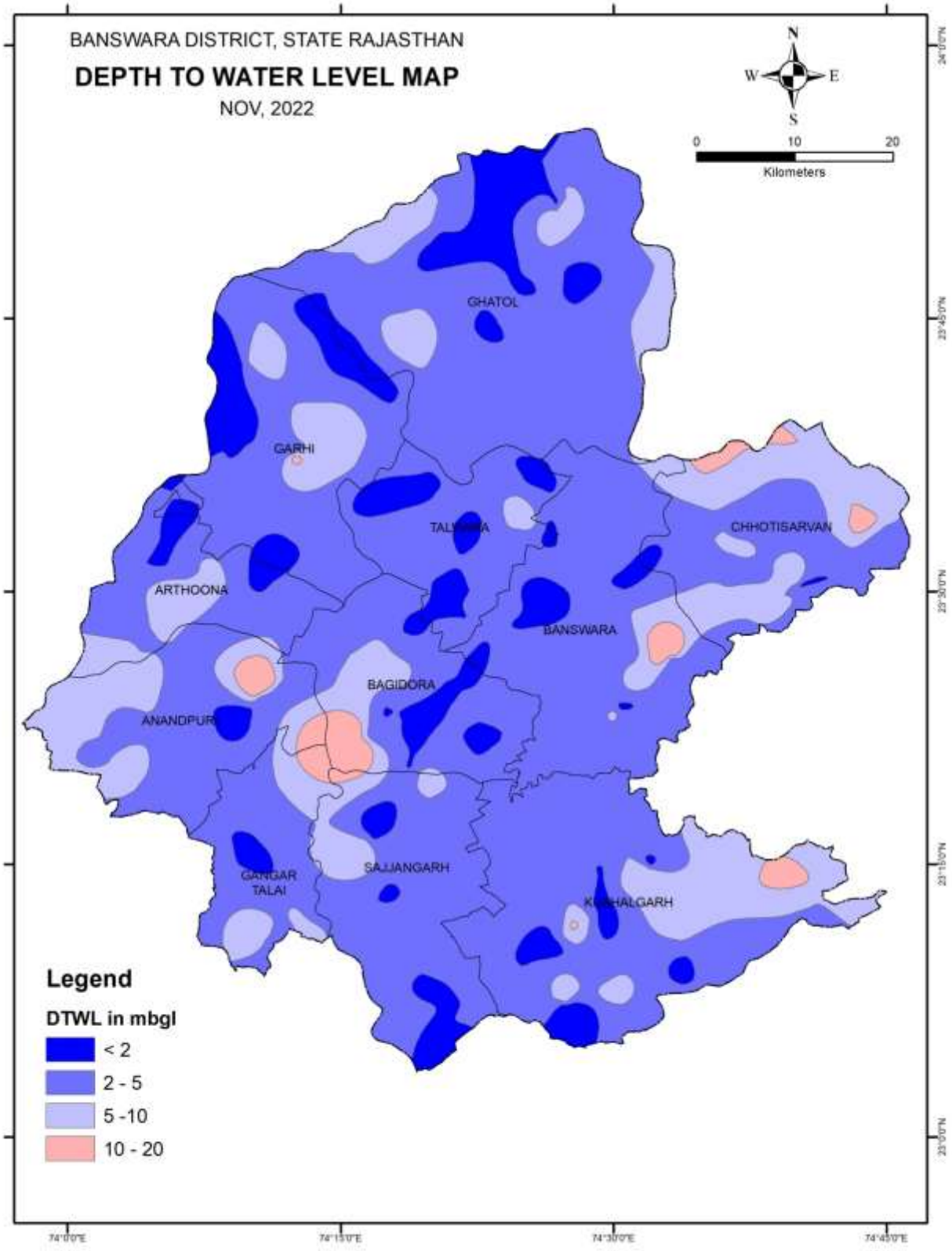


Figure 17: Depth to Water Level – Post-monsoon (November 2022)

(c) Decadal Fluctuation of Ground Water (Pre monsoon) May 2022 - In general, Decadal Fluctuation of Ground water varies from 2 to 4 m bgl rising in greater part of the district. There is falling of water level have also been observed in parts of Ghatol, Bagidora, Chhotisarwan, Arthoona and Sajjangarh Block.

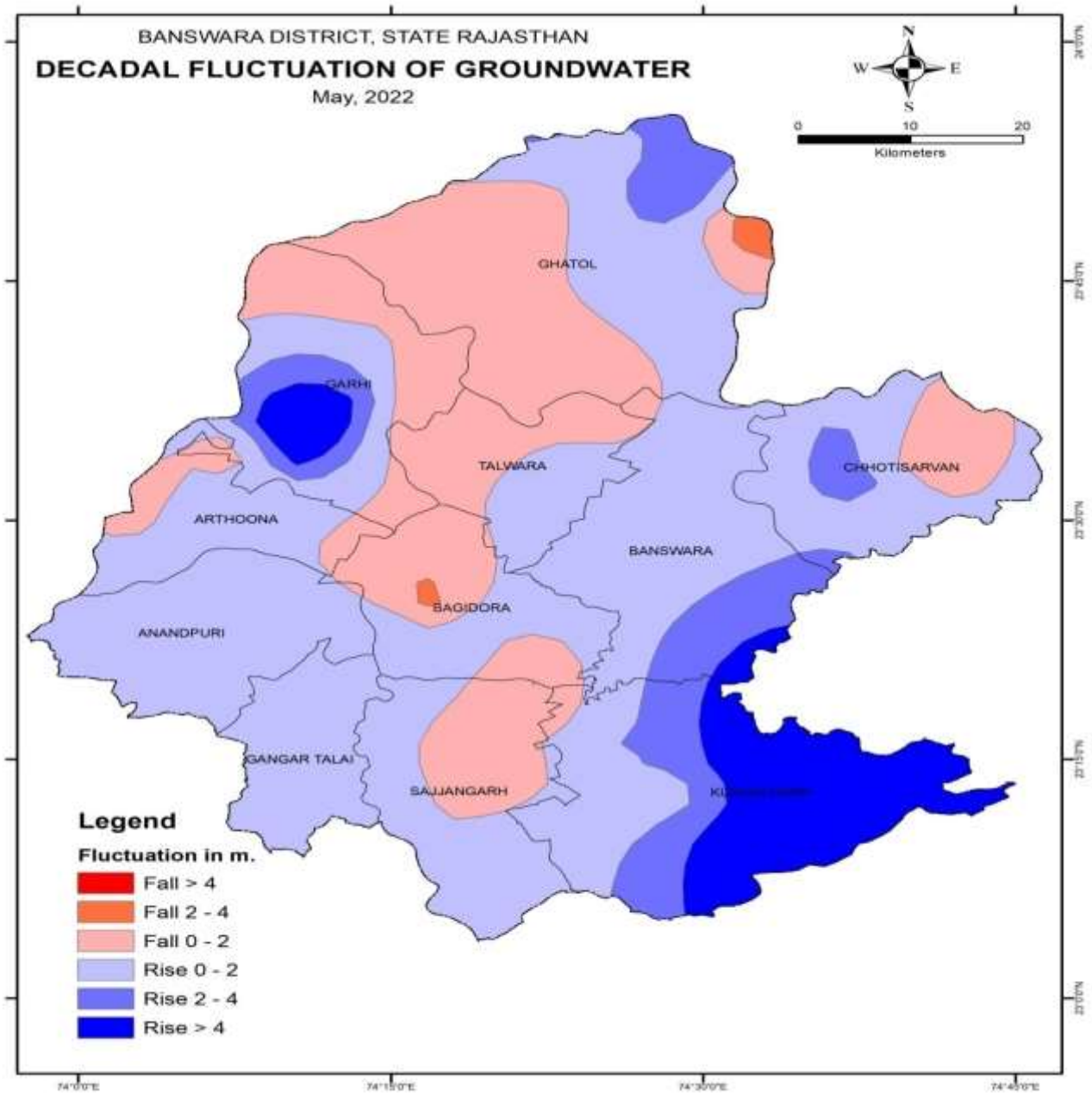


Fig 18: Decadal Fluctuation of Ground Water (Pre monsoon) May 2022

Figure 19: Field Photograph Showing Measuring Water level

2.3Aquifer Maps and Aquifer Characteristics

(a) Aquifer Disposition

The data generated during ground water exploration by constructing exploratory wells, observation wells, slim holes and piezometers, was utilized to decipher the aquifer disposition in the area. This particularly includes the information on geometry of aquifers and hydrogeological information of these aquifer zones (figure and).There is mainly one formation exist here i.e. Hard rock formation like Basalt, Granite,Gneiss, Schist, Phyllite. Single aquifer system exists in the area where ground water occurs in two zones one is weathered near the surface and the second one is deep in the hard and compact formation where secondary porosity has developed.

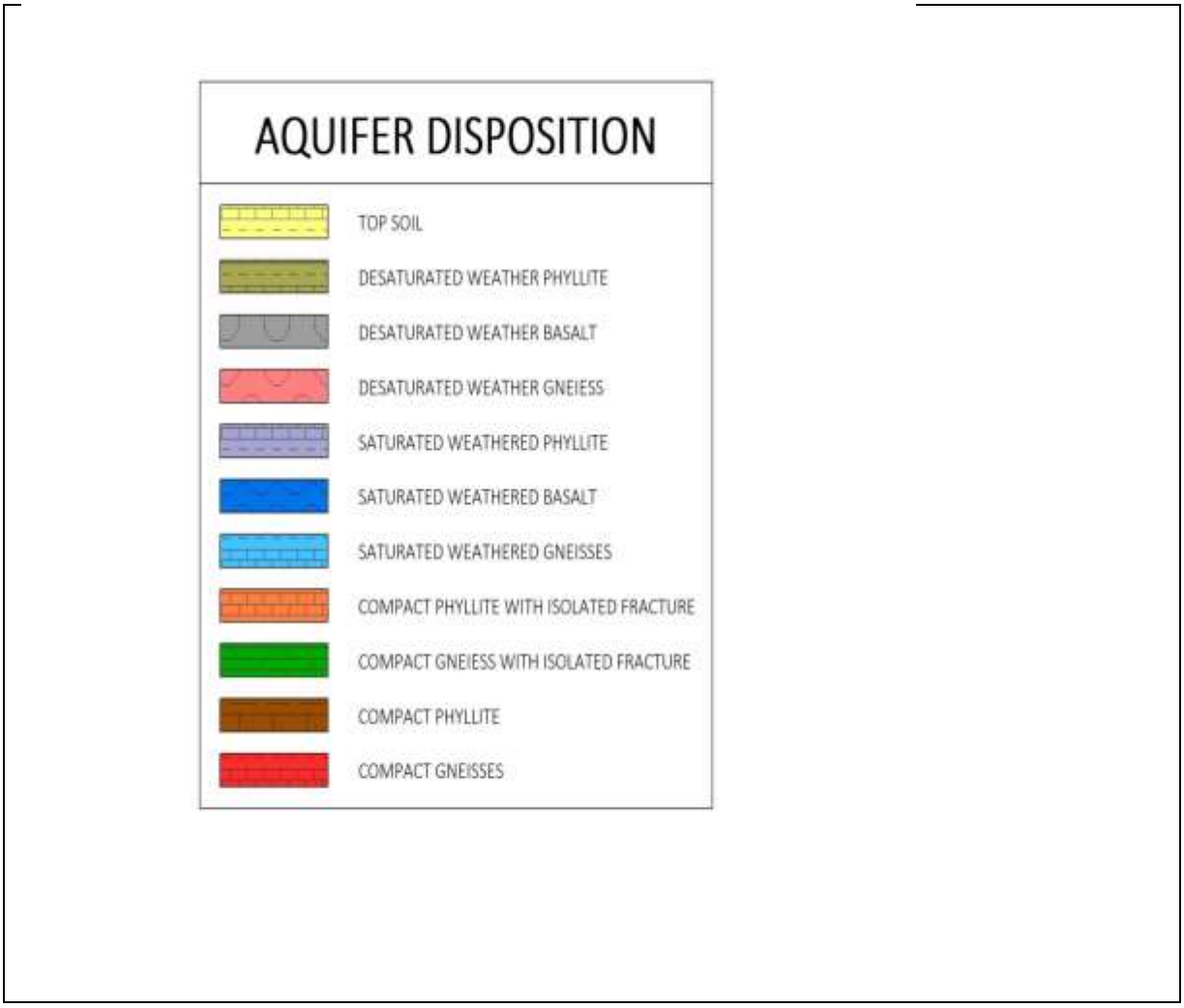


Figure: 20 Index of Aquifer disposition

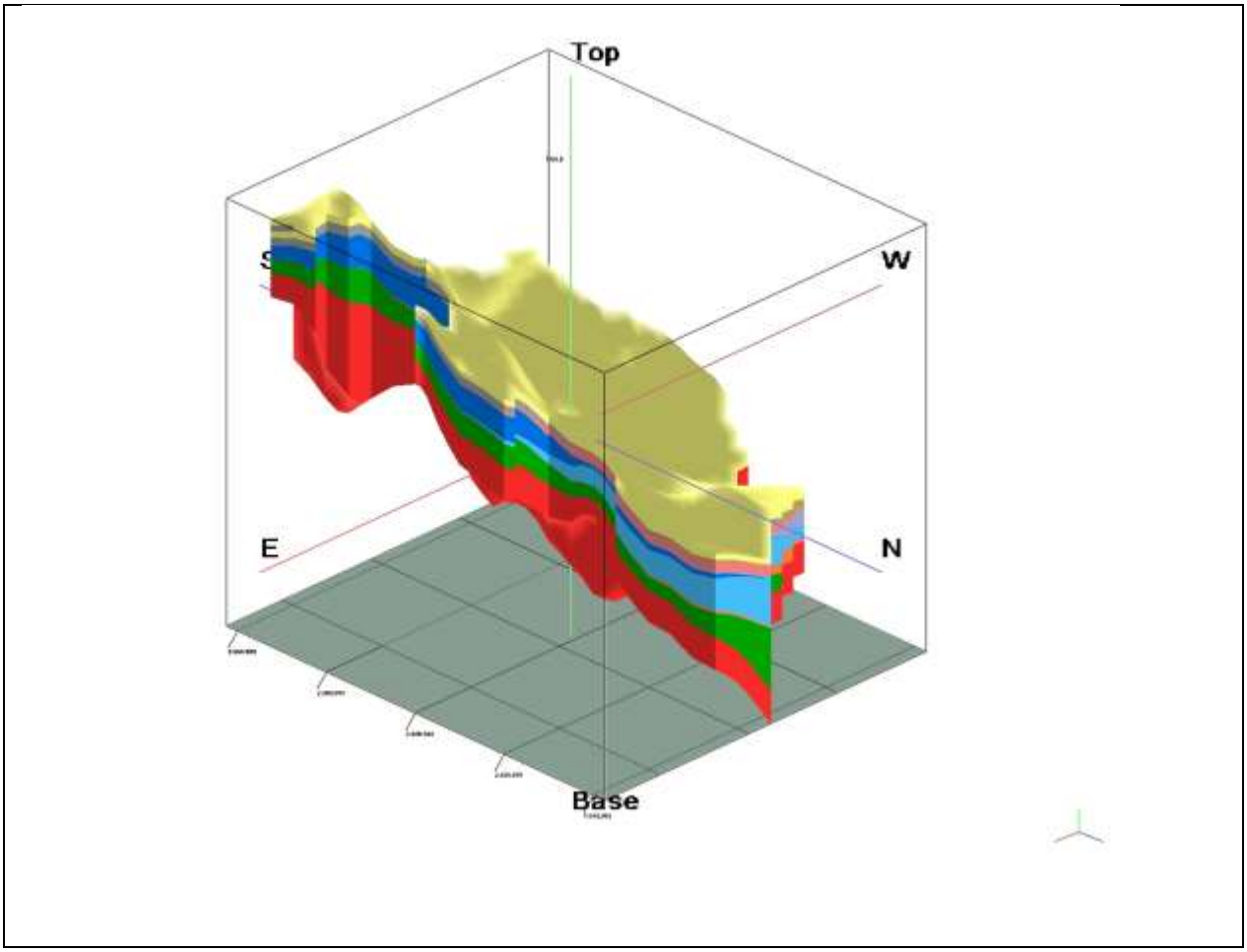


Figure 21: 3D representation of Aquifer Disposition in Banswara District.

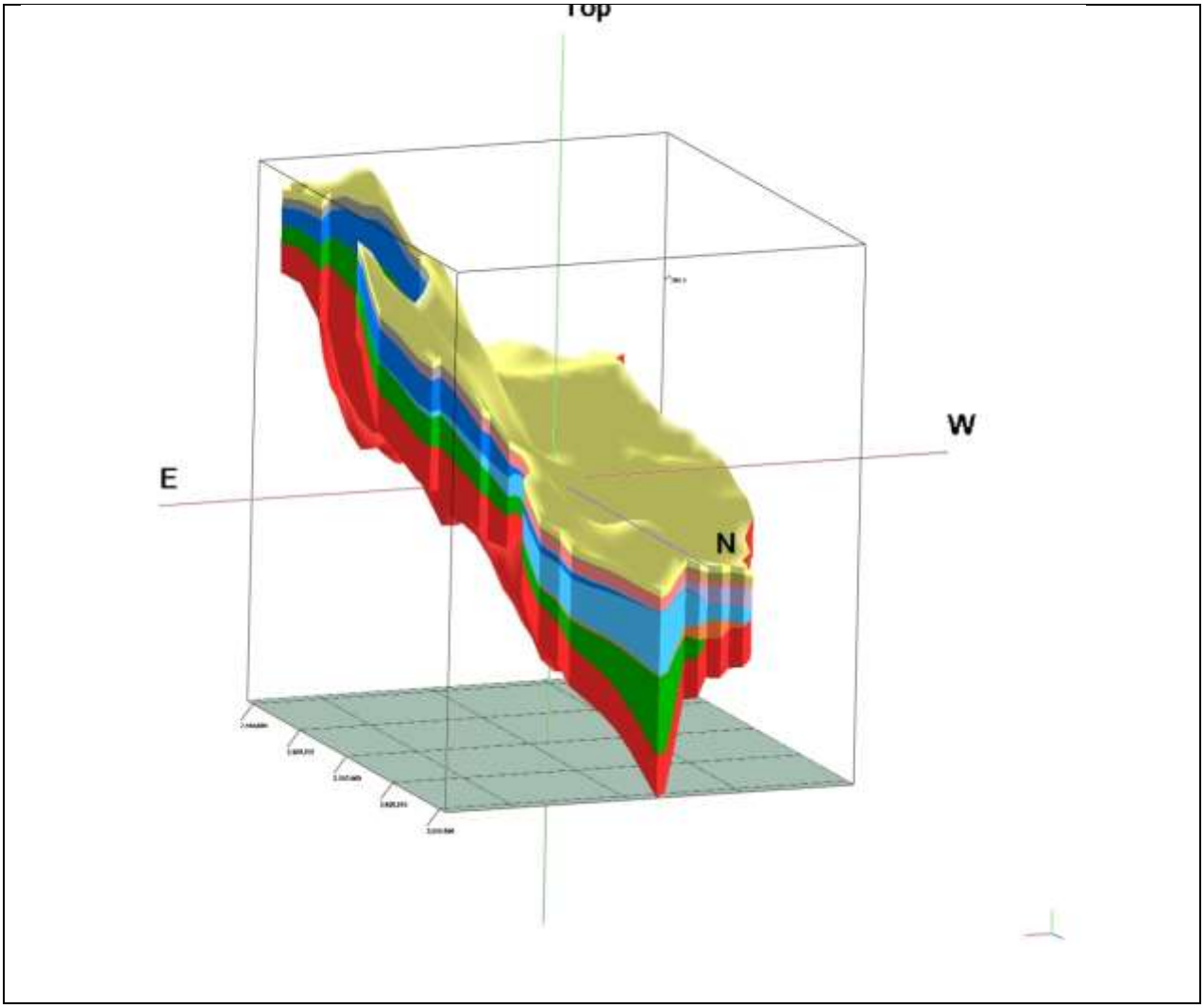


Figure 22: 3D representation of Aquifer Disposition in Banswara District.

(b)Hydro geological Cross Sections

(a) To study the aquifer disposition in detail, various hydro geological cross section indicating aquifer geometry has been prepared viz. A-A' representing Anandpuri to Danpura well locations..

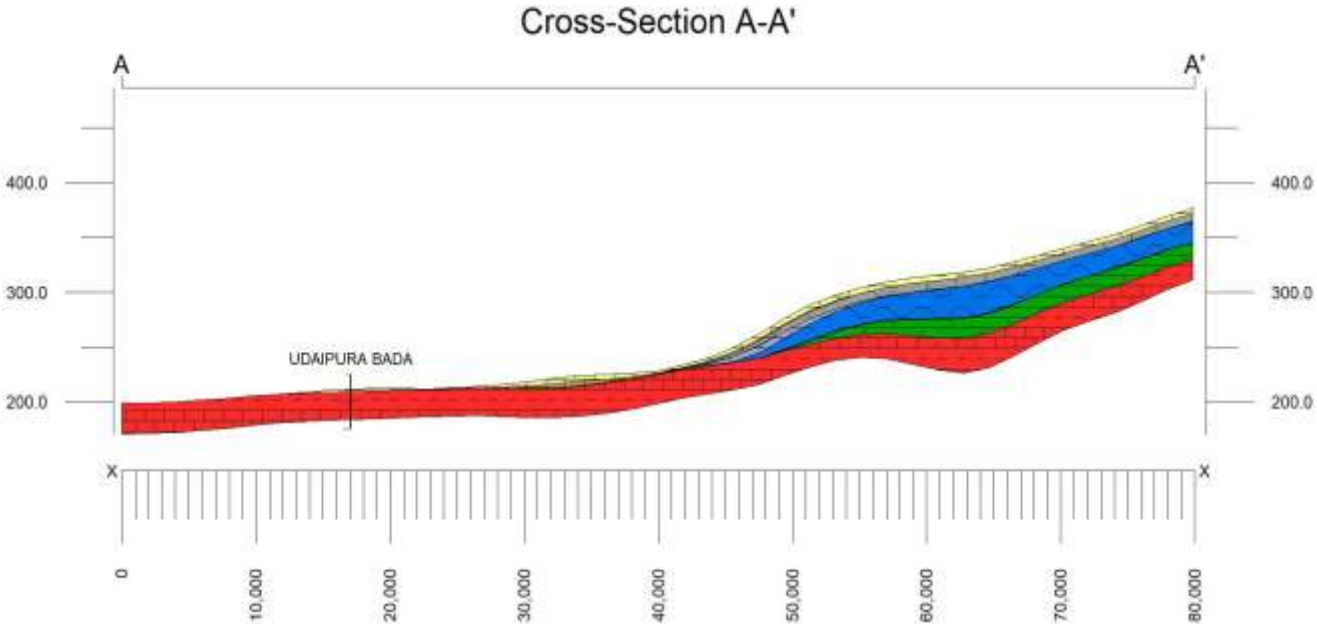


Figure: 23 Aquifer Disposition 2D cross section from Anandpuri to Danpura in Banswara District.

(b) To study the aquifer disposition in detail, various hydro geological cross section indicating aquifer geometry has been prepared viz. B-B' representing Narawali to Nagda Bari well locations.

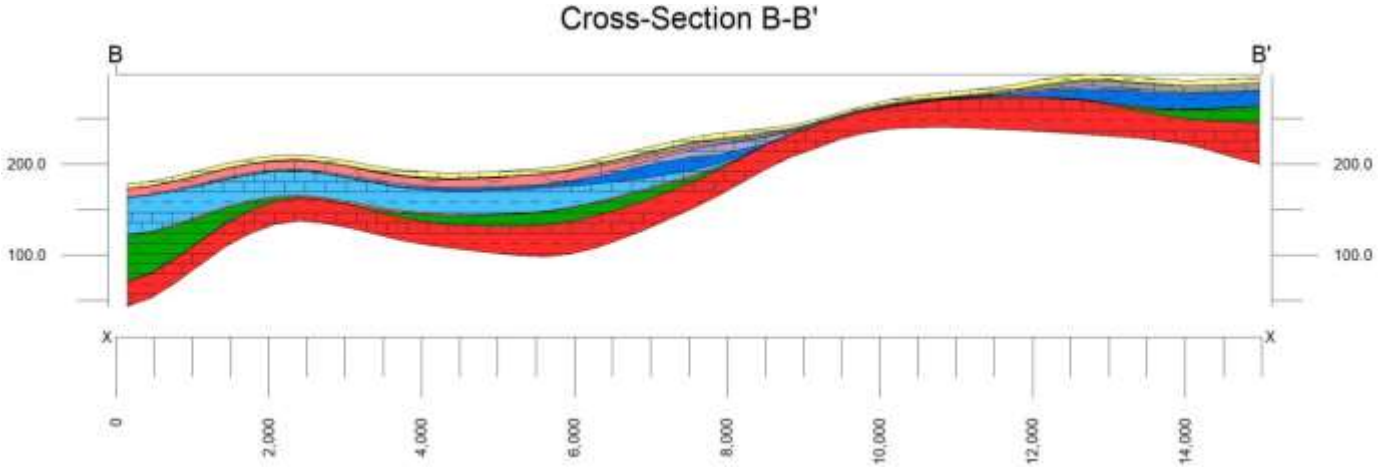


Figure: 24 Aquifer Disposition 2D cross section from Narawali to Nagda Bari in Banswara District.

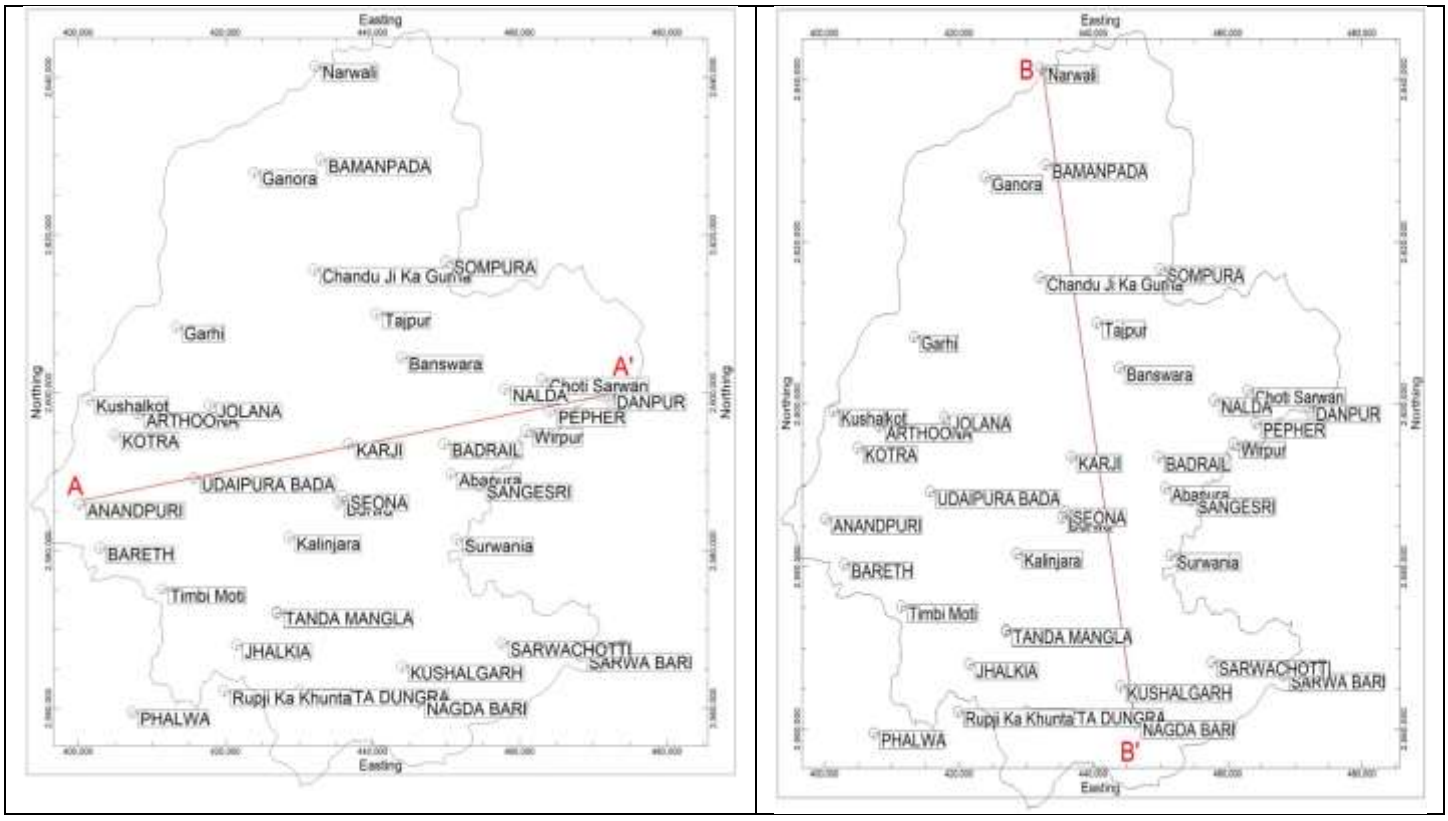


Figure 25: Sections lines of both the 2D sections represented above.

2.4 Groundwater Quality

The concentrations of various gases and ions dissolved in water from the atmosphere, soil strata and minerals and rocks with which it comes are the characteristics of water. This ultimately decides the quality of ground water. The concentration of CO_3^{2-}, HCO_3^-, OH^- and H^+ ions and dissolved CO_2 gases in water decide the acidic or basic nature of water while the salts of ions like Ca^{2+} and Mg^{2+} in water makes it soft or hard. Water with high Na^+ and Cl^- concentration can make the water saline. Nitrate ions percolated from anthropogenic sources can become predominant major anion in ground water. The excess fluoride concentration in ground water from fluoride bearing minerals may be related to the concentration of $Ca^{2+,}$ Na^{2+} and HCO_3^- ions present in ground water.

Major Cations and Anions

The major cations include Ca, Mg, Na and K. The water chemistry of the Banswara District is marginally dominated by alkali (Na) metals followed by Alkaline earth metals Mg^{2+} and Ca^{2+}. The order of abundance is $Na^{+}>Mg^{2+}>Ca^{2+}>K^{+}$ water type. The weathering and cation exchange processes normally control the levels of these cations in the ground water.

The anion chemistry of the analyzed samples shows that Cl^{-}andHCO_3^{-} are the dominant anions and follow the abundance order of $Cl^{-}>HCO_3^{--}>SO_4^{-}>NO_3^{--}>CO_3^{-}>F^{-}$. **Major Quality Parameter**

(a) Electrical Conductivity (EC)

Shallow groundwater of dug well zone is alkaline in nature with pH ranging from 7.5to 8.7.The Electrical Conductivity (EC) is within range 390-2390 mmhos/cm at25ºCbut higher values have been recorded in Northern part of the district like Banswara district in Ghatol and Garhi Block.

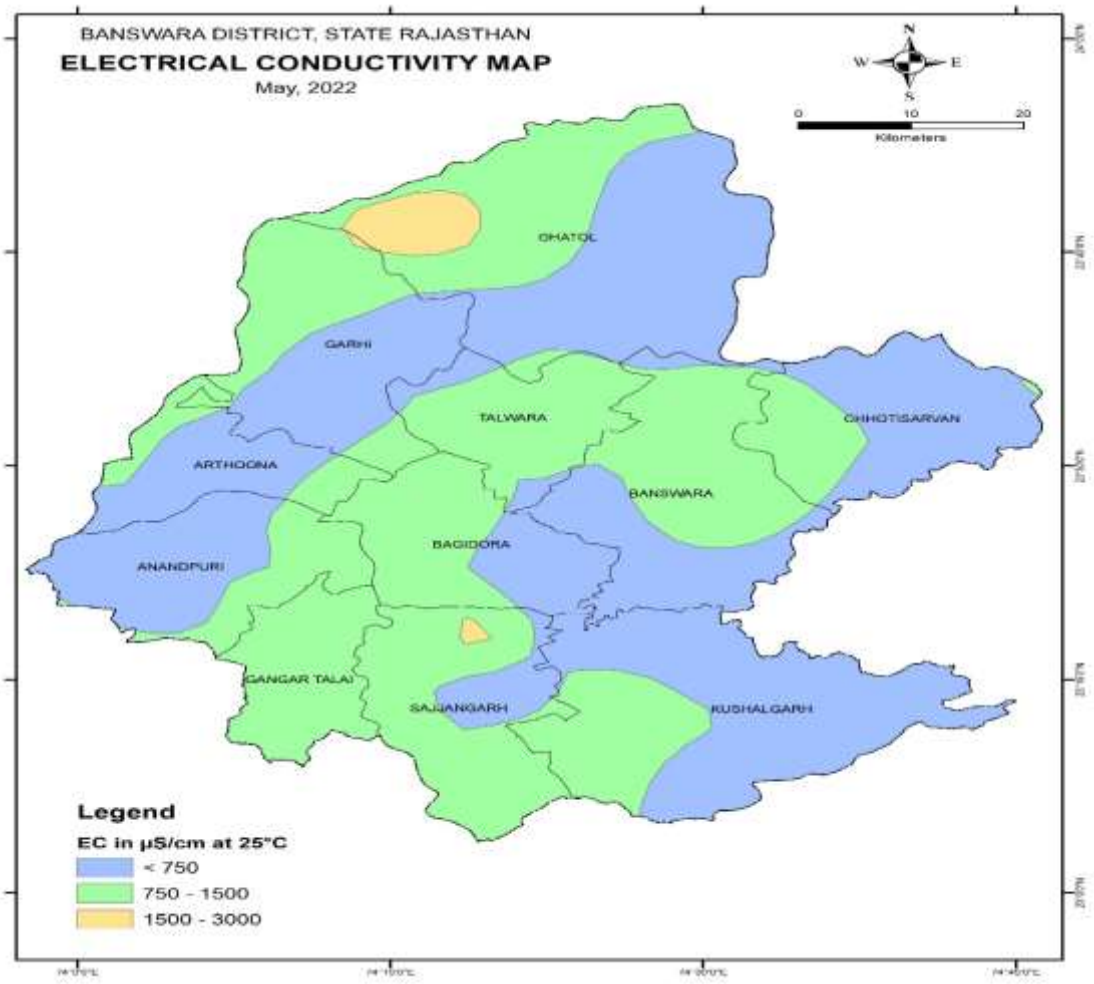


Figure: 26 Pre-Monsoon Electrical Conductivity

(b) Fluoride

The fluoride content in ground water is generally within the maximum permissible limit (1.5mg/lit) in major part of the district. In India, high fluoride (2–10mgl −1) water is reported mainly from granites and pegmatites which have F-bearing minerals, e.g. fluorite (CaF2) and fluor-apatite. Fluoride is beneficial when present in small concentration (0.8–1.0mgl −1) in drinking water for calcification of dental enamel but it causes dental and skeletal fluorosis if present in higher amount**.**

Table 14: Fluoride removal methods

Methods	Domestic + Low costs	Community + Low costs	Domestic + High Fremoval	Community + High Fremoval	Domestic + Brackish water	Communiy + Brackish water
Activated Alumina						
Ion exchange						
Reverse osmosis						
Electro dialysis						
Nalgonda process						
Contact precipitation						
Bone Charcoal						
Calcined Clay						
Water Pyramid/ Solar Dew						

Source: ***Feenstra.et.al...2007***

The colours in the matrix correspond with the appropriateness of the method for the given situation as shown in **Table: 17**

- Green colour means that the method is very suitable
- Orange colour means average suitability
- Red colour means that the method is unattractive or not applicable for the given situation.

The Nalgonda process, Bone charcoal and Calcined clay are low costs methods for domestic use. On a community scale, the Nalgonda process is also a low cost option. If a high fluoride removal is necessary then activated alumina, reverse osmosis and electrodialysis are preferred methods.

For brackish water only reverse osmosis, electrodialysis and the Water Pyramid /Solar Dew method can be used.

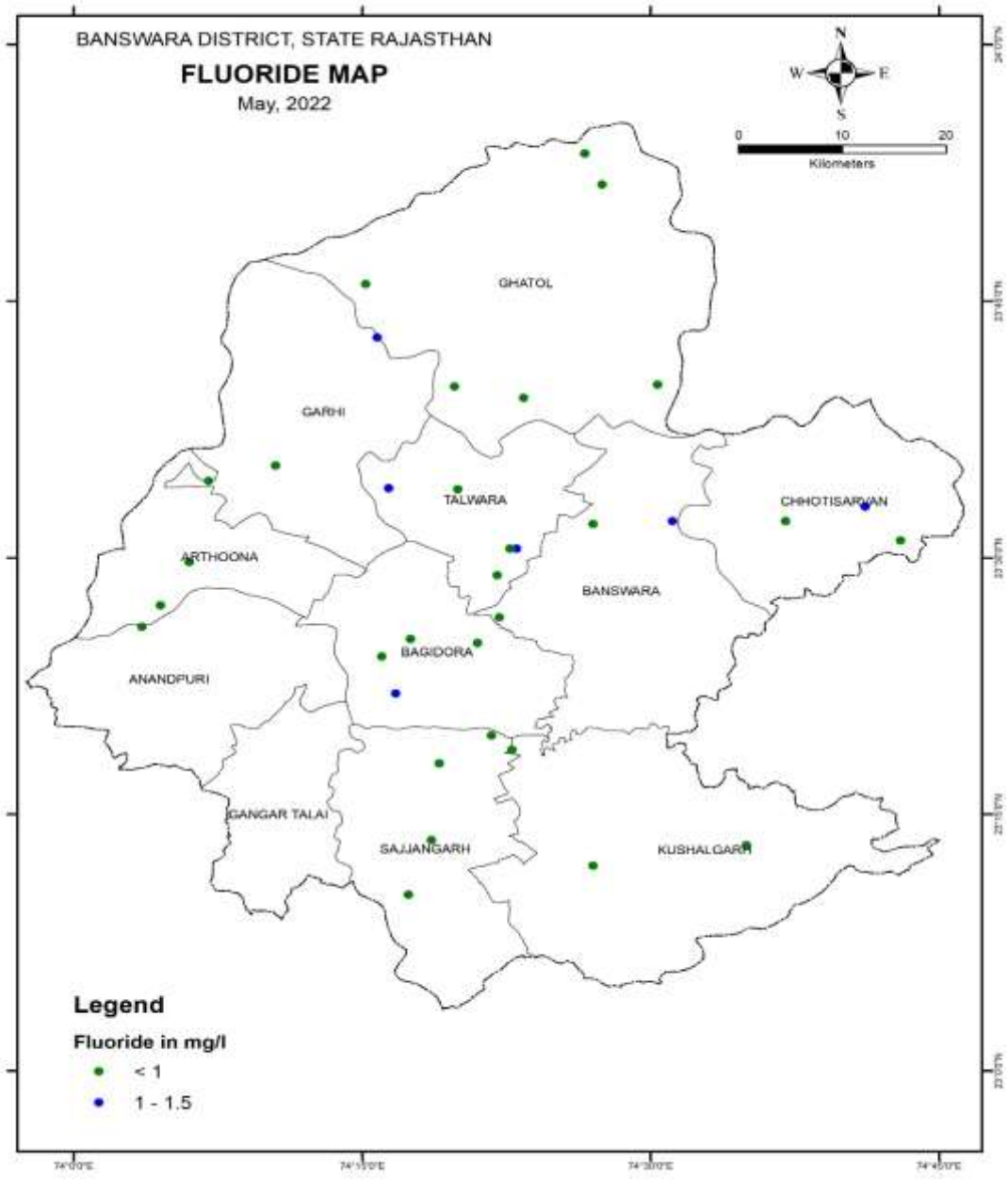


Figure: 27 Pre-Monsoon fluoride

(c) Nitrate

Nitrate concentrations in major part of the district are with in 45 mg/l or less than 45mg/l, which are shown by blue colour suitable for drinking purposes. Higher values of nitrate concentration more than 45mg/l which are shown by red colour not suitable for drinking purposes. Nitrate (NO3) is one of the most common groundwater contaminants in the world presence in higher concentrations poses human health and ecological risks.

Source of Nitrate Diffuse Sources: Diffuse sources pollution is mainly caused by the extensive use of synthetic and organic nitrogen fertilizers. The development of synthetic fertilizer production is mainly based on the Haber- Bosch process (Smil, 2001). It catalyzes atmospheric nitrogen gas with hydrogen to produce ammonia, which can then be further oxidized to produce nitrate. The main nitrogen transformation processes in soil are shown in Figure.28

Point sources

Point source pollution results from accidental spills of nitrogen-rich compounds, absence of slurry storage facilities and manure tanks in rural areas. Examples of point sources include areas of concentrated livestock confinement, leaky septic or sewer systems and areas of chemical or manure storage. Moreover, unplugged abandoned wells and boreholes, improperly constructed wells and sinkholes can allow rapid contamination of groundwater from point sources at the surface.

Human health

Excessive levels of nitrate in drinking water can produce negative health impacts on human well-being. Especially infants below the age of six months could become seriously ill from intake of water with a concentration higher than 45 mg/L of nitrate.Infants consuming water containing high nitrate levels can result *methemoglobinemia*, also referred to as “blue baby syndrome”. The name derives from the characteristically blue or lavendar skin color of infants suffering from the syndrome. Normally, the distinctive blue color is caused by the red blood cells which are not able to carry oxygen from the lungs to the rest of the body. Symptoms can occur rapidly over a period of days with the shortness of breath and blueness of the skin.

Methods to reduce nitrate risks

Prevention method: One of the most important steps to reduce the nitrate leaching in area is to limit the amount of nitrogen applied. It is better to use slow-release nitrogen sources, or low rates of soluble nitrogen applied more often. In addition, the farmers should be more cautious about adding nitrogen during periods in which the ground is not yet frozen but the grass is not

growing. The farmers should also avoid over-irrigation, which increases the chance of nitrate leaching. By following these steps, the agricultural areas will greatly reduce the chance of nitrate leaching into groundwater.

Prevention techniques

Ion exchange: needs a substance such as chloride to exchange with nitrate in the water. The ion exchange unit is a tank filled with special resin beads that are charged with chloride. Once contaminated water passes over the tank, the nitrate is substituted with the chloride. The resin is recharged by backwashing it using a sodium chloride solution. Ion exchange method is very effective method, except for water that contains high amounts of sulfate.

Reverse osmosis: is another method that can be used tho reduces nitrate concentration. Water is move under high pressure through a membrane. The membrane contains many microscopic pores that allow only water molecules to pass through, and as such, will stop nitrate and other inorganic chemicals such as calcium and magnesium.

Biological denitrification is using denitrifying bacteria and microbes so that nitrate ions are converted into its elemental state of nitrogen.

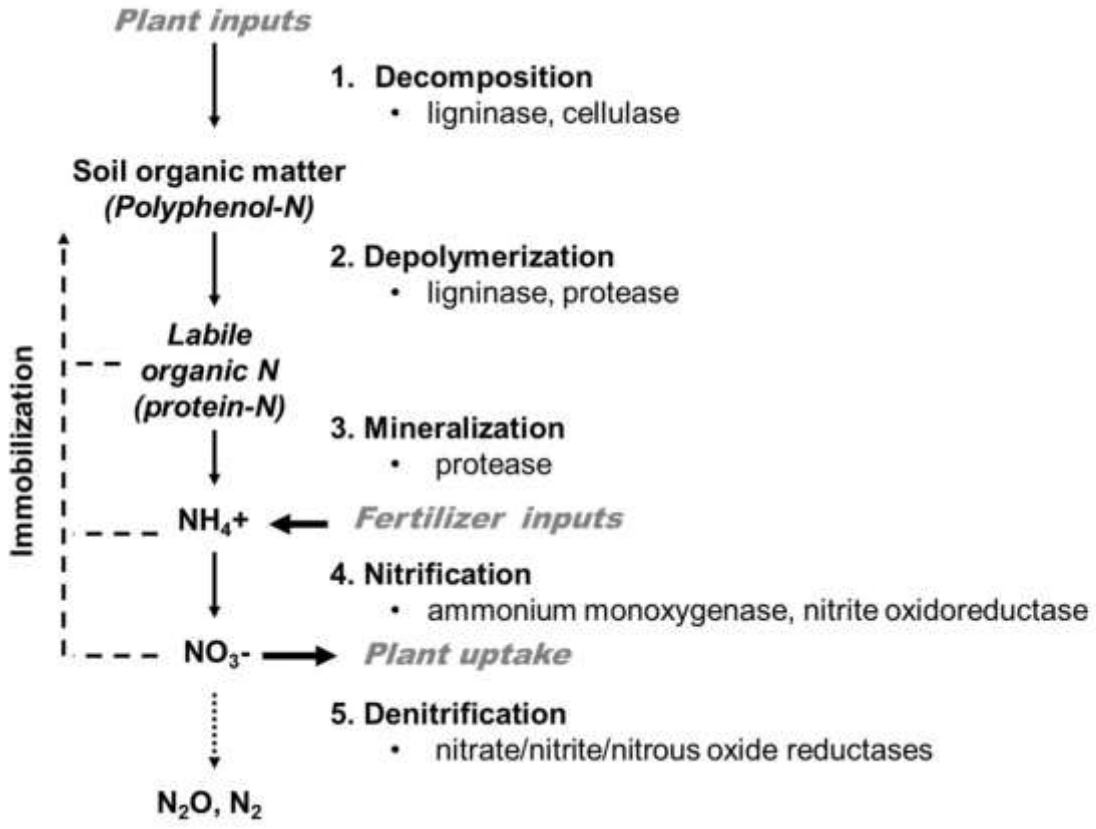


Figure 28: Transformations of Nitrates

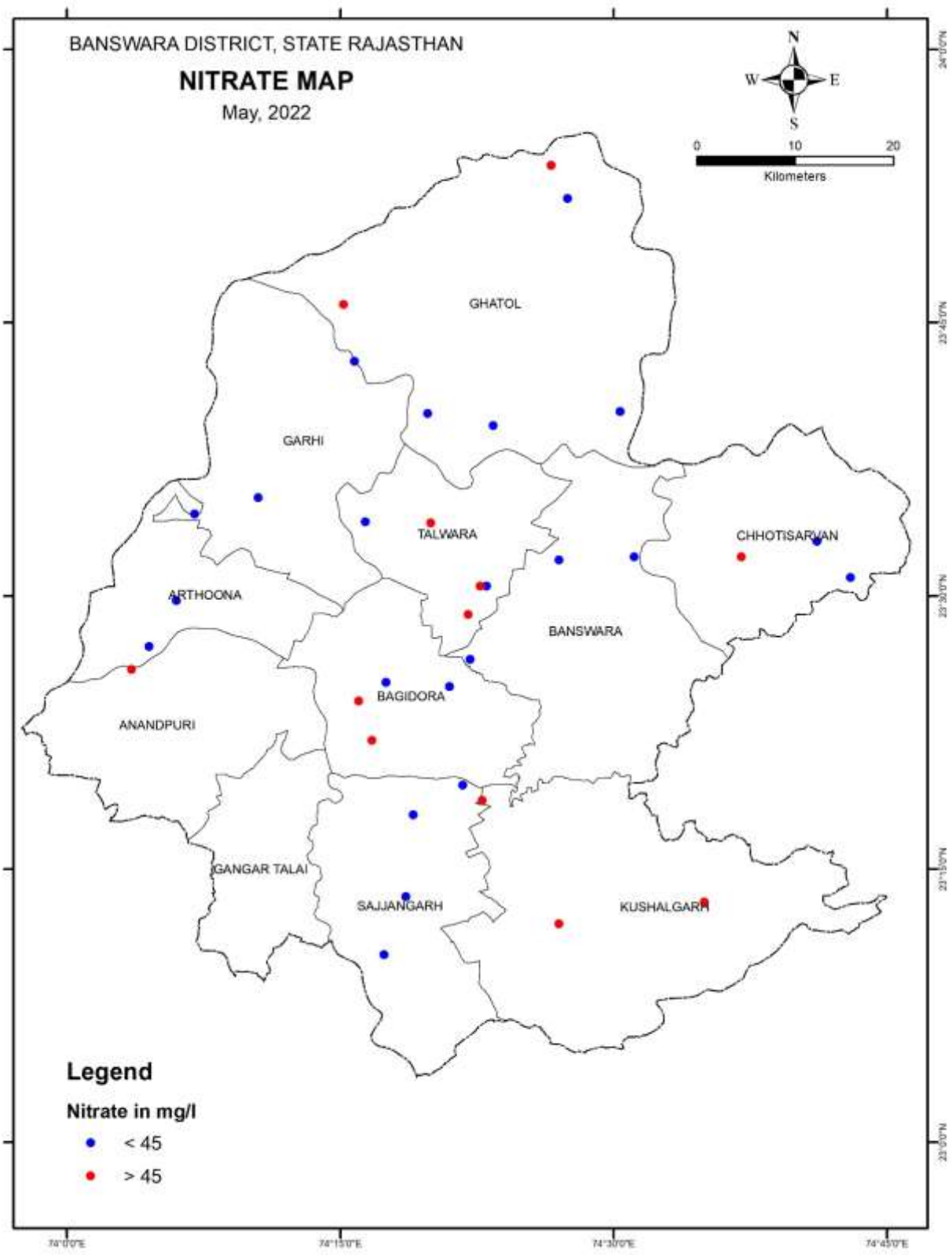


Figure: 29 Pre-Monsoon Nitrates

(d) Suitability of Ground Water for Irrigation Purposes

The ground water used for irrigation is an important factor in productivity of crop, its yield and quality of irrigated crops. The quality of irrigation water depends primarily on the presence of dissolved salts and their concentrations. The Electrical Conductivity (EC), Sodium Absorption Ratio (SAR) and Residual Sodium Carbonate (RSC) are the most important quality criteria, which influence the water quality and its suitability for irrigation. The quality of groundwater based on EC, SAR and Na% is discussed in tables.

High saline water cannot be used on soils with restricted drainage and requires special management for salinity control. Plants with good salt tolerance should be selected for such areas. Very high saline water is not suitable for irrigation under ordinary conditions but may be used occasionally under very special circumstances. The soil must be permeable, drainage must be adequate, irrigation water must be applied in excess to provide considerable leaching and salt tolerance crops/plants should be selected.

Table: 18 Classification of Ground Water Samples (Pre Monsoon) based on SAR

Type of Water	Sodium Adsorption Ratio			Classification of water
	Range	No. of samples	% of Samples	
Low Sodium Water	< 10	91	76.47	Excellent
Medium Sodium Water	10 to 18	23	19.33	Good
High Sodium Water	18 to 26	3	2.521	Doubtful
Very High Sodium Water	>26	2	1.681	Unsuitable
		119	100	

Table 19: Classification of Ground Water Samples (Pre Monsoon) based on EC

Level	EC(s/cm)	Hazard and limitations	No of wells
C1(low salinity)	<250	Low hazard: No detrimental effects on plants and no soil buildup expected.	NIL
C2(medium salinity)	250-750	Sensitive plants may show stress; moderate leaching prevents alt accumulation in soil.	54

C3(High salinity)	750-2250	Salinity will adversely affect most plants, requires selection of salt tolerant plants, careful irrigation, good drainage, and leaching.	62
C4(Very high Salinity)	>2250	Generally unacceptable for irrigation.	2

2.5. Groundwater resources

Groundwater resources have been estimated jointly by the Central Ground Water board and the State Ground Water Department as per the norms recommended by GEC97. While assessing the ground water resources saline and hilly areas have been considered. Net annual Extractable Ground Water is estimated to be **20253.98 ham**. Draft for all uses is **13134.17 ham** and overall stage of ground water development is 64.85%.Summarized block wise estimates of dynamic groundwater resources *are* given in Table 17.

Table 20: Block wise replenish able ground water resources in Banswara district (as on GWRA 2022

Block	Annual Extractable Ground Water Resource (Ham)	Irrigation Use (Ham)	Domestic Use (Ham)	Total Extraction (Ham)	Stage of Ground Water Extraction (%)	Categorization (OE/Critical/Semi-Critical/Safe)
ANANDPURI	1461.77	1054.19	191.36	1245.55	85.21	Semi_Critical
ARTHOONA	1485.20	587.54	151.40	738.94	49.75	Safe
BAGIDORA	1585.77	1152.28	140.82	1293.10	81.54	Semi_Critical
BANSWARA	3430.95	1573.79	213.08	1791.32	52.21	Safe
CHHOTISARVAN	1366.06	749.51	127.79	877.30	64.22	Safe
GANGAR TALAI	725.50	541.20	31.17	572.37	78.89	Semi_Critical
GARHI	2553.44	1574.12	275.47	1858.45	72.78	Semi_Critical
GHATOL	3443.53	1466.30	272.78	1740.47	50.54	Safe
KUSHALGARH	1484.83	1131.99	173.91	1305.90	87.95	Semi_Critical
SAJJANGARH	1297.28	593.40	190.72	784.12	60.44	Safe
TALWARA	1419.65	648.98	276.27	926.65	65.27	Safe
Total	20253.98	11073.3	2044.77	13134.17	64.85	Safe

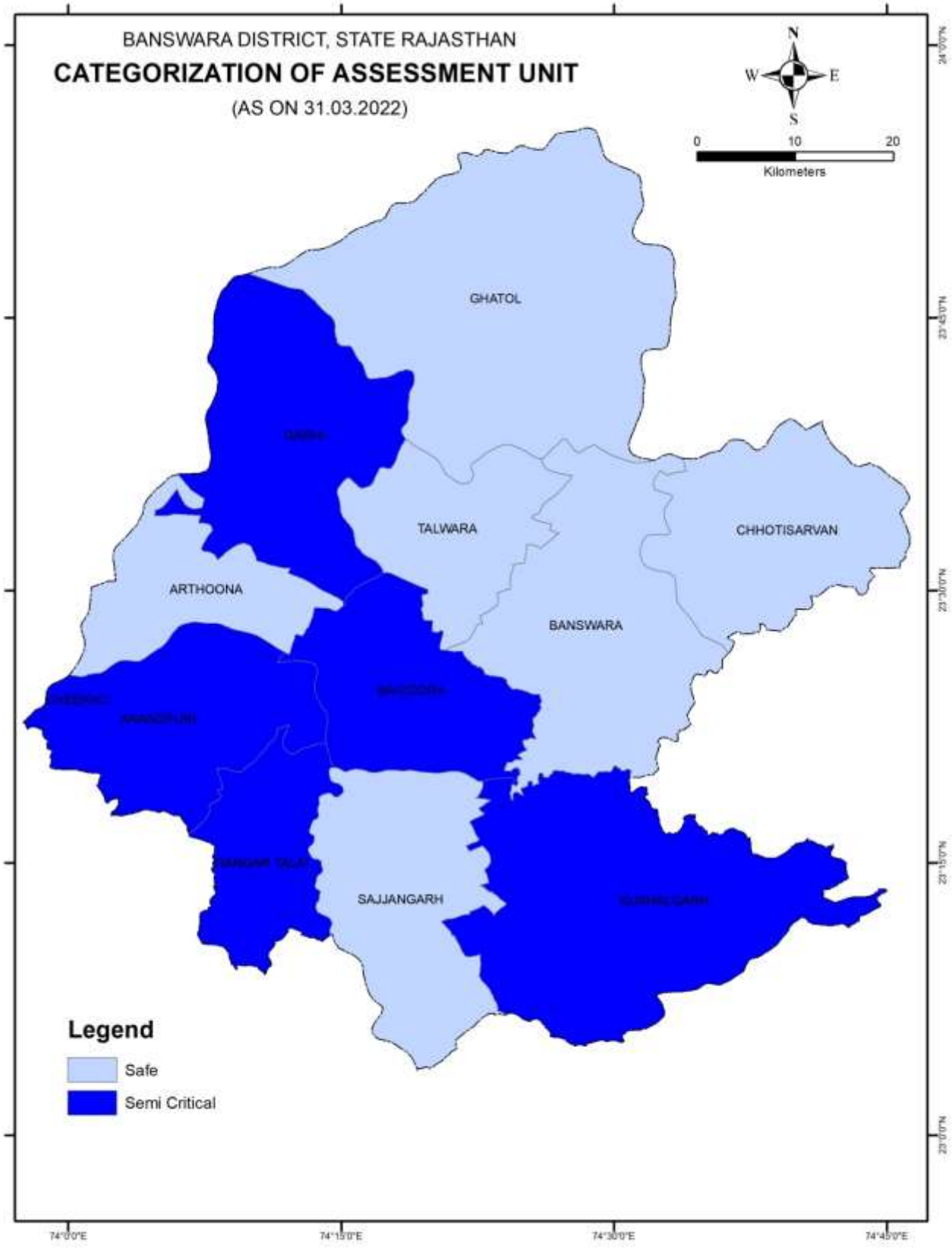


Figure: 30 Categorization of assessment unit

(GWRA 2022)

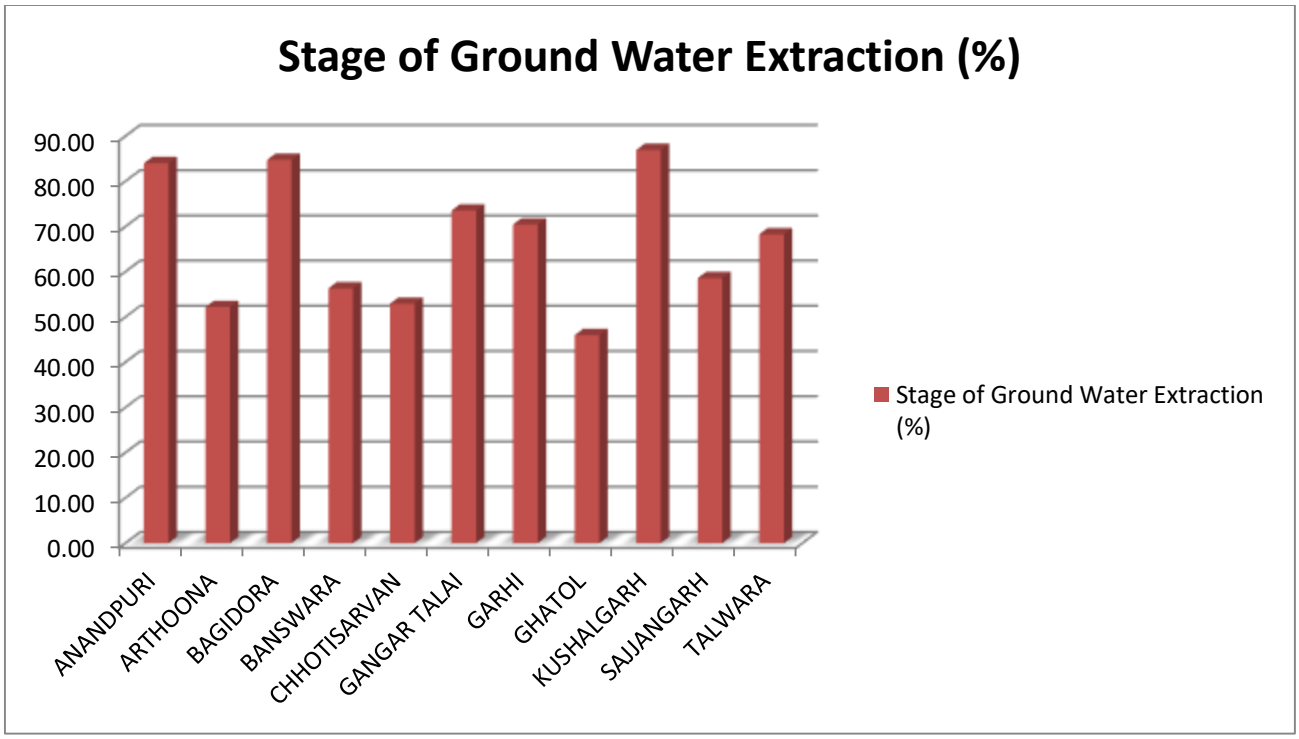


Fig 31 Graph showing Ground Water Availability and Draft (as on GWRA March 2022)

2.6 Groundwater Related Issues & Problems

Almost entire district is facing problem of ground water scarcity during summers. However, there are some areas vulnerable to pollution and depleted water table. Major issues in the district are as follows:

(a) Groundwater Depletion Hazard

Out of 11 blocks, five are semi critical and six are safe which is leading to stress on available ground water resources. Comparison of water level data of the past decade shows that water levels have registered decline in water level. The long term depleting nature of water level causes reduction in storage, which leads to water scarcity.

(b) Water Quality Hazard.

Except some part, almost maximum part of district, the ground water quality is in permissible limit. But long term depleting nature of water level causes reduction in storage, which leads to concentration of ions which can deteriorate ground water quality.

2.7 Causes of groundwater depletion

(a) Increased demand for water for domestic, industrial and agricultural needs and limited surface water resources lead to the over-exploitation of groundwater resources.

(b) Frequent pumping of water from the ground without waiting for its replenishment leads to quick depletion.

(c) Deforestation, unscientific methods of agriculture, chemical effluents from industries, lack of sanitation also lead to pollution of groundwater, making it unusable.

3. Management Plan

In order to manage the ground water resources and to control further decline in water levels, a management plan has been proposed. The management plan comprises two components- supply side management and demand side management. Since there is very little surplus surface water available in this district, very little intervention in the form of supply side management could be proposed.

(a) Supply Side Management

The supply side management of ground water resources can be done through the artificial recharge of surplus runoff available within river sub basins and micro watersheds. Also it is necessary to understand the unsaturated aquifer volume available for recharge. The unsaturated volume of aquifer for Banswara district is computed based on following; the area feasible for recharge, unsaturated depth below 5 m bgl and the specific yield of the aquifer. The block-wise volume available for the recharge is given below in table 21.

Block	Geographical Area of Block (sq km)	Hilly Area (sq km)	Potential Area (sq km)
Anandpuri	337.4	8.02	329.38
Arthoona	248.7	3.55	245.15
Bagidora	308.19	12.9	295.29
Banswara	516.75	67.92	448.83
Chhoti Sarwan	383.37	88.42	294.95
Gangartalai	214.15	8.95	205.20
Garhi	461.85	6.56	455.29
Ghatol	778.4	97.49	680.91
Kushalgarh	651.8	143.91	507.89
Sajjangarh	392.29	42.32	349.97
Talwara	243.18	76.08	167.10
Total	**4536.08**	**556.12**	**3979.96**

To enhance ground water availability from supply side, artificial recharge through 2 Interventions are considered. These are:

Intervention 1: Catchment area treatment (which includes plantation, constructing staggered trenches, continuous contour trench) wherein catchment area is taken as 10% of Pasture and Barren land Surplus Water utilized in Catchment area treatment is given in Table 22

Block	Arable/ Cultivable land (ha)	Pasture land (ha) (PL)	Barren land (ha) (BL)	Area recommneded for Catchment area treatment (ha) (10% of PL+BL)	Volume of sub surface storage space available (50% of unsaturated thickness) for artificial recharge (MCM)
Anandpuri	20740	387	390	78	15.73
Arthoona	12153	138	187	33	7.69
Bagidora	18541	526	612	114	6.89
Banswara	24945	4018	3116	713	8.84
Chhoti Sarwan	15453	3580	3946	753	17.26
Gangartalai	12827	315	402	72	3.91
Garhi	25569	285	248	53	7.19
Ghatol	35513	3678	3956	763	1.36
Kushalgarh	30285	6345	6289	1263	40.22
Sajjangarh	23181	2167	1789	396	3.30
Talwara	11739	1890	1987	388	2.18
Total	**230946.00**	**23329**	**22922**	**4625.1**	**114.57**

Intervention 2: By constructing Mini percolation tanks (on I order streams), Percolation tanks, Mini storage tanks, Pacca check dams (on 3rd order streams), anicut etc. Capacity of MPT, PT, PCD, Anicut and MST is 1000 cum, 2000 cum, 4000 cum, 6000 cum and 9000 cum respectively. Surplus water utilized by these structures is calculated by summing up the waterstored by these structures: Table 23

Block	Surplus water available for (MPT/PT/PCD/Anicut/MST) (mcm)	Mini Percolation Tank	Percolation Tank	Pacca Check dam	Anicut	MST	Surplus water utilized by (MPT/PT/PCD/Anicut/MST) (mcm)
Anandpuri	14.59	100	50	50	89	10	1.02
Arthoona	14.84	200	70	70	21	5	0.79
Bagidora	15.81	300	50	80	83	5	1.26
Banswara	33.97	500	80	82	80	8	1.54
Chhoti Sarwan	13.36	200	62	70	70	9	1.11

Gangartalai	7.22	100	70	40	80	0	0.88
Garhi	25.51	500	90	90	70	9	1.54
Ghatol	34.11	400	150	150	80	10	1.87
Kushalgarh	14.24	300	140	90	90	11	1.58
Sajjangarh	12.81	150	90	80	80	3	1.16
Talwara	14.01	150	50	80	88	3	1.13
Total	**200.48**	**2900**	**902**	**882**	**831**	**73**	**13.875**

Table 24 summarizes the impact of interventions proposed.

Block	Annual Extractable Ground Water (mcm)	Current annual gross ground water extraction for 'All Uses' (ham)	Present Stage of GW Extraction %	Annual Extractable Ground Water (mcm) after supply side intervantions	Gross ground water extraction for 'All Uses' after intervanations (mcm)	Projected Stage of GW Extraction % after Supply Side Interventions
Anandpuri	14.6177	12.4555	85.208	15.1607	12.4555	82.1566
Arthoona	14.8520	7.3894	49.754	15.2603	7.3894	48.4223
Bagidora	15.8577	12.931	81.544	16.5373	12.9310	78.1931
Banswara	34.3095	17.9132	52.211	35.4217	17.9132	50.5713
Chhoti Sarwan	13.6606	8.773	64.221	14.5116	8.7730	60.4552
Gangartalai	7.2550	5.7237	78.893	7.7253	5.7237	74.0905
Garhi	25.5344	18.5845	72.782	26.3259	18.5845	70.5939
Ghatol	34.4353	17.4047	50.543	35.6972	17.4047	48.7565
Kushalgarh	14.8483	13.059	87.949	16.2434	13.0590	80.3956
Sajjangarh	12.9728	7.8412	60.443	13.7132	7.8412	57.1799
Talwara	14.1965	9.2665	65.273	14.9450	9.2665	62.0042
Total	**202.5398**	**131.3417**	**64.847**	**211.541**	**131.342**	**62.088**

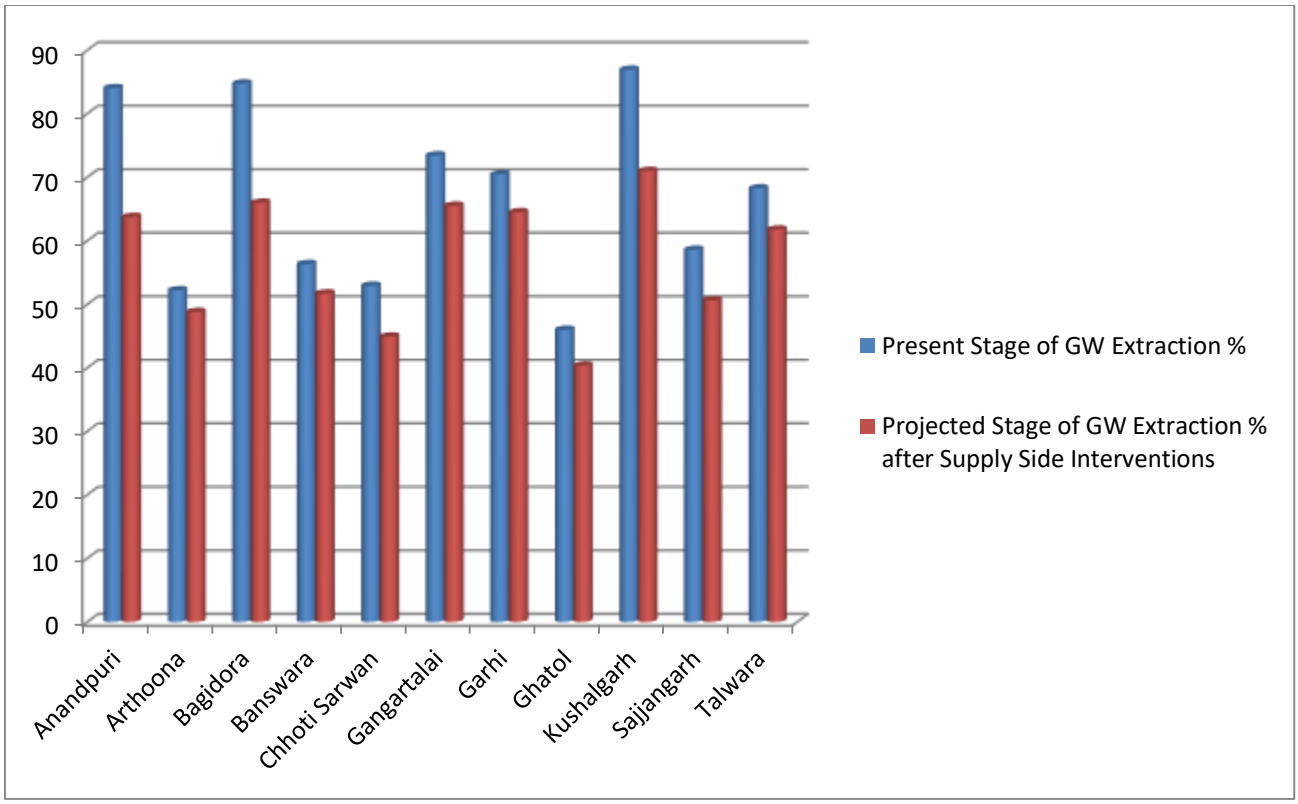


Fig 32 Graph showing Stages of Ground Water Extraction

(b) Demand Side Management

Impact assessment of existing water harvesting structures (WHS) reveals that therehas been increase in cropping area, cropping intensity, crop production and laboremployment observed in the project area. Erosion from nallah bank has minimized.Cropping pattern and cropping intensity have changed. Harvested water providessupplementary irrigation during long dry spell. In view of the above, such waterharvesting programmes may be taken up in the district for further development ofsurface waterandground water resources to enhance agricultural production**.**

Table 25: Summarizes the impact of interventions proposed Demand side

Block	Net Irrigated Area hectare			Gross Irrigated Area hectare		
	DW	TW	Total	DW	TW	Total
Anandpuri	30	0	30	1020	15	1035
Arthoona	65	0	65	1051	335	1386
Bagidora	65	0	65	1828	115	1943
Banswara	9	26	35	2091	1029	3120
Chhoti Sarwan	15	0	15	725	102	827
Gangartalai	15	0	15	1165	0	1165
Garhi	143	16	159	2432	935	3367
Ghatol	155	32	187	2551	1005	3556
Kushalgarh	25	0	25	1022	0	1022
Sajjangarh	42	0	42	1624	18	1642
Talwara	45	12	57	1033	503	1536
District	**609**	**86**	**695**	**16542**	**4057**	**20599**

Table 26: Summarizes the impact of interventions proposed Demand side

Block	Projected Stage of GW Extraction % after Supply Side Interventions	Water Saving through Micro Irrigation Techniques	Projected Stage of GW Extraction % after Demand side inteventions (adopting Micro Irrigation Techniques)	Water Saving through crop Change	Gross ground water extraction for 'All Uses' after Demand side inteventions (mcm)	Projected Stage of GW Extraction % after Demand side inteventions (adopting Crop Change)
Anandpuri	82.1566	0.207	80.79	2.49	9.7550	64.34
Arthoona	48.4223	0	48.42	0.00	7.3894	48.42
Bagidora	78.1931	0.3886	75.84	4.78	7.7639	46.95
Banswara	50.5713	0.00	50.57	0.00	17.9132	50.57
Chhoti Sarwan	60.4552	0.00	60.46	0.00	8.7730	60.46
Gangartalai	74.0905	0.47	68.06	1.80	3.4577	44.76
Garhi	70.5939	1.34	65.50	6.80	10.4445	39.67
Ghatol	48.7565	0.00	48.76	0.00	17.4047	48.76
Kushalgarh	80.3956	0.40	77.93	3.80	8.8590	54.54
Sajjangarh	57.1799	0.00	57.18	0.00	7.8412	57.18
Talwara	62.0042	0.00	62.00	0.00	9.2665	62.00
Total	**62.088**	**2.802**	**60.76**	**19.672**	**108.8681**	**51.464**

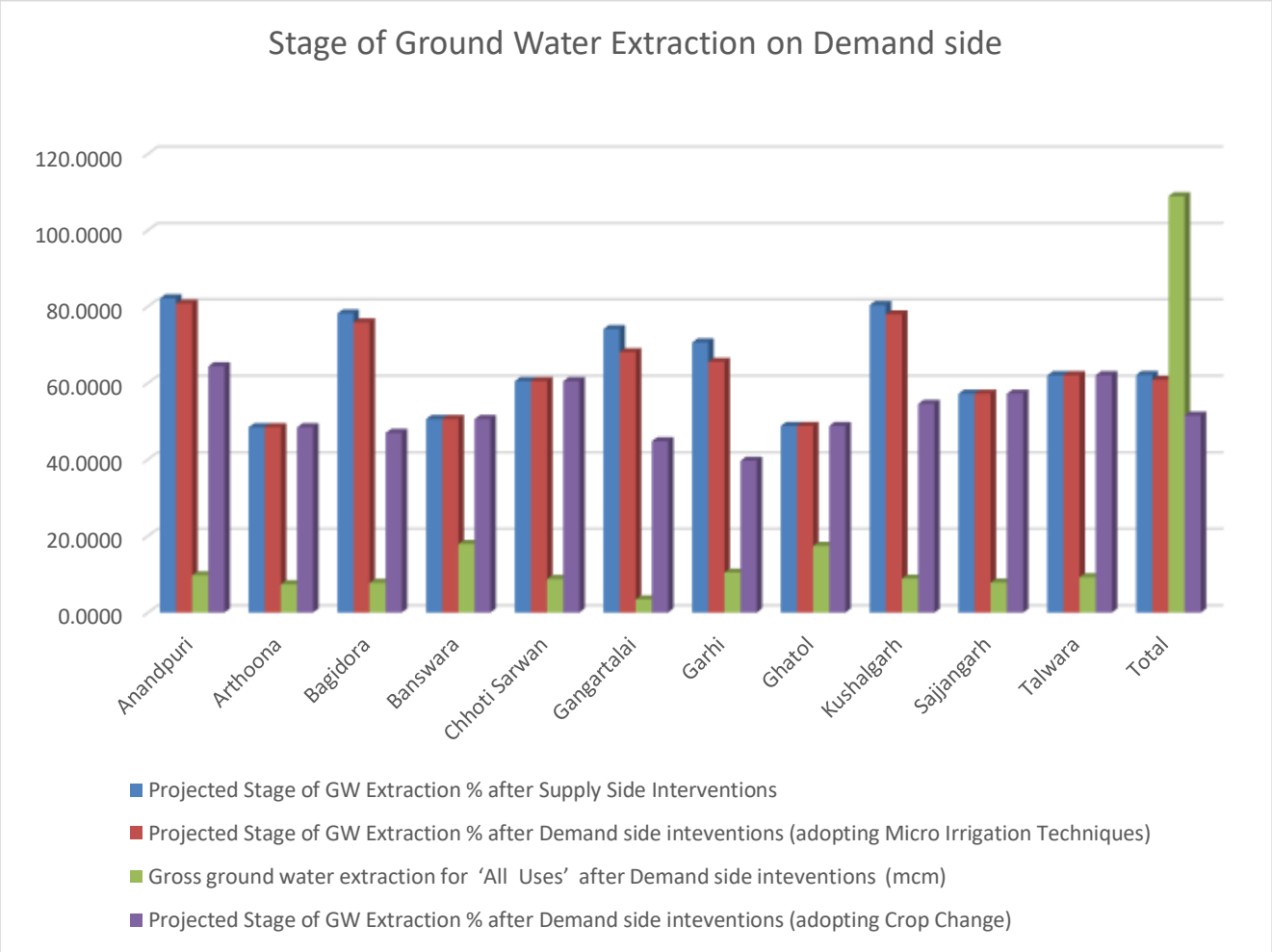


Fig 33: Graph showing Stages of Ground Water Extraction

PART B

Block wise Aquifer Maps and Management Plans of District Banswara

Garhi Block at a Glance

Salient Information	**Block**	**Garhi**
	Geographical Area (km2)	461.85
	Potential Area (Sq.km)	455.29
Climate & Rainfall	Climate	Dry with hot summer and cold winter
	Average Rainfall (1992-2022)	954
Ground Water Issues	Aquifer Characteristics	Basalt, Gneiss
	Main Aquifers in the area	Covered by Hard rocks, therefore, weathered, fractured and jointed rock.
Aquifer System	Aquifer Disposition	Weathered zone followed by Phyllite. Schist
	Geology	Phyllite, Schist
	Maximum Depth of Aquifer in meter	50
	Type of Aquifer	Unconfined Aquifer
	Hydraulic Characters (sp.Yield %)	0.023
Water Level Behavior,	Depth to Water Level (m BGL)	

Salient Information	**Block**	**Garhi**
DTW (m)		4.18
	Trend (m/yr)	-0.34
Ground Water Quality	General	
	Electrical Conductivity in micro S/cm (Min/Max)	850/503
	Nitrate in mg/litre (Min/Max)	1/27
	Fluoride in mg/litre (Min/Max)	0.5/1.37
Groundwater Resources (2022-23)	Total annual ground water recharge(mcm)	28.3716
	Natural discharge during non-monsoon season(mcm)	2.8372
	Net ground water availability(mcm)	25.5344
	Existing gross ground water draft for irrigation(mcm)	0.541
	Existing gross ground water draft for domestic & industrial uses(mcm)	0.284
	Existing gross ground water draft for all uses(mcm)	1.858
	Allocation for domestic & industrial requirement(mcm)	0.1514
	Net ground water availability for future irrigation development(mcm)	0.684
	State of ground water development	72.78
	Category	Semi Crictical.
Supply Side Management		
	Geographical Area of Block (Sq.km.)	461.85
	Potential area suitable for recharge (Sq.km.)	455.29
	Thickness of unsaturated zone 3 m below ground level (m)	1.69

Salient Information	**Block**	**Garhi**
	Volume of sub surface storage space available for artificial recharge (MCM)	7.89
	Surplus Runoff Availability	21.89
	Surface water available (mcm)	21.28
	No of Recharge/Farm ponds	0
	Mini Percolation Tanks Proposed	500
Demand side Management	Use of Advanced Irrigation Practices to be promoted	
	(i) Use of Sprinklers	
	Total Irrigated Area (ha)	3367
	Irrigated Area (ha) proposed for irrigation through sprinkler	841.7
	Water Saving by Use of Sprinklers	0.67
	Irrigated Area under wheat (ha)	13640
	Irrigated Area (ha) under wheat proposed for Gram cultivation	6820
	Water Saving by change in cropping pattern	6.81
Expected Benefits	Net G.W. Availability (MCM)	6.95
	Total Net G.W. Availability after intervention (MCM)	7.74
	Existing G.W Draft for all purpose (MCM)	18.58
	Saving of Ground water through demand side intervention (MCM)	7.49
	Net GW draft after interventions (MCM)	18.58
	Present stage of G.W. development (in %)	72.78
	Expected stage of G.W. Dev. (in %)	65.50
Other Interventions proposed, if any	Alternate water Sources available	Canal Network

Assessment Unit at a Glance

Garhi block in Banswara district, Rajasthan one of the semi critical blocksand is under partially stressed as evident from stage of Ground Water development that is 72.78 %. The total area of the block is 461.85km sq. which is potential recharge worthy area also.The block covers 9.1% of the total district area.As per census 2011, the total population of the block is 5180 persons including 2635 males and 2545 females.

1. Background Information

a. Location & extent

Garhi block covering an area of 461.8sq. km falls in western part of Banswara district and is located between North latitudes 23°30’ & 23°45’ and East longitudes 74°05’ & 74°17’.

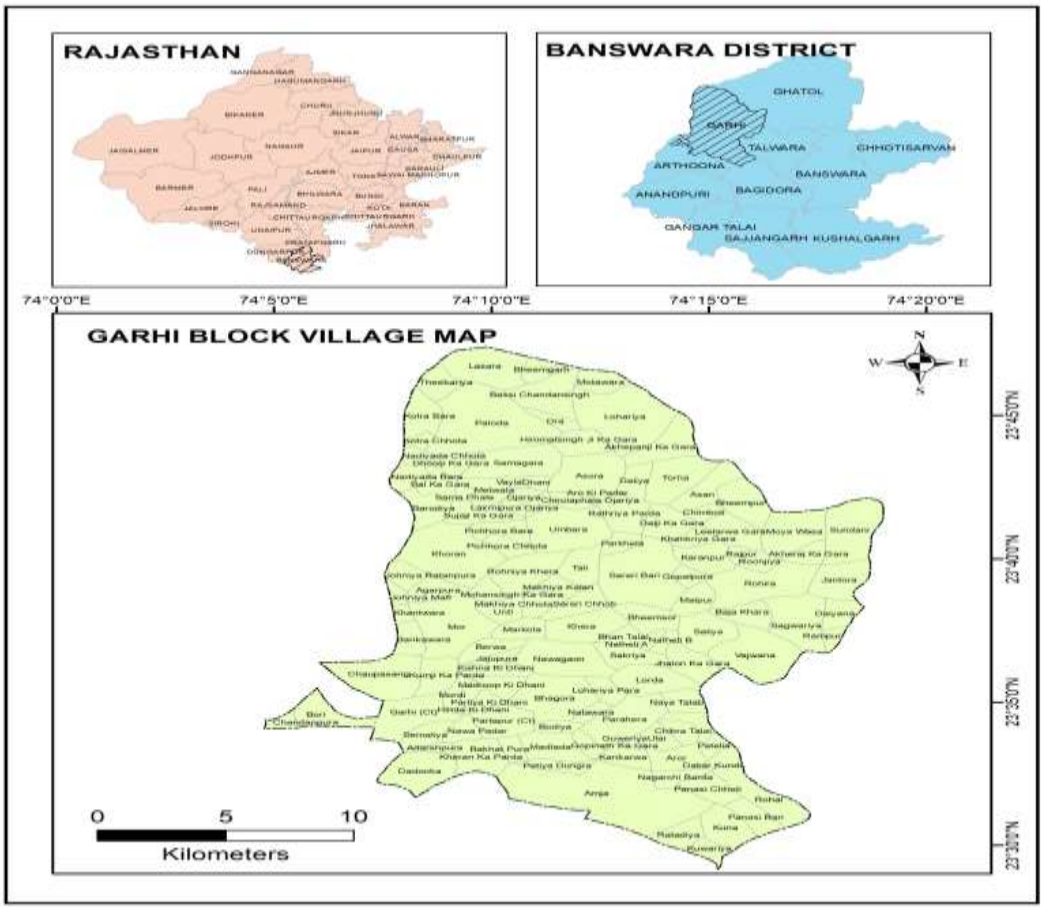


Fig.34: Location map of Garhi block, Banswara

b. Rainfall

The Garhi block receives moderate rainfall as compared to other districts of Banswara, the max rainfall is 1802 mm and min rainfall is 523 mm whereas average annual rainfall in the block being 954 mm (1992-2022). On an average the climate is fairly dry and healthy. The year may be divided into four seasons -- the hot season from March to middle of the June, the monsoon season from mid-June to September, post monsoon season from October to November and the cold season from December to February.

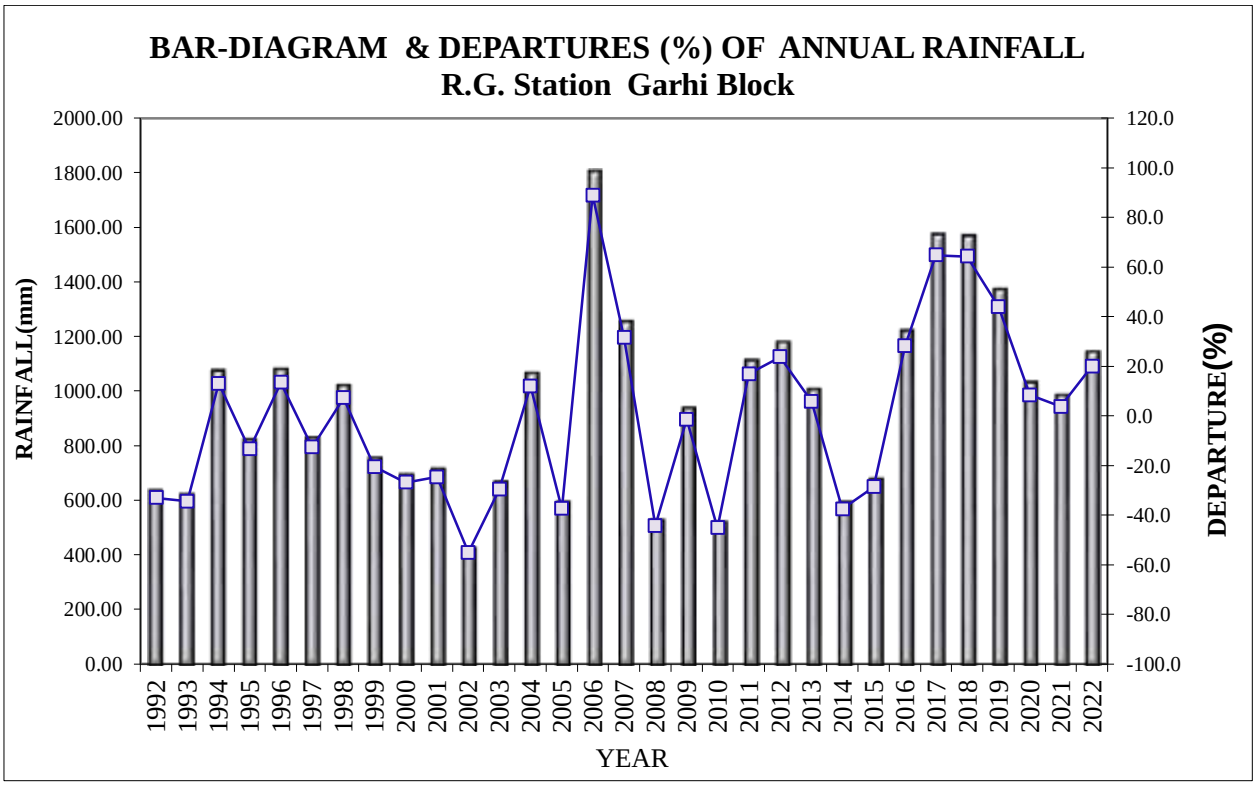


Fig.35: Bar Diagrame of Garhi block, Banswara

c.Geomorphology

The block being a part of Bansawara district, which itself because It is located at western part of district just touching with eastern boundary of Dungarpur district. The block is characterized by Buried Pediment, Pediplain, plateau, Rivers, ponds, reservoir, Structures, like linear features, denudationl landforms and various valley fill deposits.

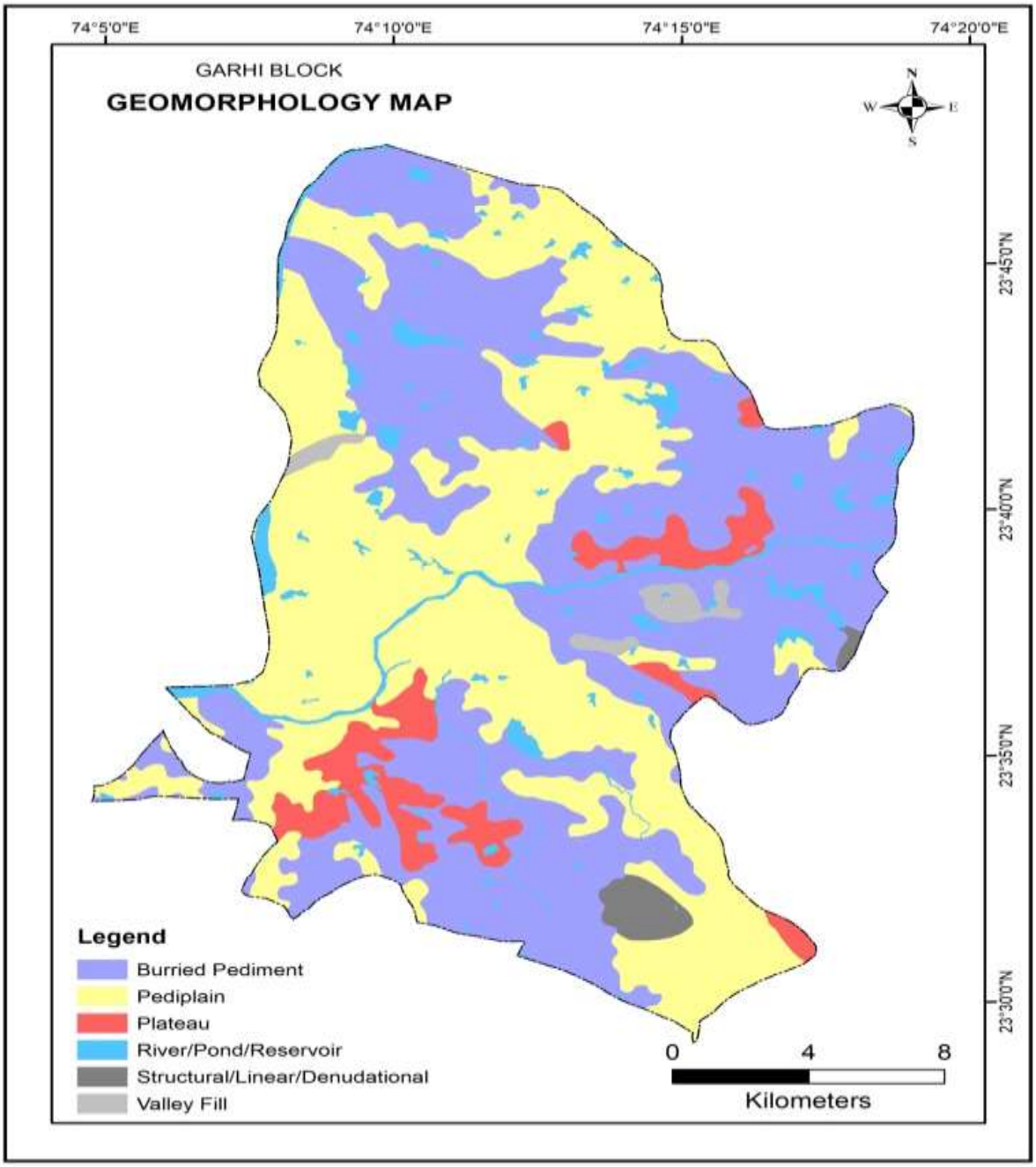


Fig.36.Geomorphology of Garhi Block

d. Drainage: Topographically Banswara district represents a rugged terrain. The eastern part of district is occupied by flat-topped hills of the Deccan trap. The drainage system belongs to the Mahi river basin. Its main tributaries are Anas, Chap, Haran, Kagdi & Nal. There are scattered ranges of Aravalis in the eastern half of the district.

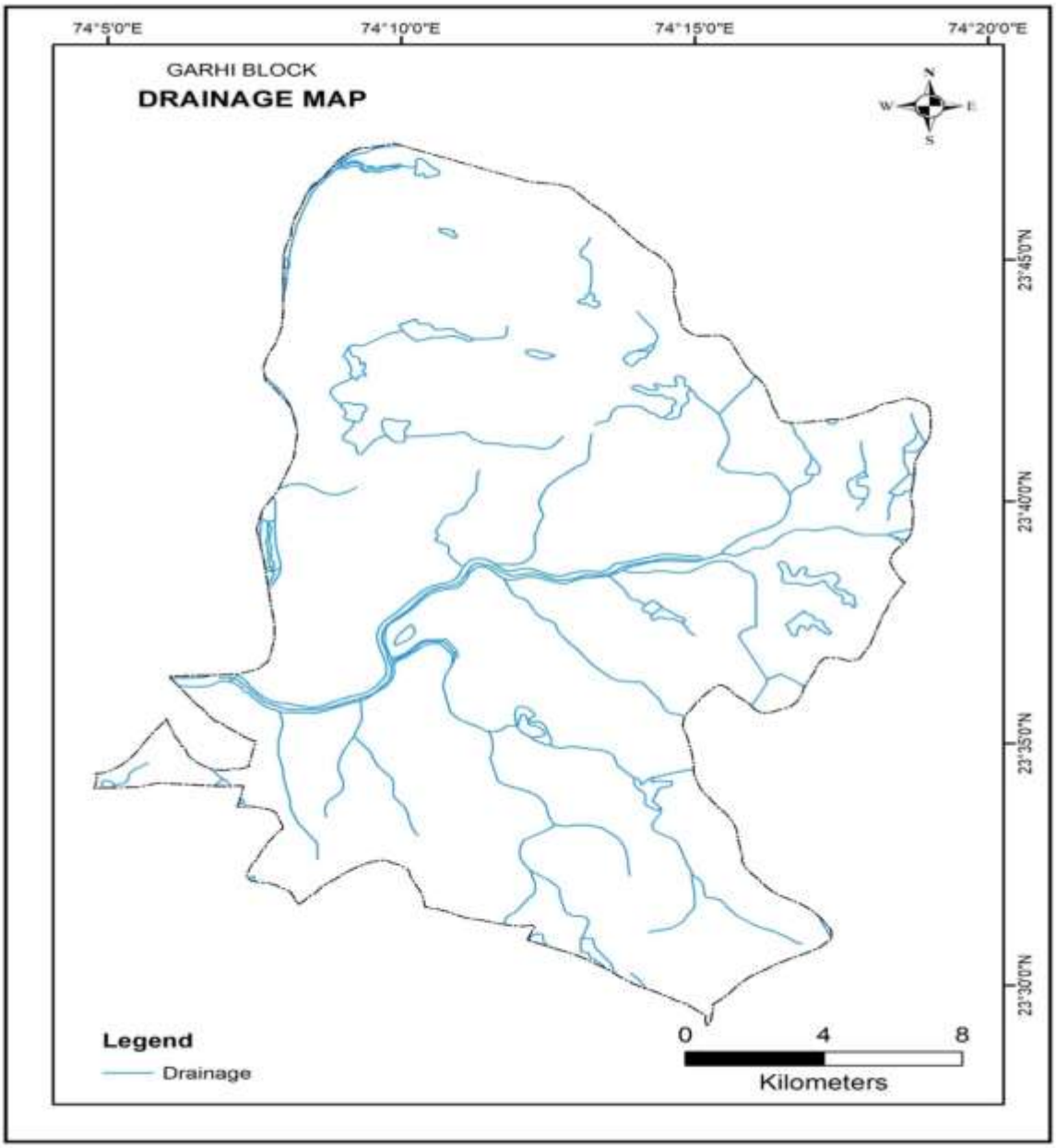


Fig 37.Drainage Map of Garhi Block of Banswara District.

2. General Hydrogeology

a. Groundwater Conditions:

Geologically the block is occupied by Gneiss and schist, the ground water is mainly under unconfined conditions in weathered, fractures and jointed hard rock formation developed by secondary porosity. The depth to water level varies widely depending upon topography, drainage, bed rock geology etc.

Pre Monsoon (May 2022):

The depth to water level varies widely depending upon topography, drainage, bed rock geology etc.During Pre-monsoon (May, 2022), depth to water level was found to vary from3mbg1to more than 40 mbgl (Figure 38).The depth to water level map of the block shows that in central part very small pockets have water levels between 2 and 5 m bgl. Eastern, central parts of the blocks had water levels between 5 and 10mbgl, rest of the area has water levels between 10 and 20 m and a very small northern and southern part has water levels between 20 and 40mbgl

Post Monsoon (November 2022):

During Post-monsoon (November, 2022), depth to water level in major part of the district was observed to be between 20 and 40mbgl (Figure 39).This map depicts that only north eastern and northern – southern parts show water levels below 2mbgl and 2 and 5mbgl, 5 and 10mbgl Rest all the area extending from western, eastern and southern10 and 20mbgl. Only small pocket is having water levels within 20 and 40mbgl from Eastern side.

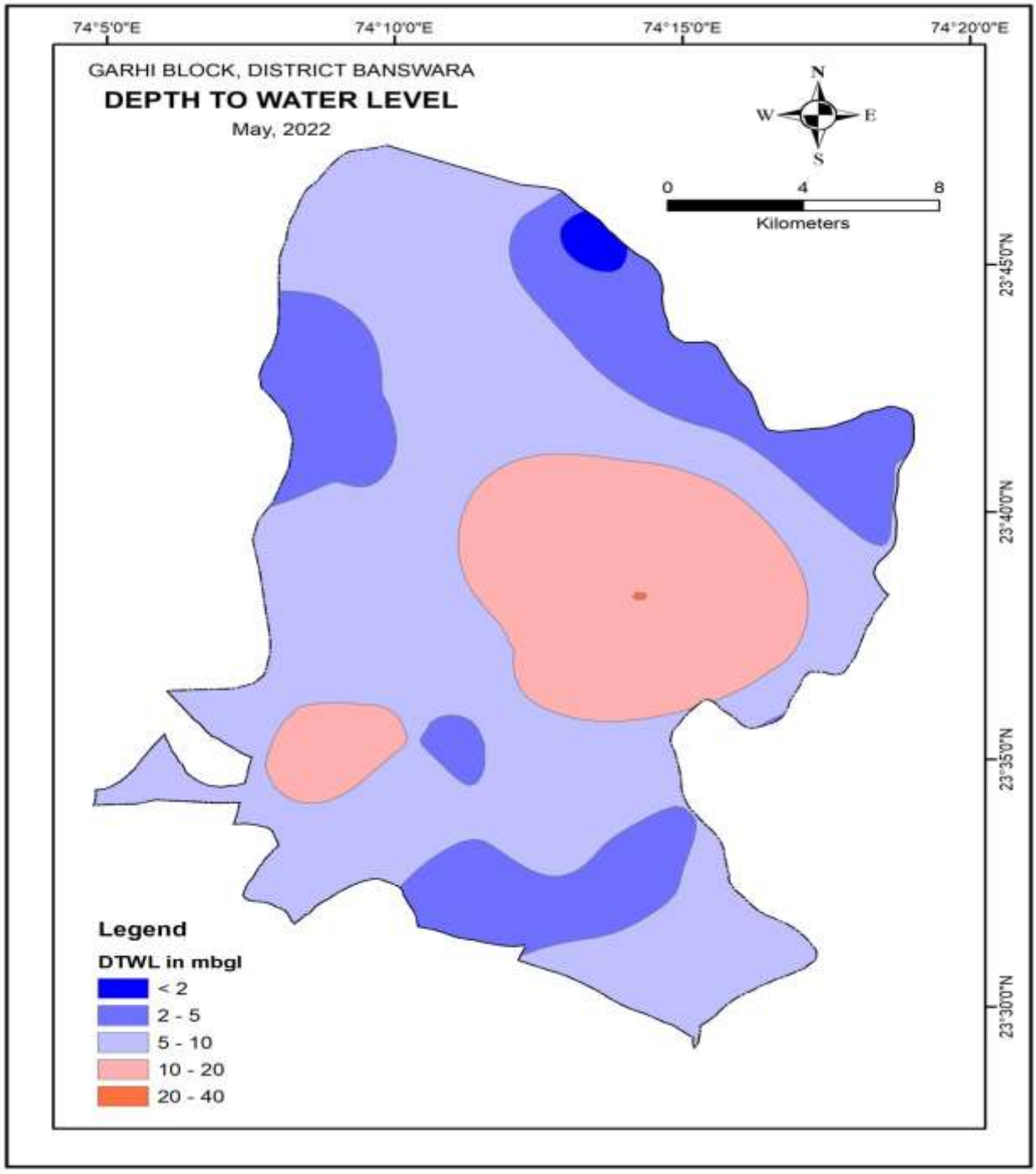


Fig: 38: Depth to water Level Map Pre-Monsoon 2022, Grahi Block Banswara District

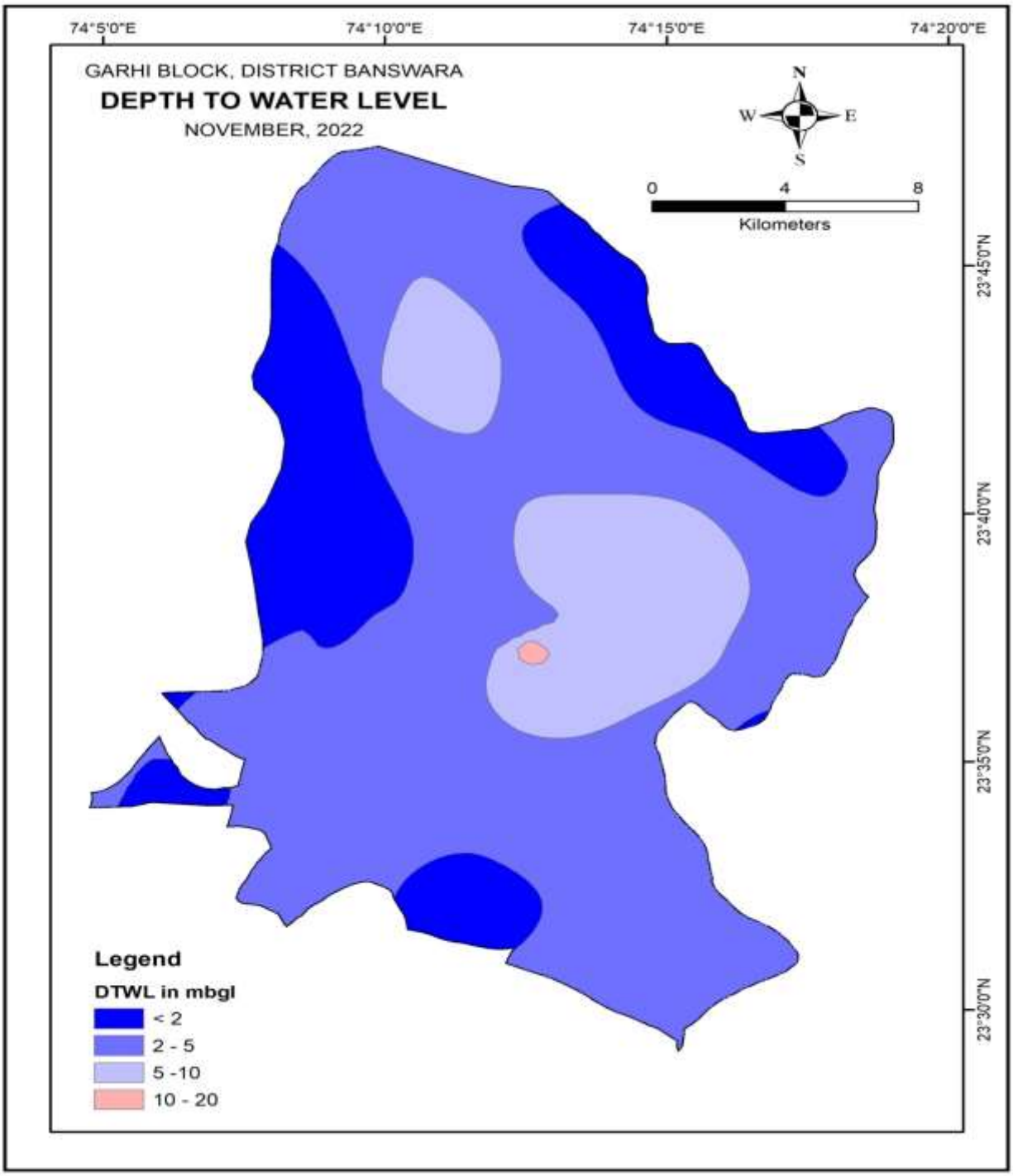


Fig: 39 Depth to water Level Map Post-Monsoon 2022, Grahi Block Banswara District

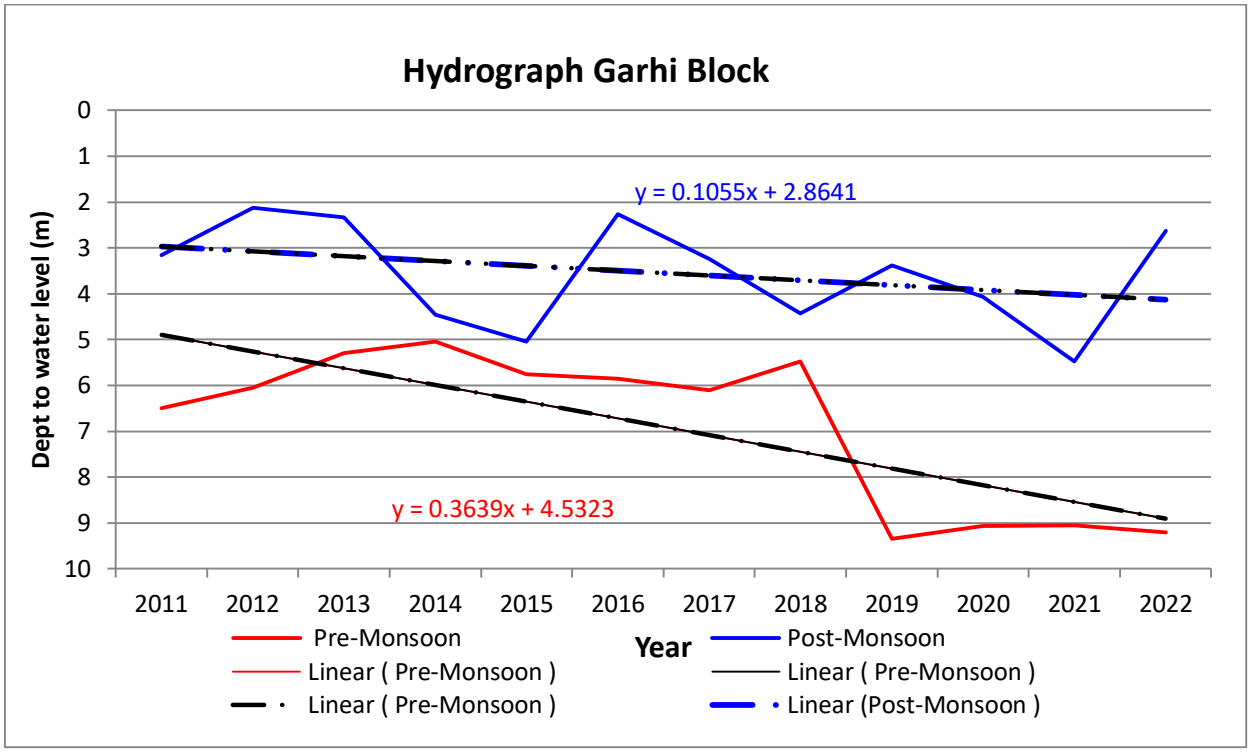


Fig 40: Hydrograph of Garhi Block

GangarTalai Block at a Glance

Salient Information	**Block**	**Gangar talai**
	Geographical Area (km2)	214.15
	Potential Area (Sq.km)	205.20
Climate & Rainfall	Climate	Dry with hot summer and cold winter
	Average Rainfall (1992-2022)	898.6
Ground Water Issues	Aquifer Characteristics	Basalt, Gneiss
	Main Aquifers in the area	Covered by Hard rocks, therefore, weathered, fractured and jointed rock.
Aquifer System	Aquifer Disposition	Weathered zone followed by Phyllite. Schist
	Geology	Phyllite, Schist
	Maximum Depth of Aquifer in meter	75
	Type of Aquifer	Unconfined Aquifer
	Hydraulic Characters (sp.Yield %)	0.023
Water Level Behavior, DTW (m)	Depth to Water Level (m BGL)	4.25
	Trend (m/yr)	-0.03
Ground Water Quality	General	

Salient Information	Block	Gangar talai
	Electrical Conductivity in micro S/cm (Min/Max)	0/1020
	Nitrate in mg/liter (Min/Max)	1/60
	Fluoride in mg/liter (Min/Max)	0/0.39
Groundwater Resources (2022-23)	Total annual ground water recharge(mcm)	0.80612
	Natural discharge during non-monsoon season(mcm)	0.08062
	Net ground water availability(mcm)	0.7255
	Existing gross ground water draft for irrigation(mcm)	0.541
	Existing gross ground water draft for domestic & industrial uses(mcm)	0.03117
	Existing gross ground water draft for all uses(mcm)	0.572
	Allocation for domestic & industrial requirement(mcm)	0.03117
	Net ground water availability for future irrigation development(mcm)	0.153
	State of ground water development	78.89
	Category	Semi Crictical.
Supply Side Management		
	Geographical Area of Block (Sq.km.)	214.15
	Potential area suitable for recharge (Sq.km.)	205.20
	Thickness of unsaturated zone 3 m below ground level (m)	1.69
	Volume of sub surface storage space available for artificial recharge (MCM)	7.89
	Surplus Runoff Availability	10.19
	Surface water available (mcm)	10.22

Salient Information	Block	Gangar talai
	No of Recharge/Farm ponds	0
	Mini Percolation Tanks Proposed	100
Demand side Management	Use of Advanced Irrigation Practices to be promoted	
	(i) Use of Sprinklers	
	Total Irrigated Area (ha)	1165
	Irrigated Area (ha) proposed for irrigation through sprinkler	291.25
	Water Saving by Use of Sprinklers	0.23
	Irrigated Area under wheat (ha)	3641
	Irrigated Area (ha) under wheat proposed for Gram cultivation	1820.5
	Water Saving by change in cropping pattern	8
Expected Benefits	Net G.W. Availability (MCM)	1.53
	Total Net G.W. Availability after intervention (MCM)	2.00
	Existing G.W Draft for all purpose (MCM)	5.72
	Saving of Ground water through demand side intervention (MCM)	2.05
	Net GW draft after interventions (MCM)	5.72
	Present stage of G.W. development (in %)	78.89
	Expected stage of G.W. Dev. (in %)	44.76
Other Interventions proposed, if any	Alternate water Sources available	Canal Network

Assessment Unit

Gangartalai in Banswawa district, Rajasthan one of the semi critical block and is under partially stress as evident from stage of Ground Water development that is 78.89%. The total area of the block is 205.20 km sq. which is potential recharge worthy area also. The block covers 4.2% of the total district area. As per census 2011, the total population of the block is 3867 persons including 2010 males and 1857 females. There are about 760 houses found in Gangartalai block.

1. Background Information

a. Location & extent

Gangar Talia block covering an area of 214.15km sq falls in central part of Banswara district and is located between North latitudes 23°10’ & 24°20’ and East longitudes 74°07’ & 75°15’.Location map is shown in fig.1

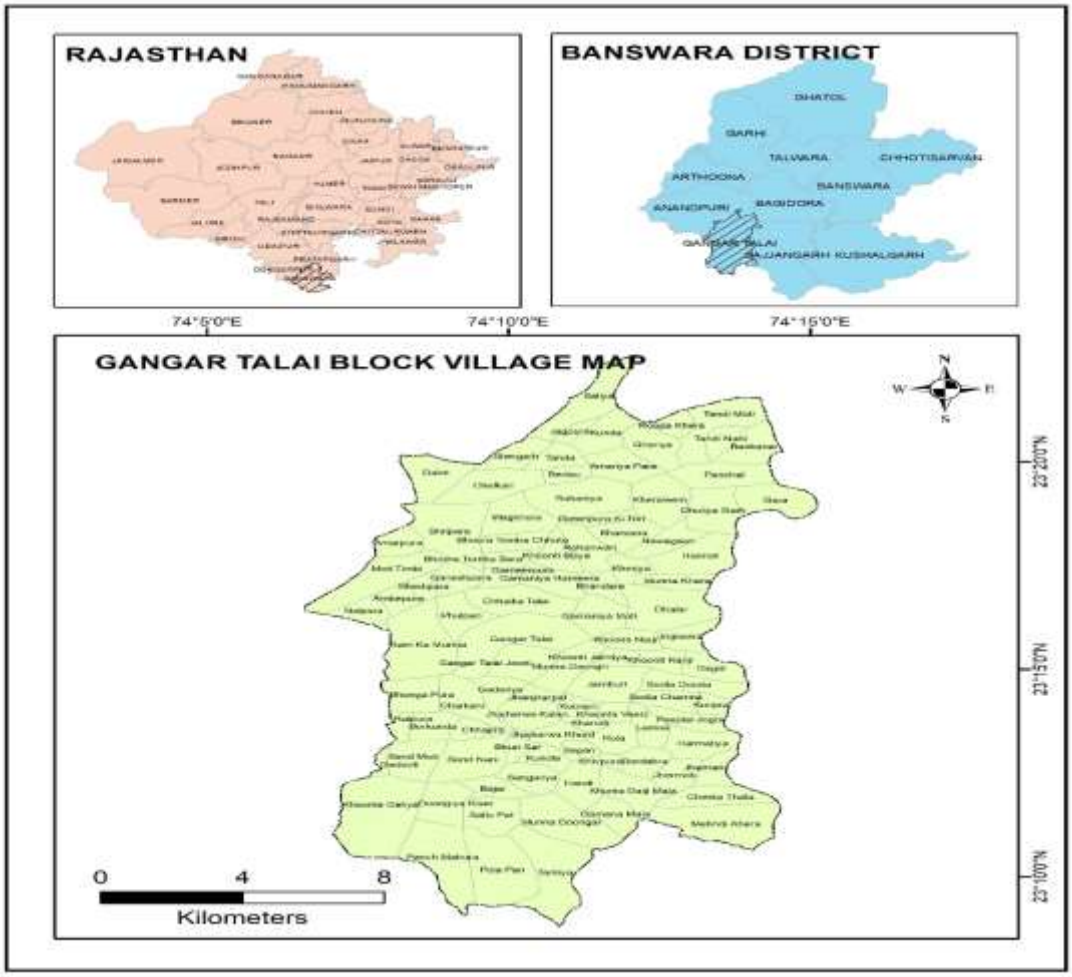


Fig: 41Location map of Gangartalai block, Banswara District

b.Rainfall

The Gangartalai block receives moderate rainfall as compared to other districts of Banswara, the max rainfall is 1882 mm and min rainfall is 412 mm whereas average annual rainfall in the block being 898.6 mm (1992-2022). On an average the climate is fairly dry and good. The year may be divided into four seasons -- the hot season from March to middle of the June, the monsoon season from mid-June to September, post monsoon season from October to November and the cold season from December to February.

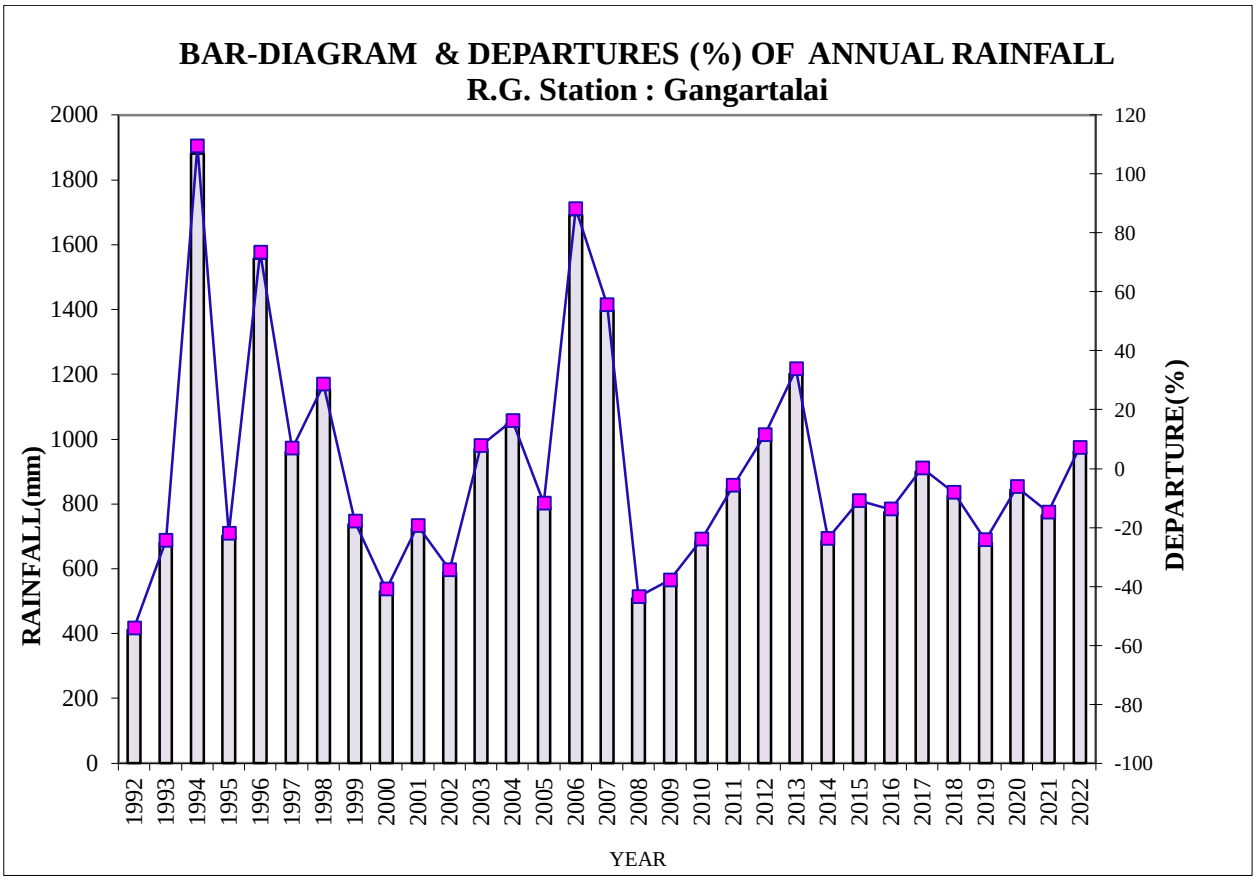


Fig.42: Bar Diagrame of Gangartalai block, Banswara

c. Geomorphology

The Gangartalai block is characterized by buried piedmont Pedi plain, Rivers, pond, Reservoir structure feature like lineation and denudation landforms and valley fills deposits. Geomorphology map of Gangartalai block is given in fig.43

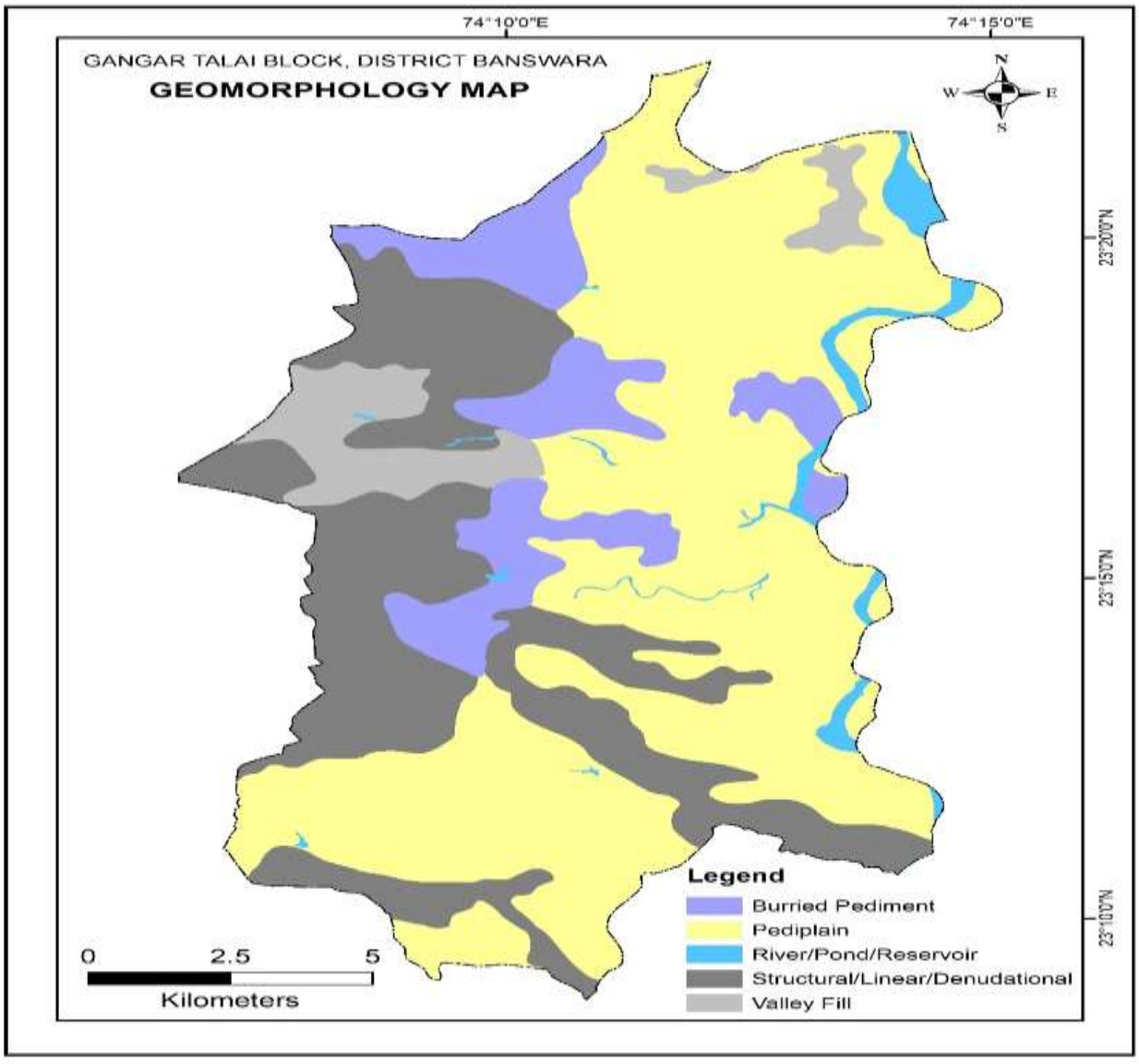


Fig.43. Geomorphology of Gangartalai Block

d. Drainage: The, drainage system of Block belongs to the Mahi river basin.Its main tributaries are Anas, Chap, Haran, Kagdi &Nal.

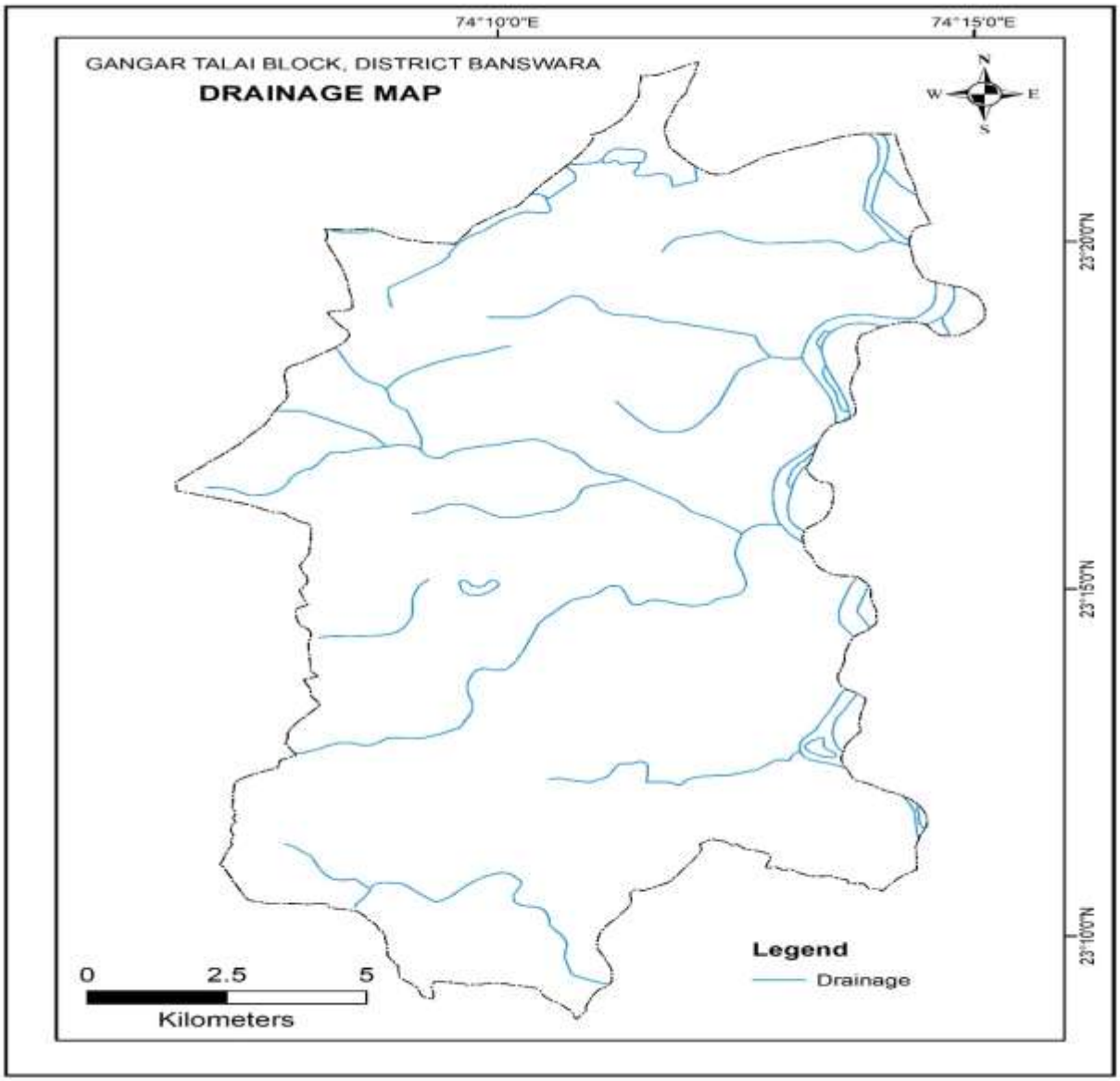


Fig.44. Drainage of Gangartalai Block

3. General Hydrogeology

a. Groundwater Conditions:

Geologically the block is occupied by Gneiss and schist, the ground water is mainly under unconfined conditions in weathered, fractures and jointed hard rock formation developed by secondary porosity. The depth to water level varies widely depending upon topography, drainage, bed rock geology etc.

Pre Monsoon (May 2022):

The depth to water level varies widely depending upon topography, drainage, bed rock geology etc.During Pre-monsoon (May, 2022), depth to water level was found to vary from3mbg1to more than 40 mbgl (Figure 45).The depth to water level map of the block shows that in central part very small pockets have water levels between 2 and 5 m bgl. Eastern, central parts of the blocks had water levels between 5 and 10mbgl, rest of the area has water levels between 10 and 20 m and a very small northern and southern part has water levels between 20 and 40mbgl

Post Monsoon (November 2022):

During Post-monsoon (November, 2022), depth to water level in major part of the district was observed to be between 20 and 40mbgl (Figure 46).This map depicts that only north eastern and northern – southern parts show water levels below 2mbgl and 2 and 5mbgl, 5 and 10mbgl Rest all the area extending from western, eastern and southern10 and 20mbgl. Only small pocket is having water levels within 20 and 40mbgl from Eastern side.

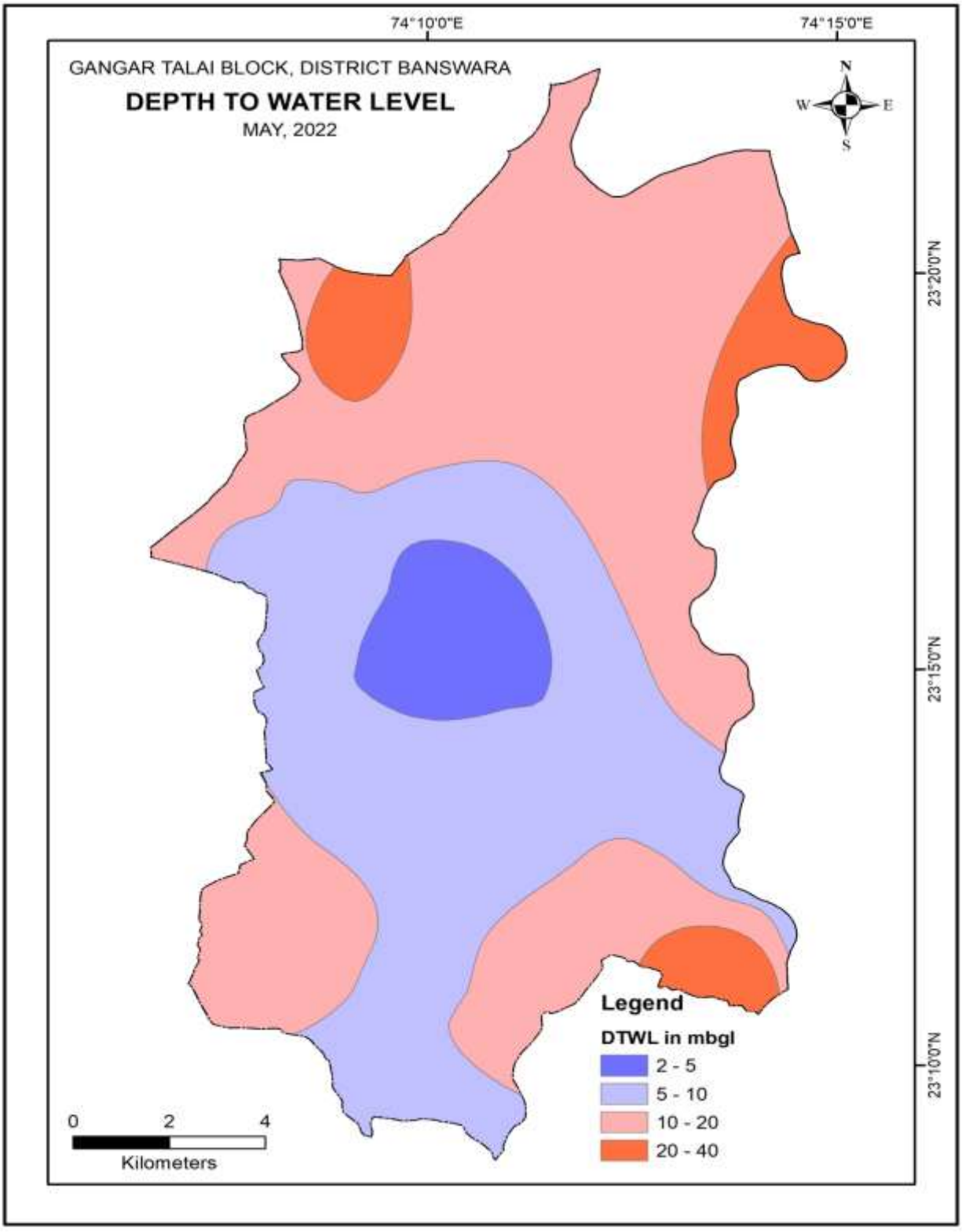


Fig: 45 Depth to water Level Map Pre-Monsoon 2022, Gangar talai Block Banswara District

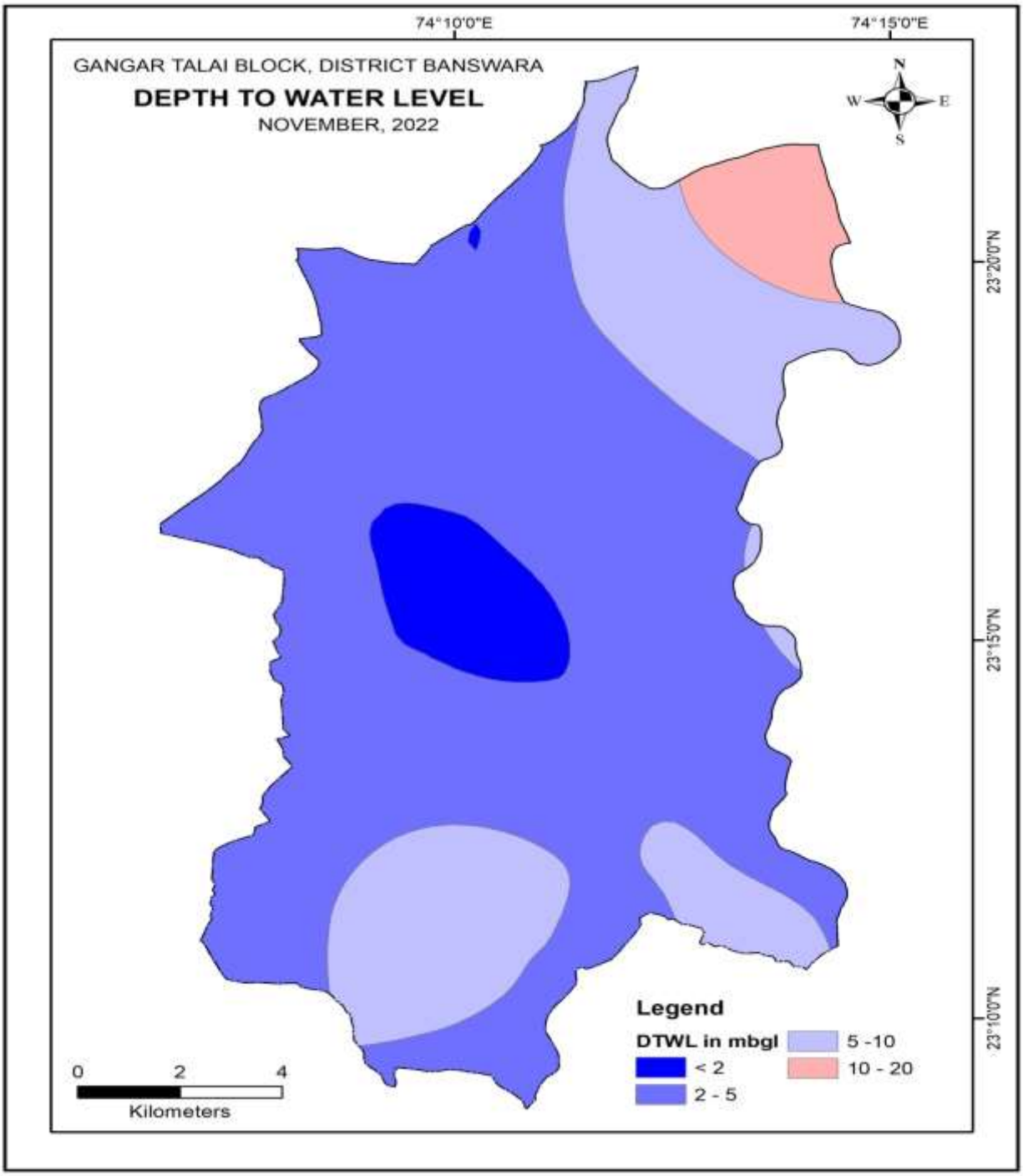


Fig 46: Depth to water Level Map Post-Monsoon 2022, Gangar talai Block Banswara District

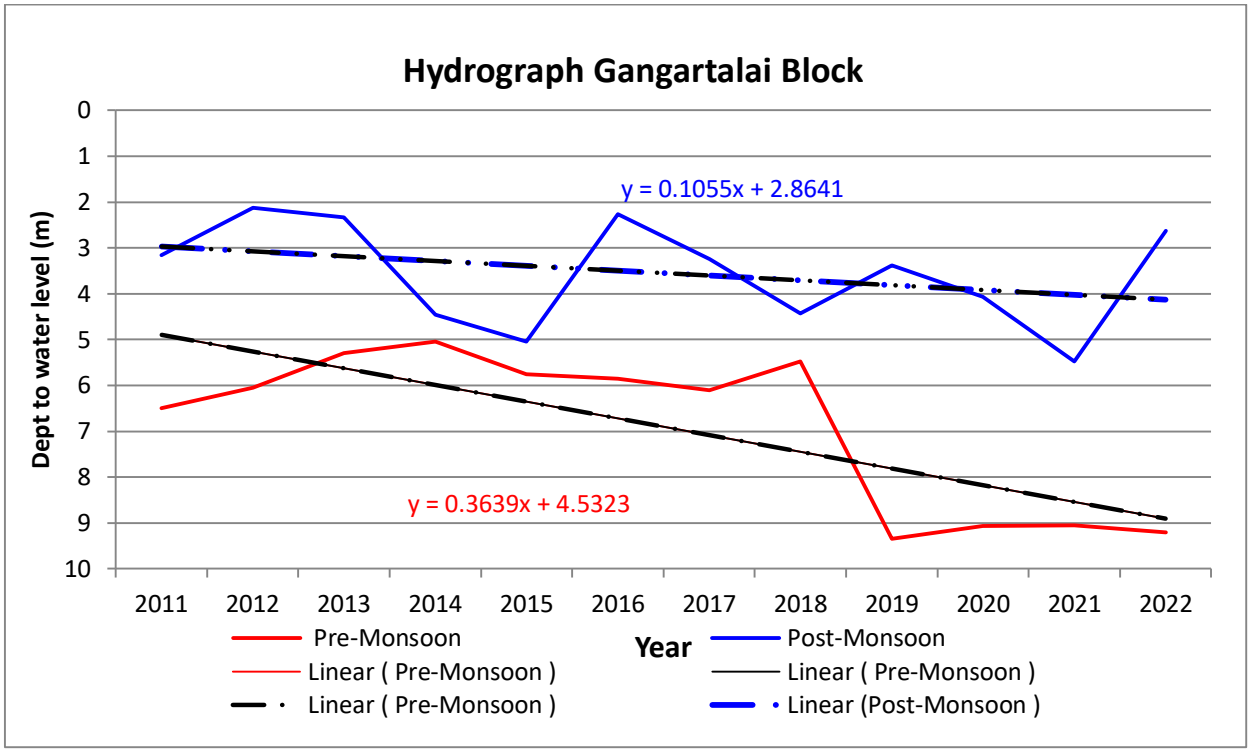


Fig 47: Hydrograph of Gangartalai block

Kushalgarh Block at a Glance

Salient Information	**Block**	**Kushal garh**
	Geographical Area (km2)	651.8
	Potential Area (Sq.km)	507.89
Climate & Rainfall	Climate	Dry with hot summer and cold winter
	Average Rainfall (1992-2022)	1012mm
Ground Water Issues	Aquifer Characteristics	Basalt, Gneiss
	Main Aquifers in the area	Covered by Hard rocks, therefore, weathered, fractured and jointed rock.
Aquifer System	Aquifer Disposition	Weathered zone followed by Basalt, Gneiss
	Geology	Basalt, Gneiss
	Maximum Depth of Aquifer in meter	60
	Type of Aquifer	Unconfined Aquifer
	Hydraulic Characters (sp.Yield %)	0.023
Water Level Behavior, DTW (m)	Depth to Water Level (m BGL)	10.04
	Trend (m/yr)	0.42
Ground Water Quality	General	

Salient Information	Block	Kushal garh
	Electrical Conductivity in micro S/cm (Min/Max)	520/1050
	Nitrate in mg/liter (Min/Max)	3.4/110
	Fluoride in mg/liter (Min/Max)	0.20/1.62
Groundwater Resources (2022-23)	Total annual ground water recharge(mcm)	1.64982
	Natural discharge during non-monsoon season(mcm)	0.164
	Net ground water availability(mcm)	1.48483
	Existing gross ground water draft for irrigation(mcm)	1.131
	Existing gross ground water draft for domestic & industrial uses(mcm)	0.173
	Existing gross ground water draft for all uses(mcm)	1.3059
	Allocation for domestic & industrial requirement(mcm)	0.173
	Net ground water availability for future irrigation development(mcm)	0.178
	State of ground water development	87.84
	Category	Semi Critical.
Supply Side Management		
	Geographical Area of Block (Sq.km.)	651.8
	Potential area suitable for recharge (Sq.km.)	507.89
	Thickness of unsaturated zone 3 m below ground level (m)	7.04
	Volume of sub surface storage space available for artificial recharge (MCM)	80.4
	Surplus Runoff Availability	30.84
	Surface water available (mcm)	31.44
	No of Recharge/Farm ponds	0

Salient Information	**Block**	**Kushal garh**
	Mini Percolation Tanks Proposed	300
Demand side Management	Use of Advanced Irrigation Practices to be promoted	
	(i) Use of Sprinklers	
	Total Irrigated Area (ha)	1022
	Irrigated Area (ha) proposed for irrigation through sprinkler	255.5
	Water Saving by Use of Sprinklers	0.20
	Irrigated Area under wheat (ha)	7763
	Irrigated Area (ha) under wheat proposed for Gram cultivation	3881
	Water Saving by change in cropping pattern	3.88
Expected Benefits	Net G.W. Availability (MCM)	1.79
	Total Net G.W. Availability after intervention (MCM)	2.00
	Existing G.W Draft for all purpose (MCM)	3.81
	Saving of Ground water through demand side intervention (MCM)	0.40
	Net GW draft after interventions (MCM)	13.05
	Present stage of G.W. development (in %)	87.94
	Expected stage of G.W. Dev. (in %)	54.44
Other Interventions proposed, if any	Alternate water Sources available	Canal Network

1. Assessment Unit at a Glance

Kushalgarh block in Banswawa district, Rajasthan one of the semi critical block and is under partially stress as evident from stage of Ground Water development that is 87.94%. The total area of the block is 507.89 km sq. which is potential recharge worthy area also. The block covers 12.93% of the total district area. As per census 2011, the total population of the block is 10,666 persons including 5406 males and 5260 females.

2. Background Information

a.Location& extent

Kushalgarh block covering an area of 651.85 km sq falls in southern part of Banswara district and is located between North latitudes 23°20’ & 23°48’ and East longitudes 74°25’ & 74°45’.Location map is shown in fig.1

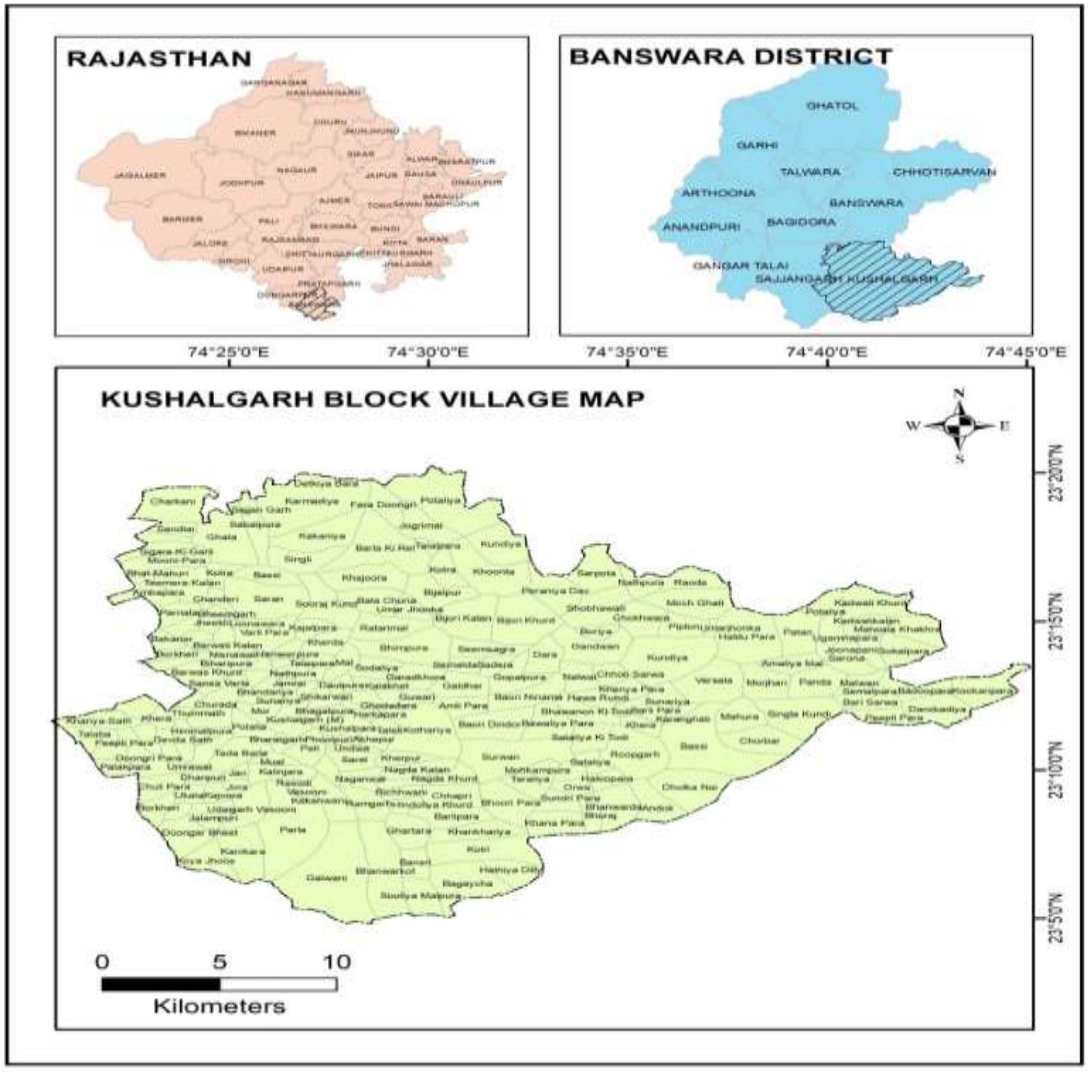


Fig.48: Location map of Kushalgarh Block, Banswara Distric

b.Rainfall

The Kushalgarh block receives highest rainfall as compared to other districts of Banswara, the max rainfall is 1011.9 mm and min rainfall is 779.7mm whereas average annual rainfall in the block being 1012.6 mm (1992-2022). On an average the climate is fairly dry and healthy. The year may be divided into four seasons -- the hot season from March to middle of the June, the monsoon season from mid-June to September, post monsoon season from October to November and the cold season from December to February

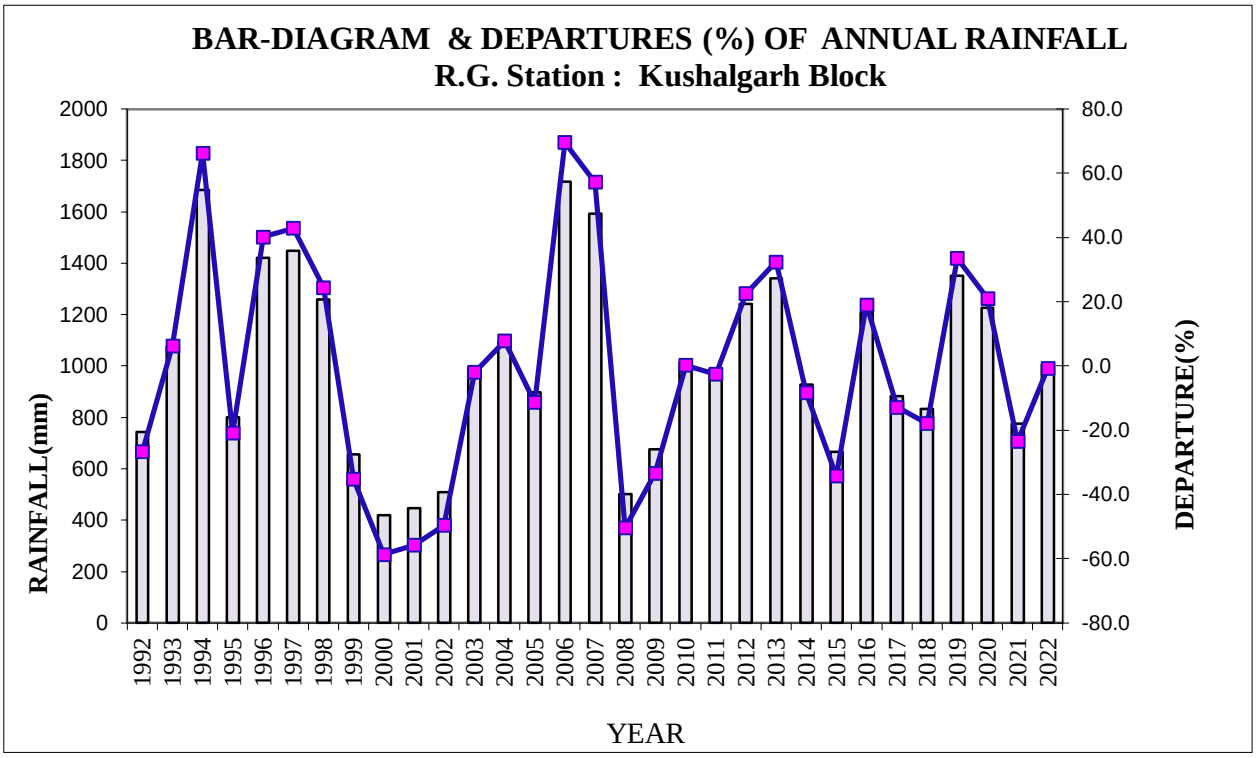


Fig.49: Bar Diagrame of Kushal garh block, Banswara

c. Geomorphology

The block Kushalgarh is characterized by Buried Pediment, Pedi plain, Piedmont zone, plateau, Rivers, Ponds, Reservoir, Structures like lineation and Denudation landforms, Valley fill deposits. Geomorphology map of Kushalgarh block is given in fig.50

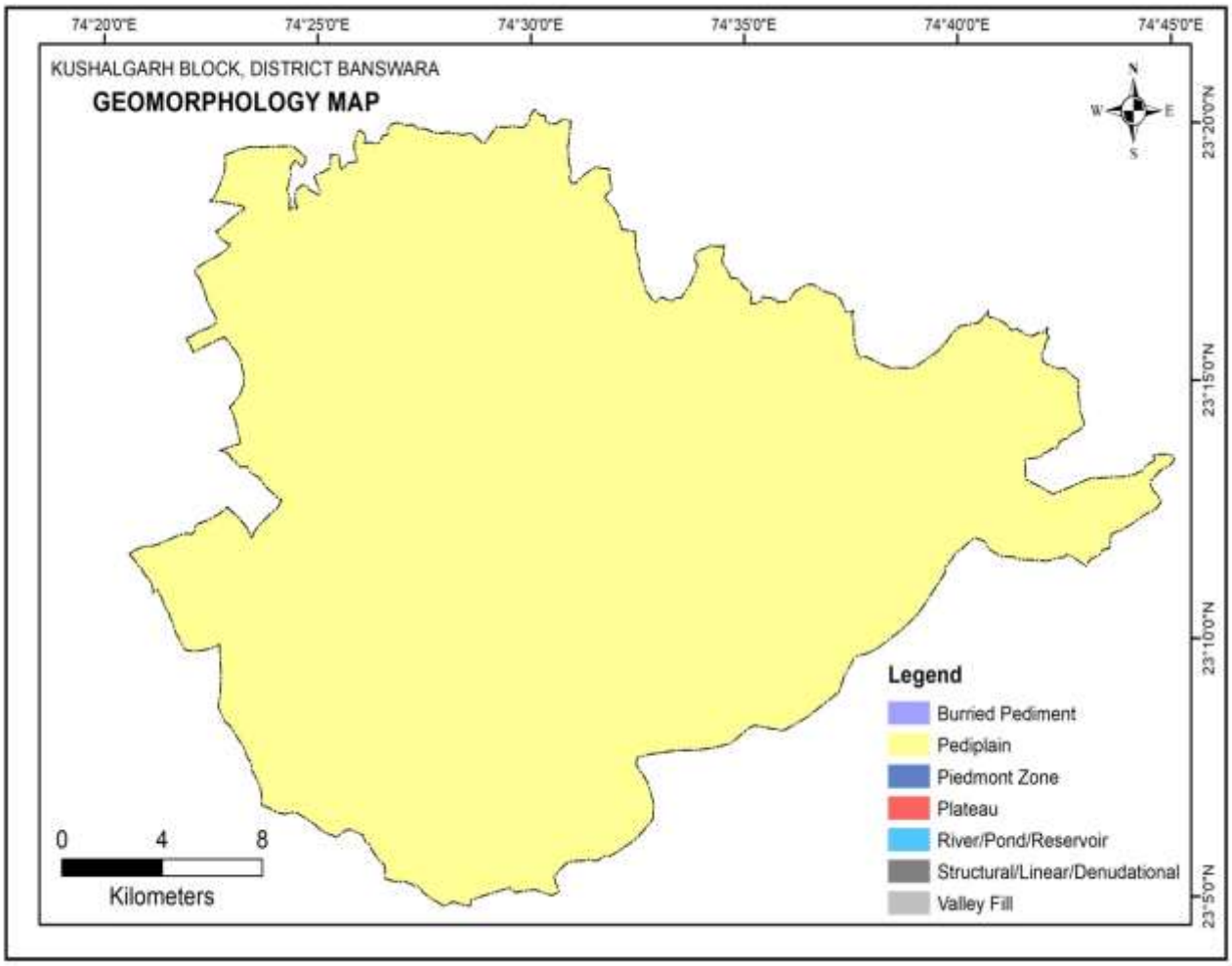


Fig.50. Geomorphology of Kushalgarh Block

Management Interventions

In order to manage the ground water resources and to control further decline in water levels, a management plan has been proposed. The management plan comprises two components- supply side management and demand side management. . The area identified for artificial recharge under supply side management is the subsurface space/unsaturated aquifer that have declining decadal trend, EC less than 2500 microseimens/cm at 25°C and post monsoon depth water level below 3 m from ground level. On the above criteria the area identified covers -------sq.kmand is presented in figure 50

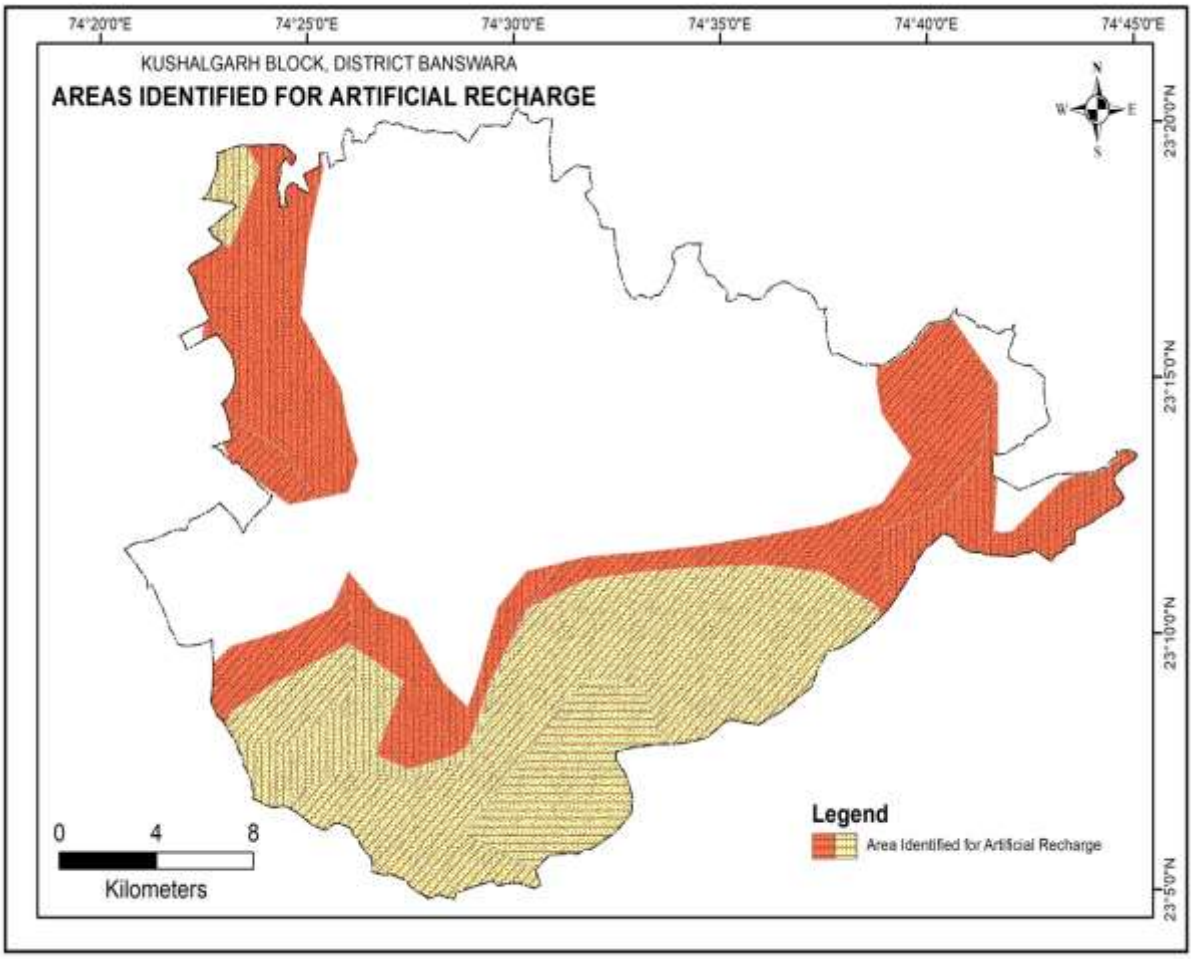


Fig 51: Area Identified for Artificial Recharge of Kushalgarh Block.

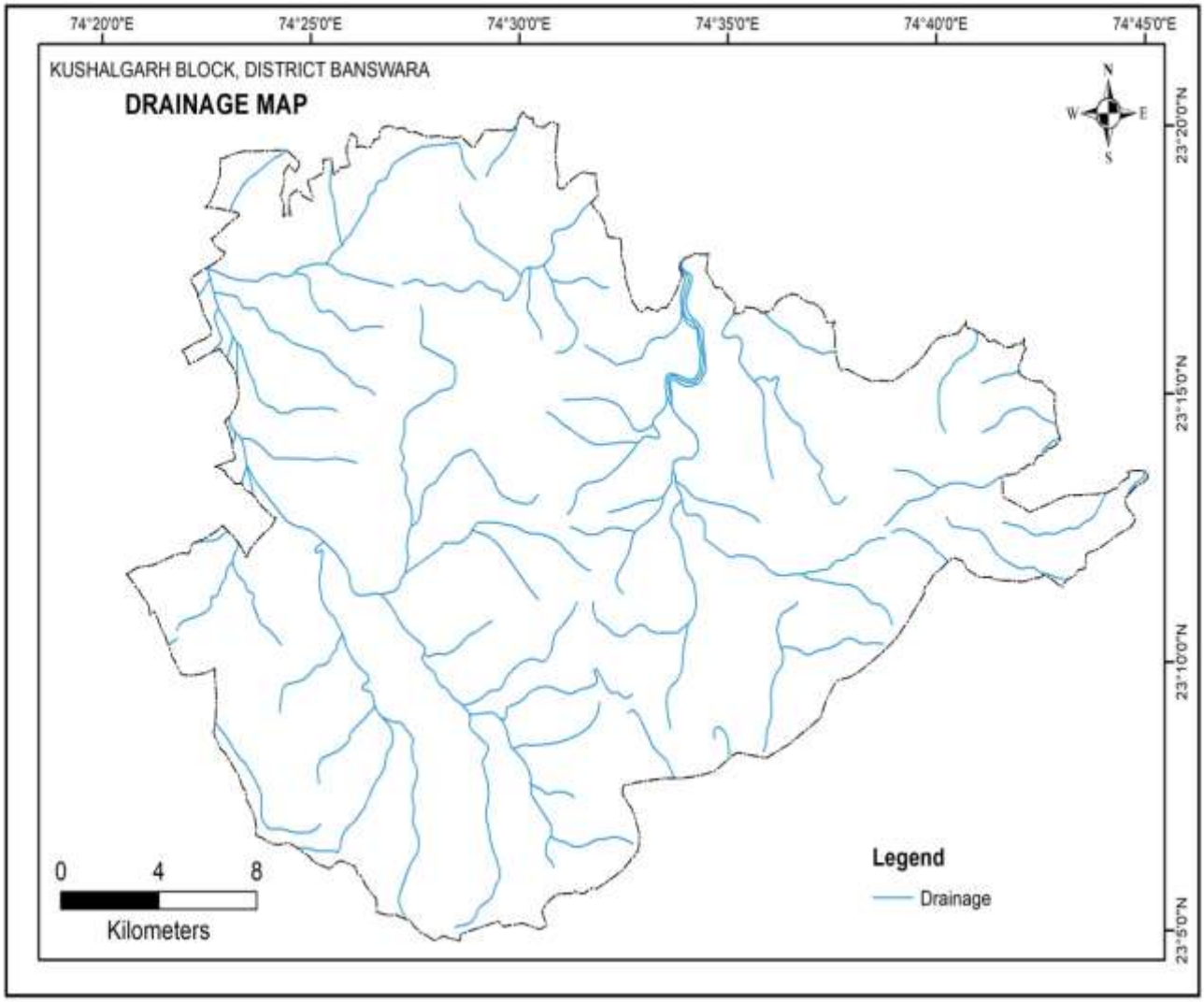


Fig. 52: Drainage Map of Kushalgarh Block of Banswara District.

4. General Hydrogeology

b. Groundwater Conditions:

Geologically the block is occupied by Gneiss and schist, the ground water is mainly under unconfined conditions in weathered, fractures and jointed hard rock formation developed by secondary porosity. The depth to water level varies widely depending upon topography, drainage, bed rock geology etc.

Pre Monsoon (May 2022):

The depth to water level varies widely depending upon topography, drainage, bed rock geology etc.During Pre-monsoon (May, 2022), depth to water level was found to vary from3mbg1to more than 40 mbgl (Figure 53).The depth to water level map of the block shows that in central part very small pockets have water levels between 2 and 5 m bgl. Eastern, central parts of the blocks had water levels between 5 and 10mbgl, rest of the area has water levels between 10 and 20 m and a very small northern and southern part has water levels between 20 and 40mbgl

Post Monsoon (November 2022):

During Post-monsoon (November, 2022), depth to water level in major part of the district was observed to be between 20 and 40mbgl (Figure 54).This map depicts that only north eastern and northern – southern parts show water levels below 2mbgl and 2 and 5mbgl, 5 and 10mbgl Rest all the area extending from western, eastern and southern10 and 20mbgl. Only small pocket is having water levels within 20 and 40mbgl from Eastern side.

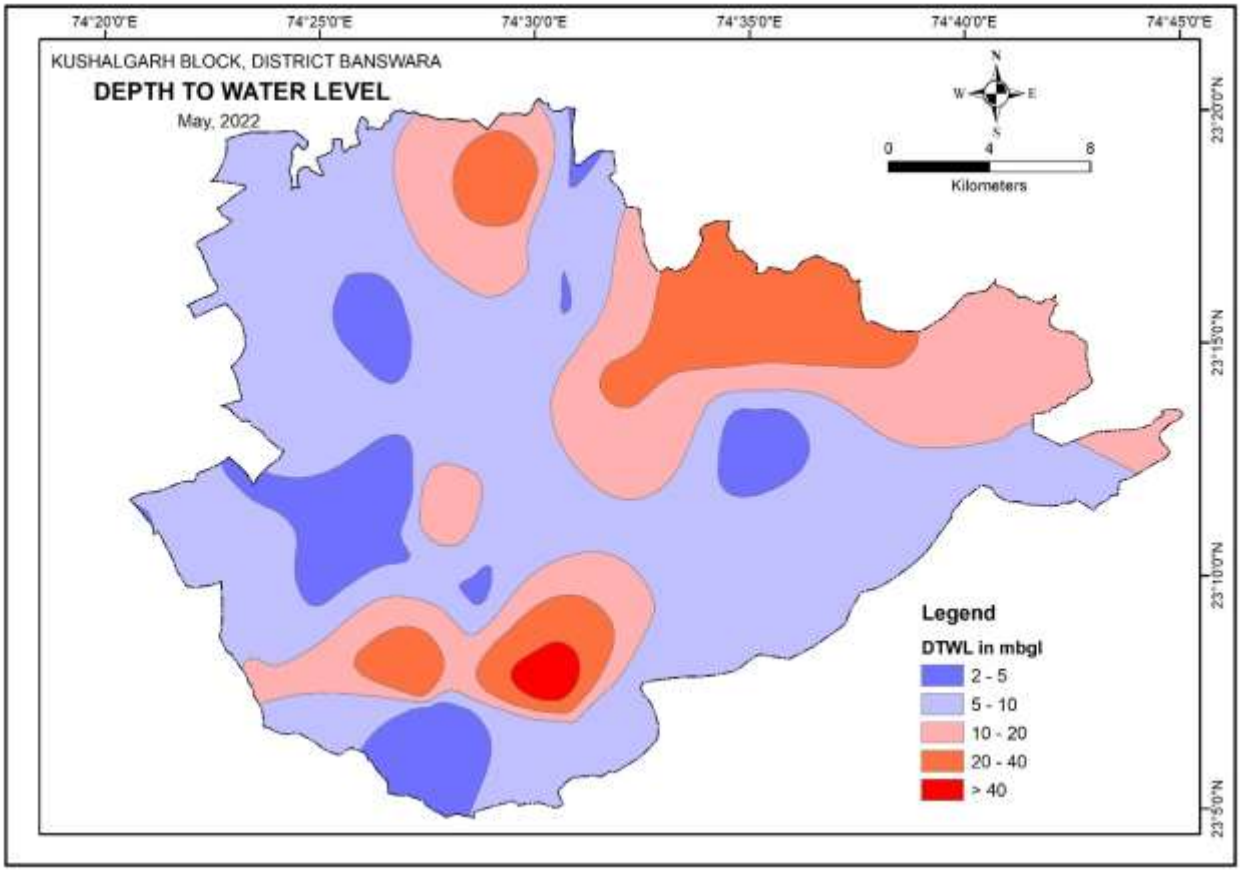


Fig 53: Depth to water Level Map Pre-Monsoon 2022, Khushalgarh Block Banswara District

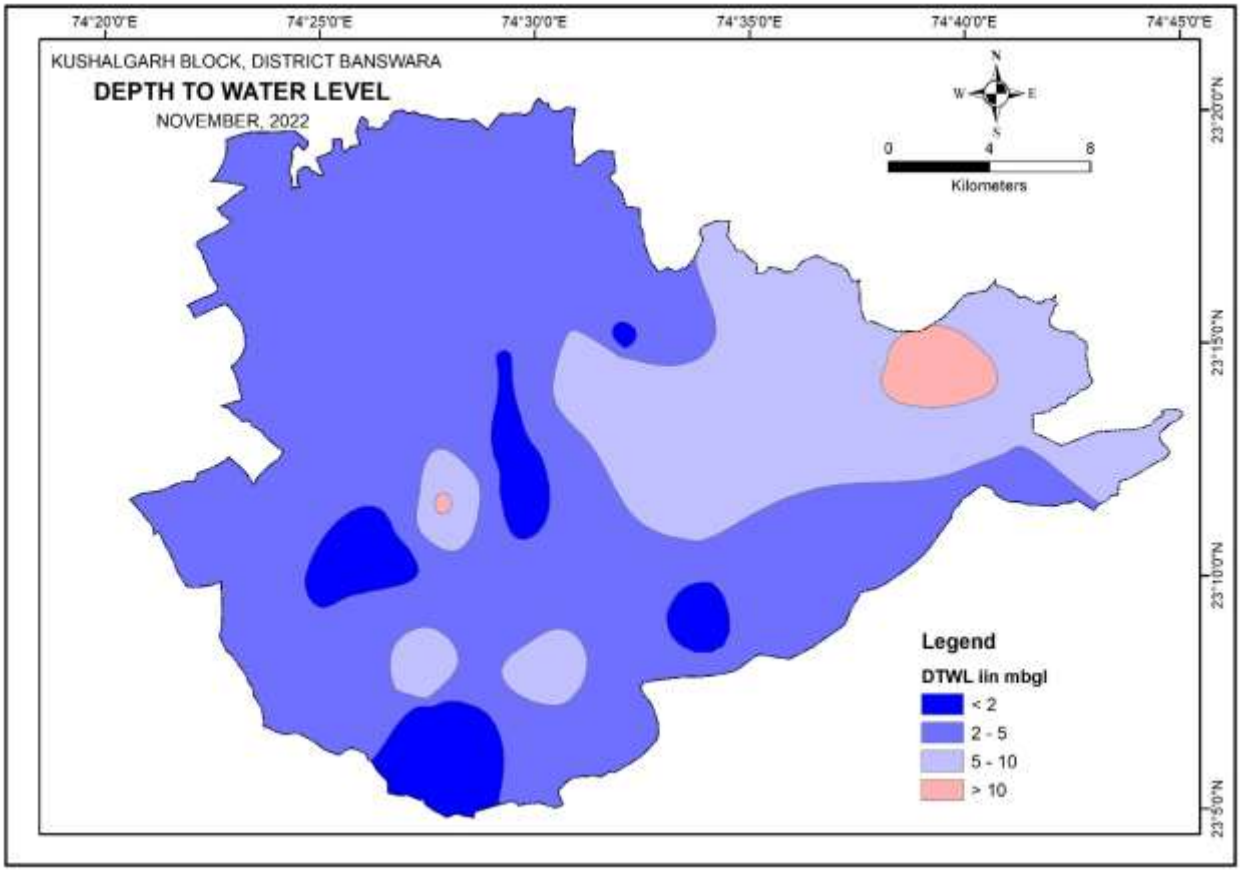


Fig 54: Depth to water Level Map Post-Monsoon 2022, Khushalgarh Block Banswara District

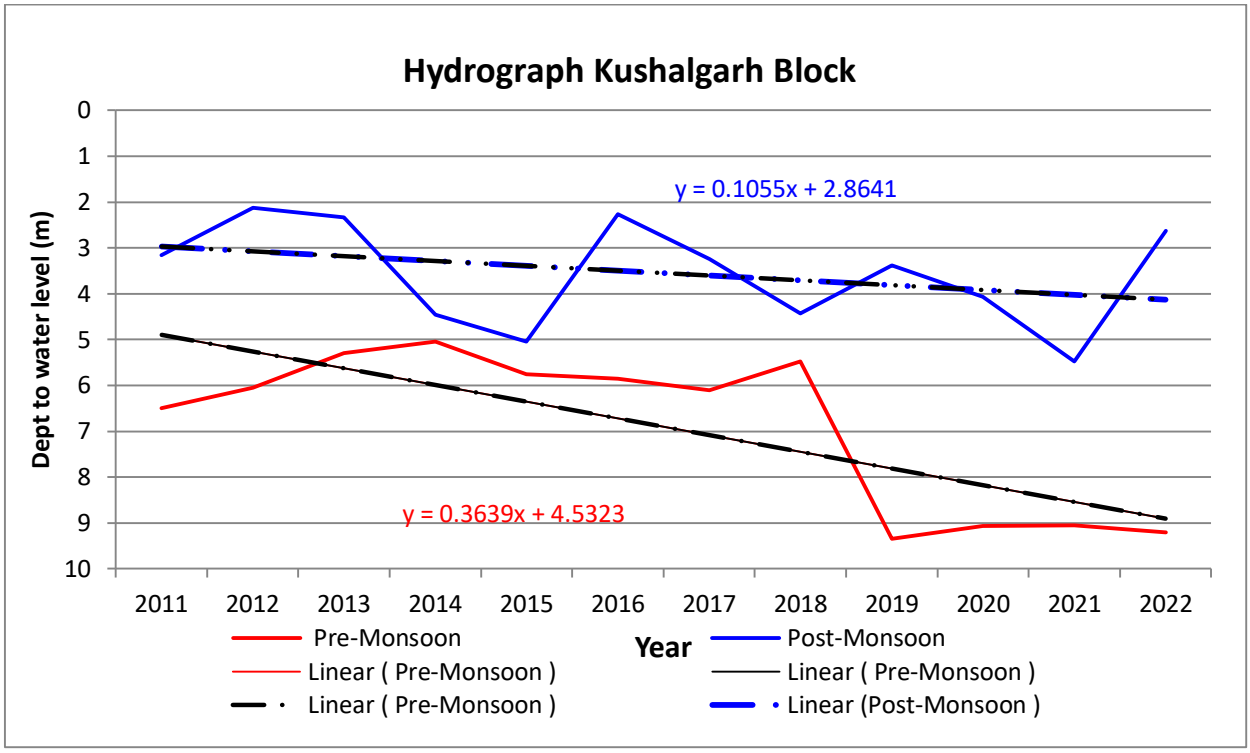


Fig 55: Hydrograph of Kushalgraph Block

Bagidora Block at a Glance

Salient Information	**Block**	**Bagidora**
	Geographical Area (km2)	308.19
	Potential Area (Sq.km)	295.29
Climate & Rainfall	Climate	Dry with hot summer and cold winter
	Average Rainfall (1992-2022)	908.7 mm
Ground Water Issues	Aquifer Characteristics	Phyllite, Gneiss
	Main Aquifers in the area	Covered by Hard rocks, therefore, weathered, fractured and jointed rock.
Aquifer System	Aquifer Disposition	Weathered zone followed by Phyllite, Gneiss
	Geology	Phyllite, Gneiss
	Maximum Depth of Aquifer in meter	50
	Type of Aquifer	Unconfined Aquifer
	Hydraulic Characters (sp.Yield %)	0.030
Water Level Behavior, DTW (m)	Depth to Water Level (m BGL)	4.56
	Trend (m/yr)	-0.11
Ground Water Quality	General	

Salient Information	**Block**	**Bagidora**
	Electrical Conductivity in micro S/cm (Min/Max)	600/2490
	Nitrate in mg/liter (Min/Max)	13.7/125
	Fluoride in mg/liter (Min/Max)	0.35/1.50
Groundwater Resources (2022-23)	Total annual ground water recharge(mcm)	1.7619
	Natural discharge during non-monsoon season(mcm)	0.176
	Net ground water availability(mcm)	1.58577
	Existing gross ground water draft for irrigation(mcm)	1.1522
	Existing gross ground water draft for domestic & industrial uses(mcm)	0.140
	Existing gross ground water draft for all uses(mcm)	1..2931
	Allocation for domestic & industrial requirement(mcm)	0.14082
	Net ground water availability for future irrigation development(mcm)	0.4253
	State of ground water development	81.54
	Category	Semi Critical.
Supply Side Management		
	Geographical Area of Block (Sq.km.)	308.19
	Potential area suitable for recharge (Sq.km.)	295.29
	Thickness of unsaturated zone 3 m below ground level (m)	1.56
	Volume of sub surface storage space available for artificial recharge (MCM)	13.79
	Surplus Runoff Availability	14.51
	Surface water available (mcm)	14.56
	No of Recharge/Farm ponds	0

Salient Information	Block	Bagidora
	Mini Percolation Tanks Proposed	300
Demand side Management	Use of Advanced Irrigation Practices to be promoted	
	(i) Use of Sprinklers	
	Total Irrigated Area (ha)	1343
	Irrigated Area (ha) proposed for irrigation through sprinkler	485
	Water Saving by Use of Sprinklers	0.38
	Irrigated Area under wheat (ha)	9557
	Irrigated Area (ha) under wheat proposed for Gram cultivation	4778
	Water Saving by change in cropping pattern	4.7
Expected Benefits	Net G.W. Availability (MCM)	2.93
	Total Net G.W. Availability after intervention (MCM)	3.61
	Existing G.W Draft for all purpose (MCM)	12.93
	Saving of Ground water through demand side intervention (MCM)	4.78
	Net GW draft after interventions (MCM)	12.93
	Present stage of G.W. development (in %)	81.54
	Expected stage of G.W. Dev. (in %)	46.95
Other Interventions proposed, if any	Alternate water Sources available	Canal Network

1. Assessment Unit at a Glance

The groundwater development in the Bagidora block of Banswara district is increasing rapidly from 68.76% in 2017 to 81.54% in 2022.The block was in Safe category in 2017, now the block is in Semi-Critical condition. The total area of the block is 308.19 km sq. out of which 195.29 km sq is potential recharge worthy. The block covers 6.79% of the total district area. As per census 2011, the total population of the block is 373,825 including 189,168 males and 184,657 females.

2. Background Information

a. Location & extent

Bagidora block covering an area of 308.19 km sq. falls in central part of Banswara district and is located between North latitudes 23°19’ & 23°32’ and East longitudes 74°11’ & 74°27’.

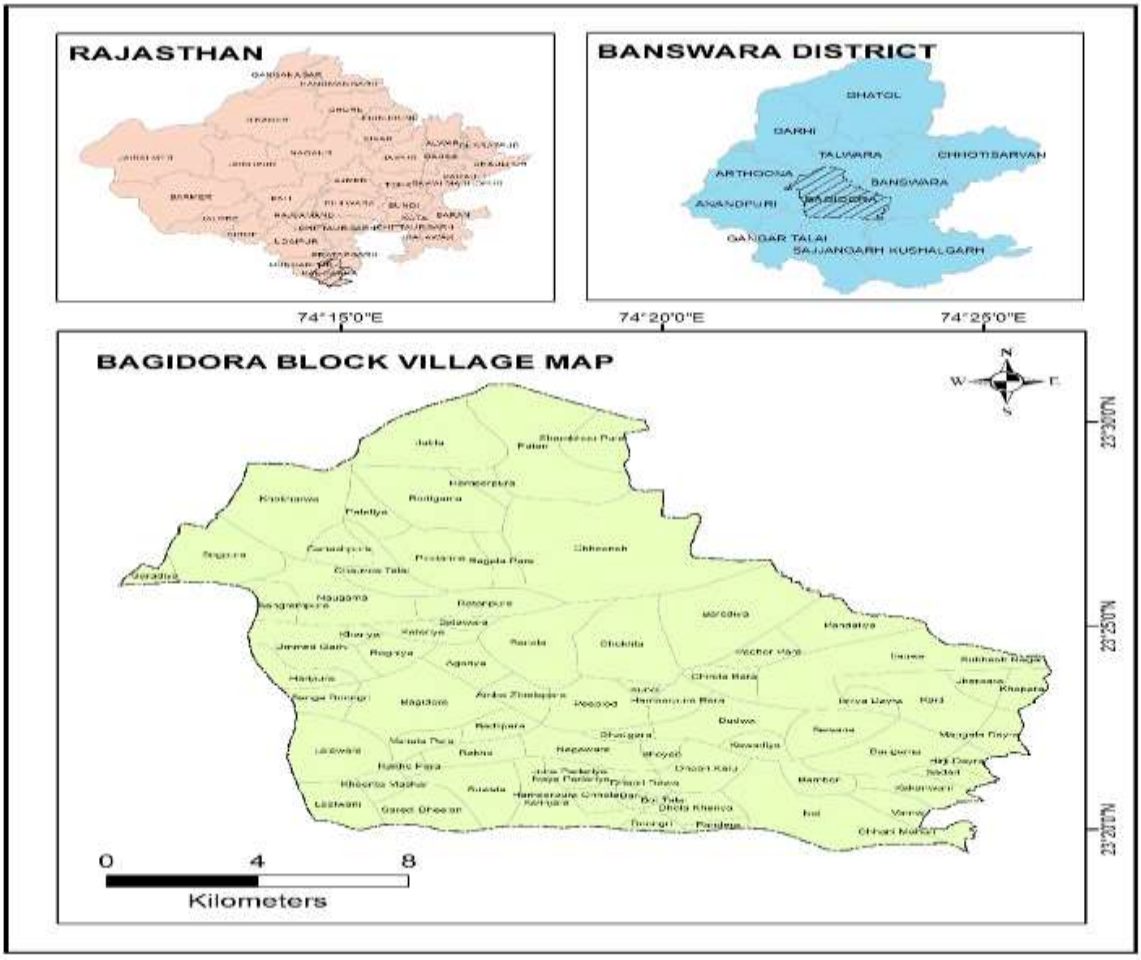


Fig.56: Location map of Bagidora block, Banswara District

b. Rainfall and Climate

Average annual rainfall (1992-2022) of the block is 908.7 mm. The climate of the block is dry except in S-W monsoon season. The cold season is from December to February and is followed by summer from March to June. From mid of September to end of November constitutes post monsoon season.

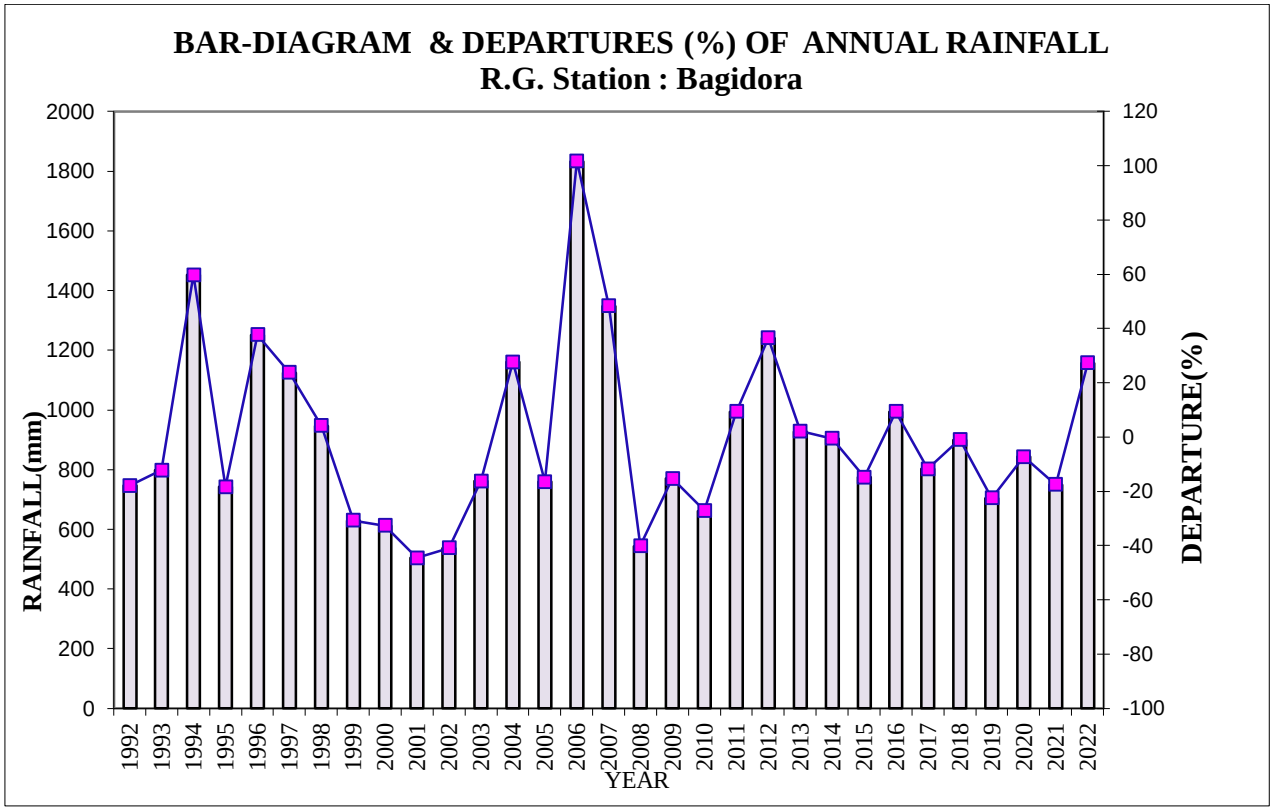


Fig.57: Bar Diagrame of Bagidora block, Banswara

c. Geomorphology

The block being a part of Bagidora district, exhibits various geomorphological landforms occurring in the district viz.Burried Pediments, Pediplain, Valley fills, Ravines, Structural hills, water bodies and Plateau. The map shown in fig.57 displays the geomorphological set up of the block.

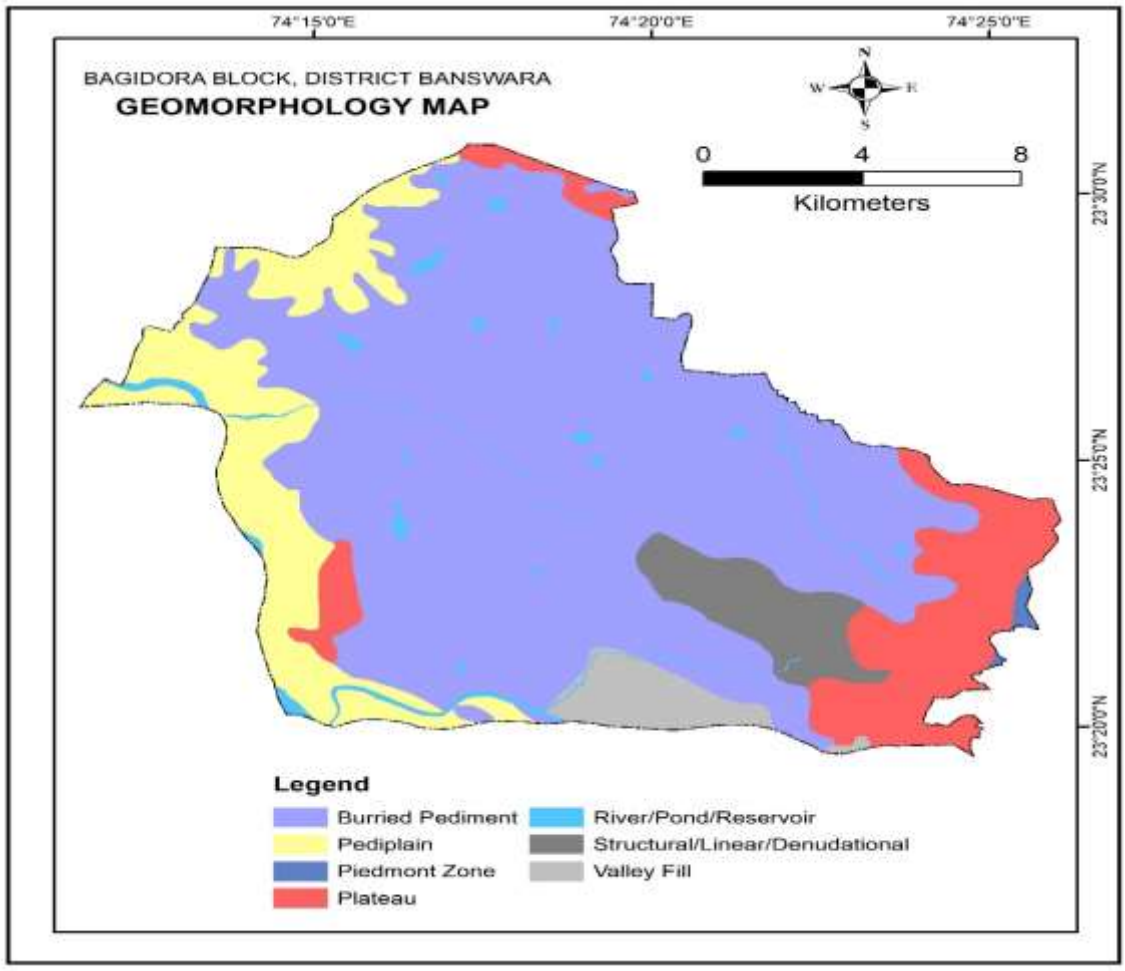


Fig .58: Geomorphology of Bagidora Block, Banswara District

3. General Hydrogeology

a. Groundwater Conditions

Bagidora block is occupied by Phyllite and Schist of Aravalli Super Group. The rocks are generally soft and susceptible to weathering. The rocks have varied mineralogical and physical character. Groundwater occurs under unconfined condition in saturated zone of rock formation. Its occurrence is controlled by topography, physiography and structural features of the geological formations. Movement of groundwater in hard rock areas is governed by size, interconnection and continuity of structurally weak planes.

Pre Monsoon (May 2022):

The depth to water level varies widely depending upon topography, drainage, bed rock geology etc.During Pre-monsoon (May, 2022), depth to water level was found to vary from3mbg1to more than 40 mbgl (Figure 59).The depth to water level map of the block shows that in central part very small pockets have water levels between 2 and 5 m bgl. Eastern, central parts of the blocks had water levels between 5 and 10mbgl, rest of the area has water levels between 10 and 20 m and a very small northern and southern part has water levels between 20 and 40mbgl

Post Monsoon (November 2022):

During Post-monsoon (November, 2022), depth to water level in major part of the district was observed to be between 20 and 40mbgl (Figure 60).This map depicts that only north eastern and northern – southern parts show water levels below 2mbgl and 2 and 5mbgl, 5 and 10mbgl Rest all the area extending from western, eastern and southern10 and 20mbgl. Only small pocket is having water levels within 20 and 40mbgl from Eastern side.

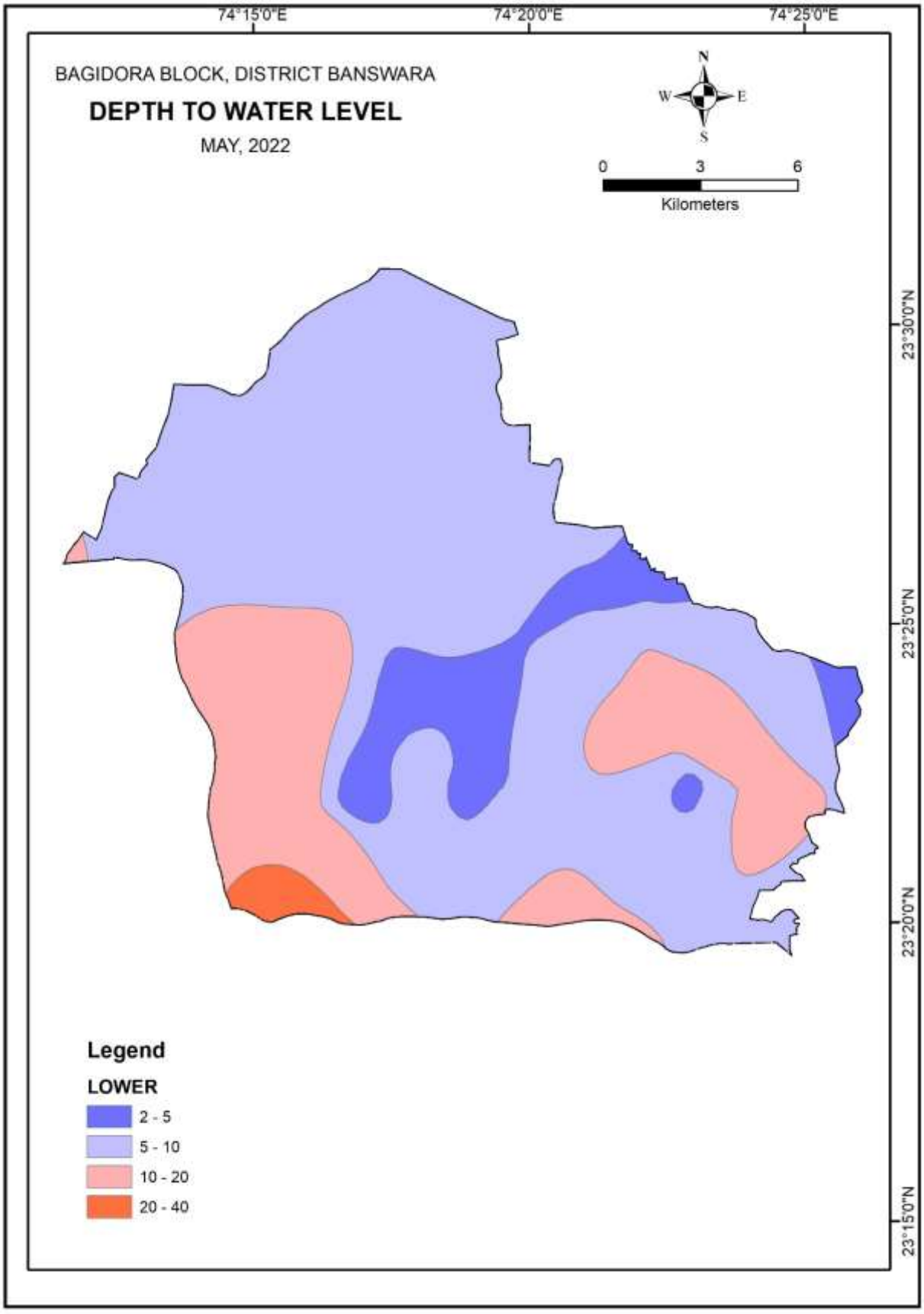


Fig 59: Depth to water Level Map Pre-Monsoon 2022, Bagidora Block Banswara District

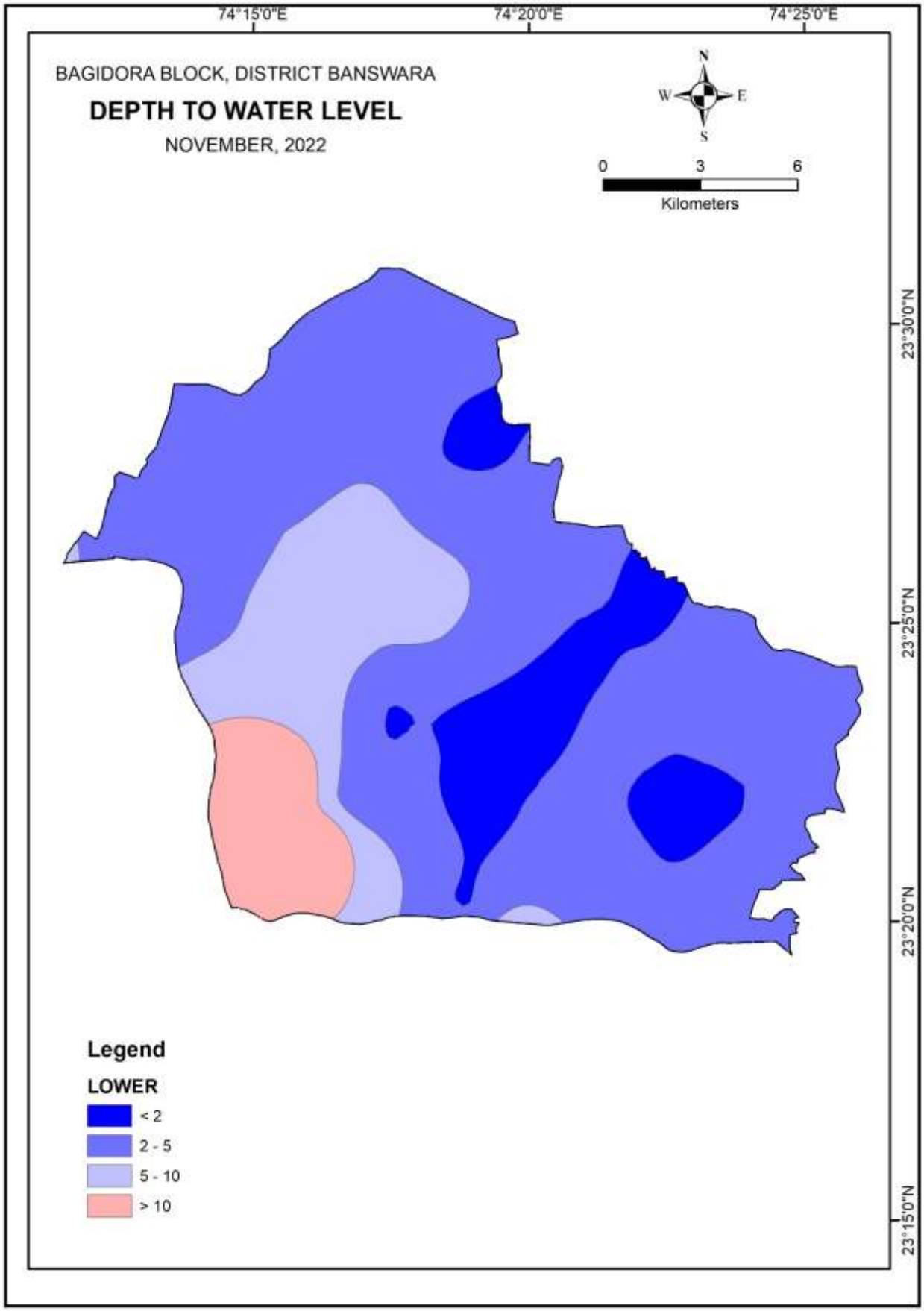


Fig 60: Depth to water Level Map Post-Monsoon 2022, Bagidora Block Banswara District

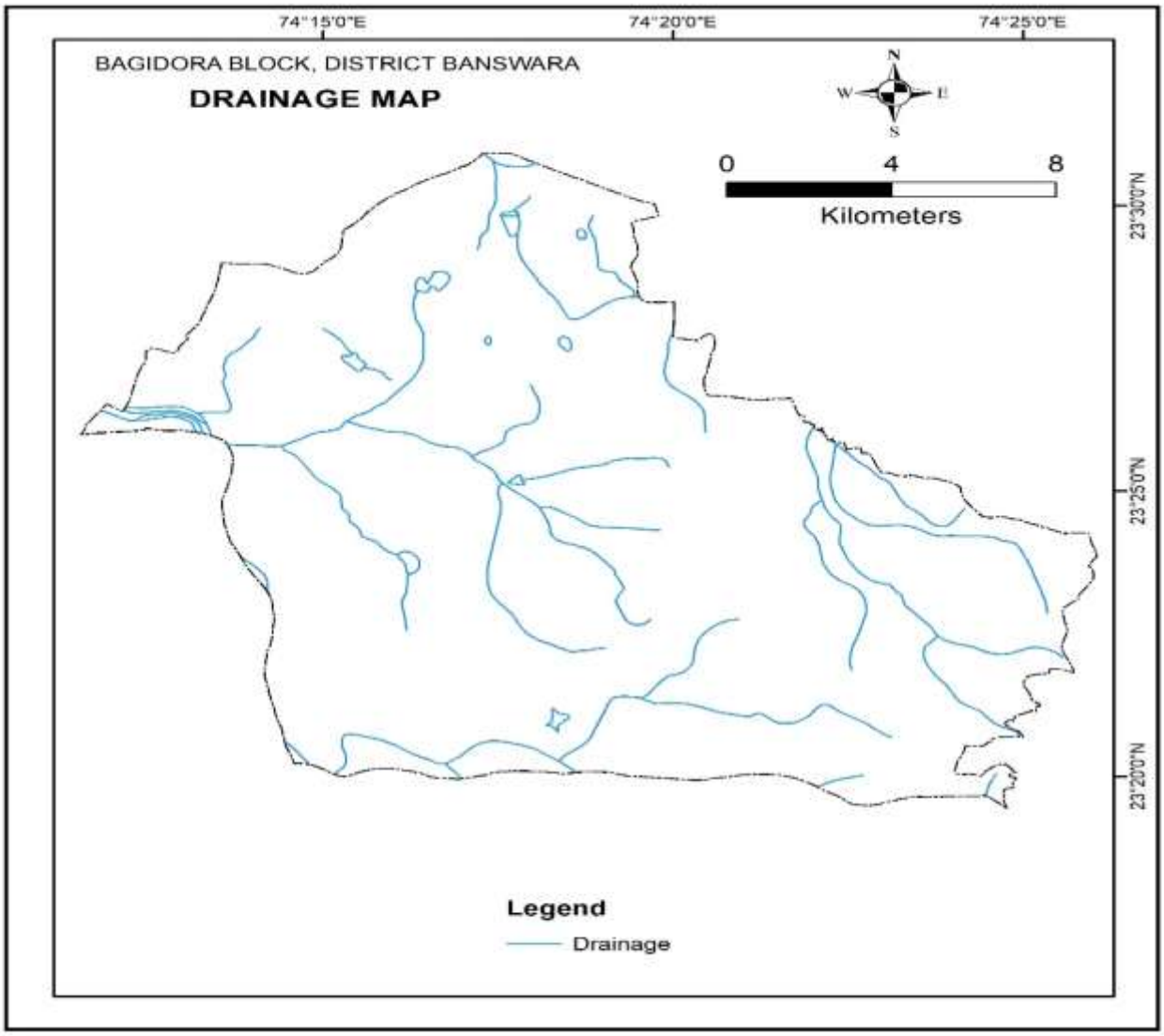


Fig. 61: Drainage Map of Bagidora Block, Banswara District

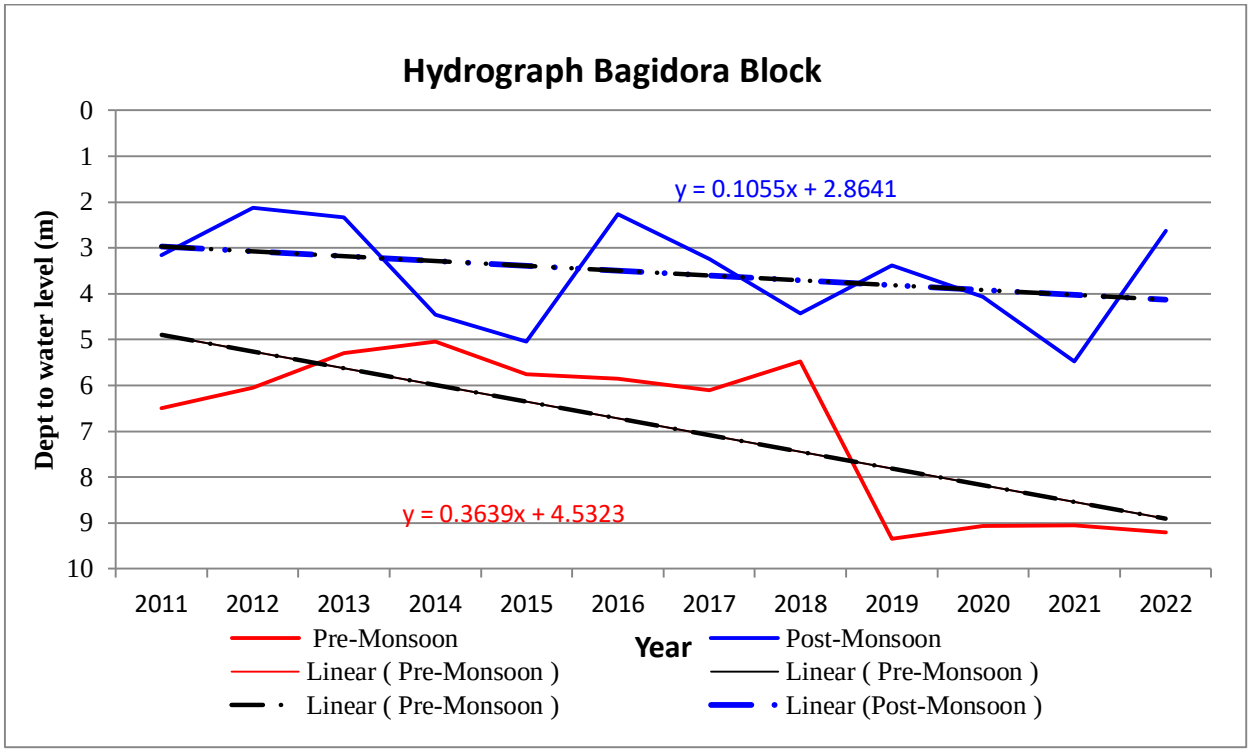


Fig 62: Hydrograph of Bagidora Block

Anandpuri Block at a Glance

Salient Information	**Block**	**Anandi pur**
	Geographical Area (km2)	337.4
	Potential Area (Sq.km)	329.38
Climate & Rainfall	Climate	Dry with hot summer and cold winter
	Average Rainfall (1992-2022)	818.2 mm
Ground Water Issues	Aquifer Characteristics	Phyllite, Gneiss
	Main Aquifers in the area	Covered by Hard rocks, therefore, weathered, fractured and jointed rock.
Aquifer System	Aquifer Disposition	Weathered zone followed by Phyllite, Gneiss
	Geology	Phyllite, Gneiss
	Maximum Depth of Aquifer in meter	80
	Type of Aquifer	Unconfined Aquifer
	Hydraulic Characters (sp.Yield %)	0.023
Water Level Behavior,	Depth to Water Level (m BGL)	

Salient Information	**Block**	**Anandi pur**
DTW (m)		7.25
	Trend (m/yr)	0.15
Ground Water Quality	General	
	Electrical Conductivity in micro S/cm (Min/Max)	480/700
	Nitrate in mg/liter (Min/Max)	6.5/65
	Fluoride in mg/liter (Min/Max)	0.18/0.42
Groundwater Resources	Total annual ground water recharge(mcm)	1.62419
	Natural discharge during non-monsoon season(mcm)	0.1624
	Net ground water availability(mcm)	1.4617
	Existing gross ground water draft for irrigation(mcm)	1.05419
	Existing gross ground water draft for domestic & industrial uses(mcm)	0.1913
	Existing gross ground water draft for all uses(mcm)	1.245
	Allocation for domestic & industrial requirement(mcm)	0.191
	Net ground water availability for future irrigation development(mcm)	0.216
	State of ground water development	85.20
	Category	Semi Critical.
Supply Side Management		
	Geographical Area of Block (Sq.km.)	337.4

Salient Information	**Block**	**Anandi pur**
	Potential area suitable for recharge (Sq.km.)	329.38
	Thickness of unsaturated zone 3 m below ground level (m)	4.25
	Volume of sub surface storage space available for artificial recharge (MCM)	31.47
	Surplus Runoff Availability	16.90
	Surface water available (mcm)	19.93
	No of Recharge/Farm ponds	0
	Mini Percolation Tanks Proposed	100
Demand side Management	Use of Advanced Irrigation Practices to be promoted	
	(i) Use of Sprinklers	
	Total Irrigated Area (ha)	1035
	Irrigated Area (ha) proposed for irrigation through sprinkler	258.75
	Water Saving by Use of Sprinklers	0.20
	Irrigated Area under wheat (ha)	4987
	Irrigated Area (ha) under wheat proposed for Gram cultivation	2493.5
	Water Saving by change in cropping pattern	2.4
Expected Benefits	Net G.W. Availability (MCM)	2.16
	Total Net G.W. Availability after intervention (MCM)	2.00
	Existing G.W Draft for all purpose (MCM)	12.45
	Saving of Ground water through demand side intervention (MCM)	2.49

Salient Information	**Block**	**Anandi pur**
	Net GW draft after interventions (MCM)	12.45
	Present stage of G.W. development (in %)	85.20
	Expected stage of G.W. Dev. (in %)	64.34
Other Interventions proposed, if any	Alternate water Sources available	Canal Network

1. Assessment Unit at a Glance

The groundwater development in the Anandpuri block of Banswara district is increasing rapidly from 68.77% in 2017 to 85.20 % in 2020.The block was in Safe category in 2017, now the block is in Semi-Critical condition. The total area of the block is 337.4 km sq. out of which 329.38 km sq is potential recharge worthy. The block covers 7.43% of the total district area. As per census 2011, the total population of the block is 144,642 including 73,720 males and 71,372 females.

2. Background Information

(a) Location & extent

Anandpuri block covering an area of 337.4 km sq. falls in western part of Banswara district and is located between North latitudes 23°16' & 24°28' and East longitudes 73°57' & 74°14'.

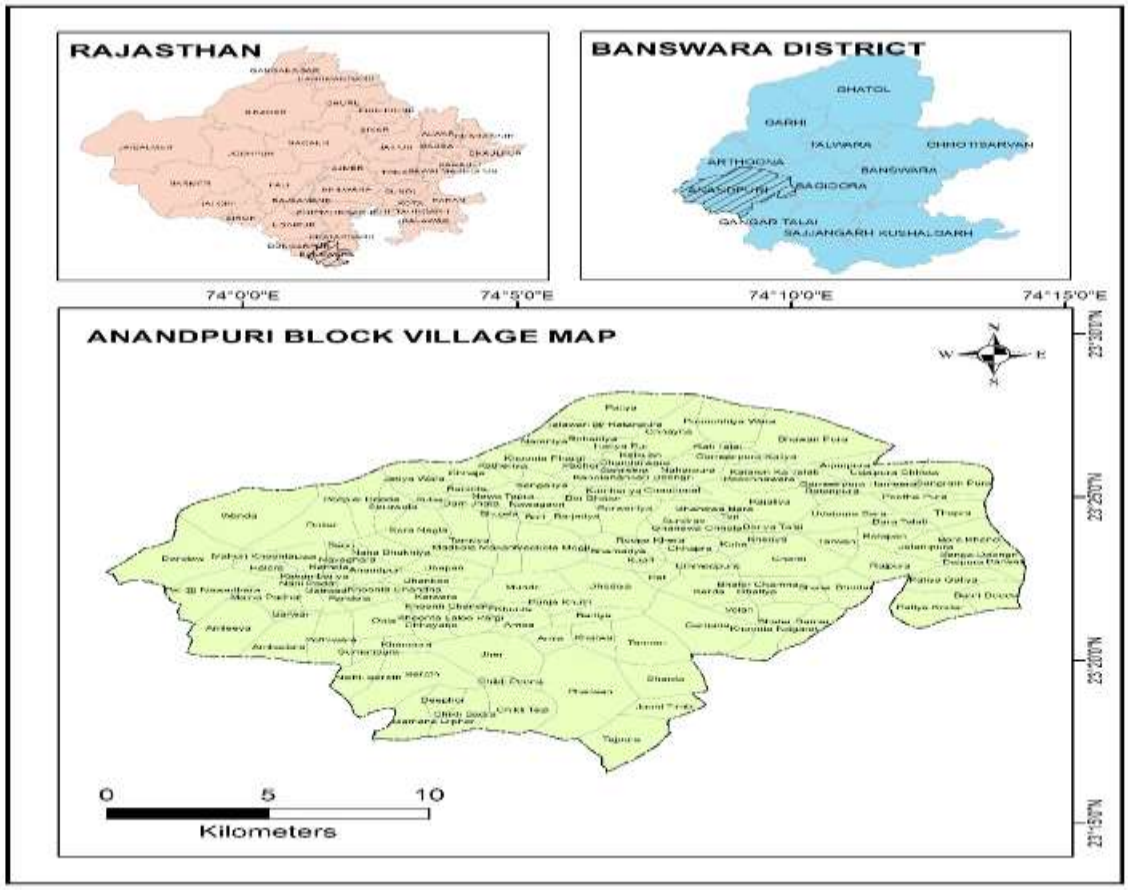


Fig.63: Location map of Anandpuri block, Banswara District

(b) Rainfall and Climate

Average annual rainfall (1992-2022) of the block is 818.30 mm. The climate of the block is dry except in S-W monsoon season. The cold season is from December to February and is followed by summer from March to June. From mid of September to end of November constitutes post monsoon season.

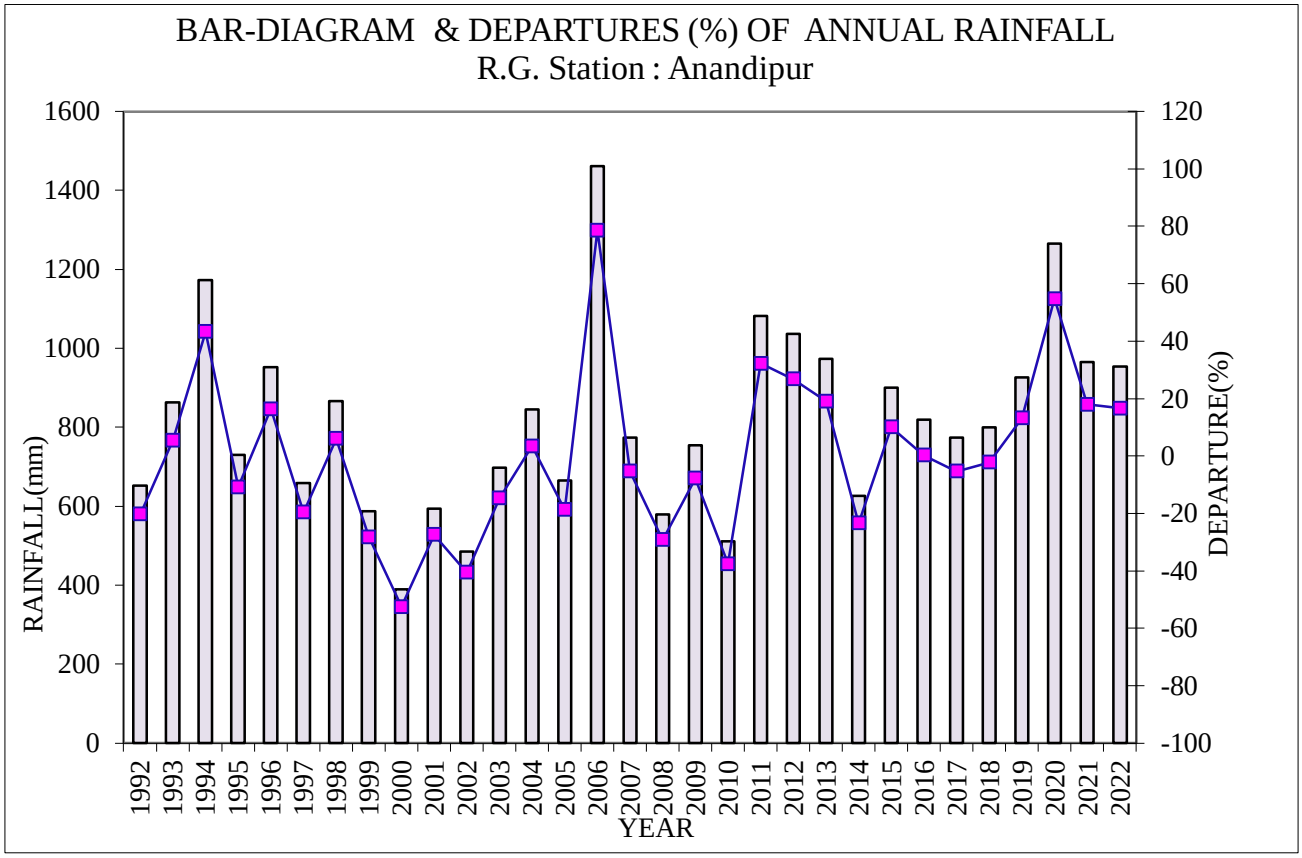


Fig.64: Bar Diagrame of Anandipur block, Banswara

c) Geomorphology

The block being a part of Anandpuri district, exhibits various geomorphological landforms occurring in the district viz.Burried Pediments, Pediplain, Valley fills, Ravines, Structural hills and water bodies. The map shown in fig.65 displays the geomorphological set up of the block.

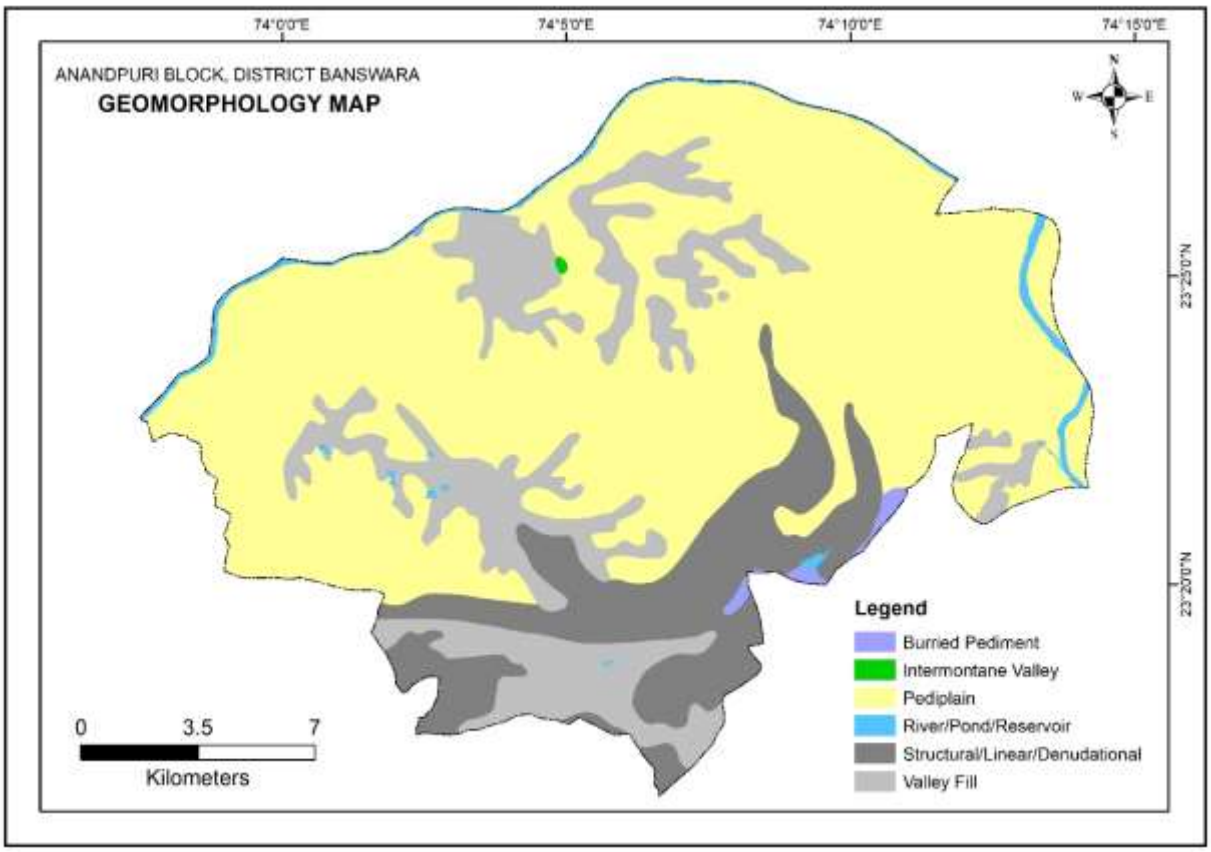


Fig 65: Geomorphology of Anandpuri Block, Banswara District

3. General Hydrogeology

(a) Groundwater Conditions

Anandpuri block is occupied by Phyllite and Schist of Aravalli Super Group. The rocks are generally soft and susceptible to weathering. The rocks have varied mineralogical and physical character. Groundwater occurs under unconfined condition in saturated zone of rock formation. Its occurrence is controlled by topography, physiography and structural features of the geological formations. Movement of groundwater in hard rock areas is governed by size, interconnection and continuity of structurally weak planes.

Pre Monsoon (May 2022):

The depth to water level varies widely depending upon topography, drainage, bed rock geology etc.During Pre-monsoon (May, 2022), depth to water level was found to vary from3mbg1to more than 40 mbgl (Figure 66).The depth to water level map of the block shows that in central part very small pockets have water levels between 2 and 5 m bgl. Eastern, central parts of the blocks had water levels between 5 and 10mbgl, rest of the area has water levels between 10 and 20 m and a very small northern and southern part has water levels between 20 and 40mbgl

Post Monsoon (November 2022):

During Post-monsoon (November, 2022), depth to water level in major part of the district was observed to be between 20 and 40mbgl (Figure 67).This map depicts that only north eastern and northern – southern parts show water levels below 2mbgl and 2 and 5mbgl, 5 and 10mbgl Rest all the area extending from western, eastern and southern10 and 20mbgl. Only small pocket is having water levels within 20 and 40mbgl from Eastern side.

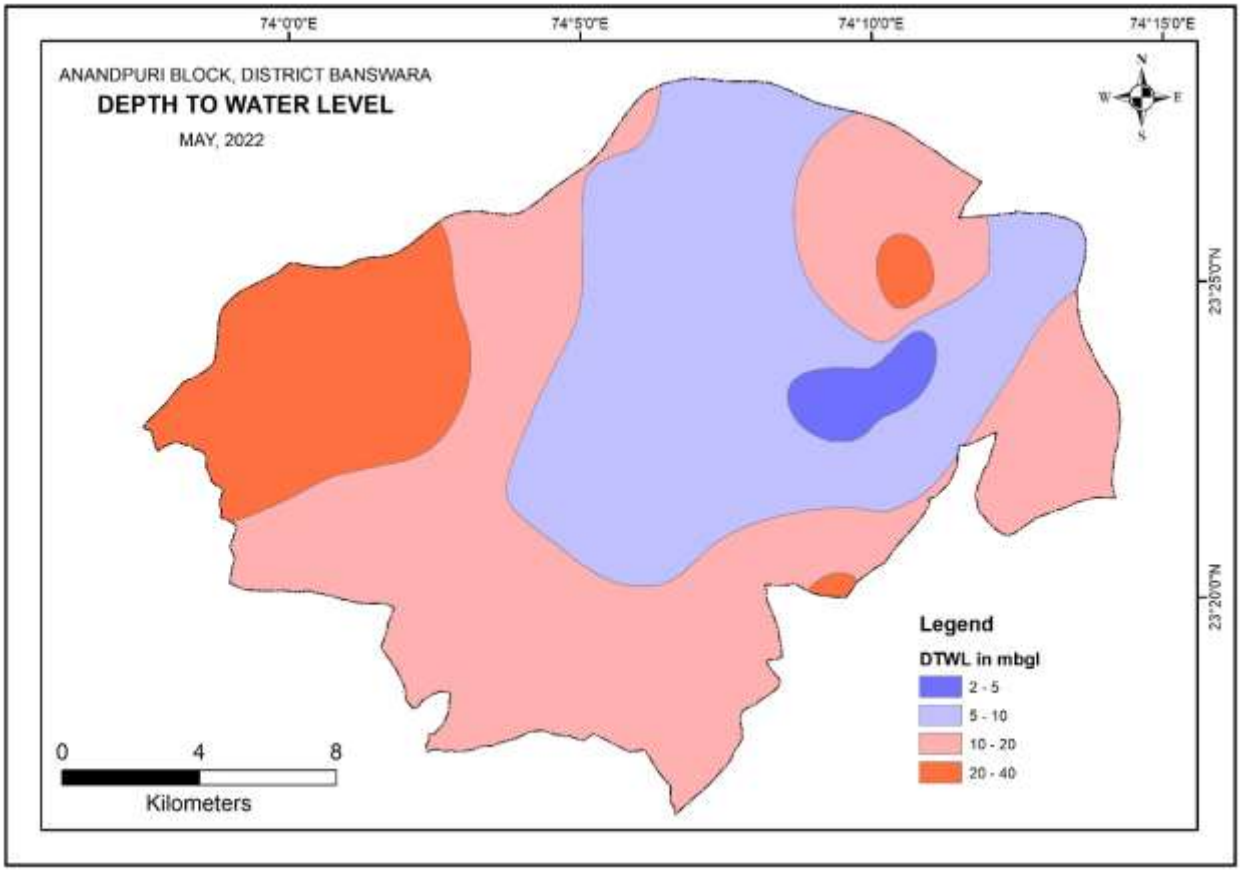


Fig 66: Depth to water Level Map Pre-Monsoon 2022, Anandipur Block Banswara District

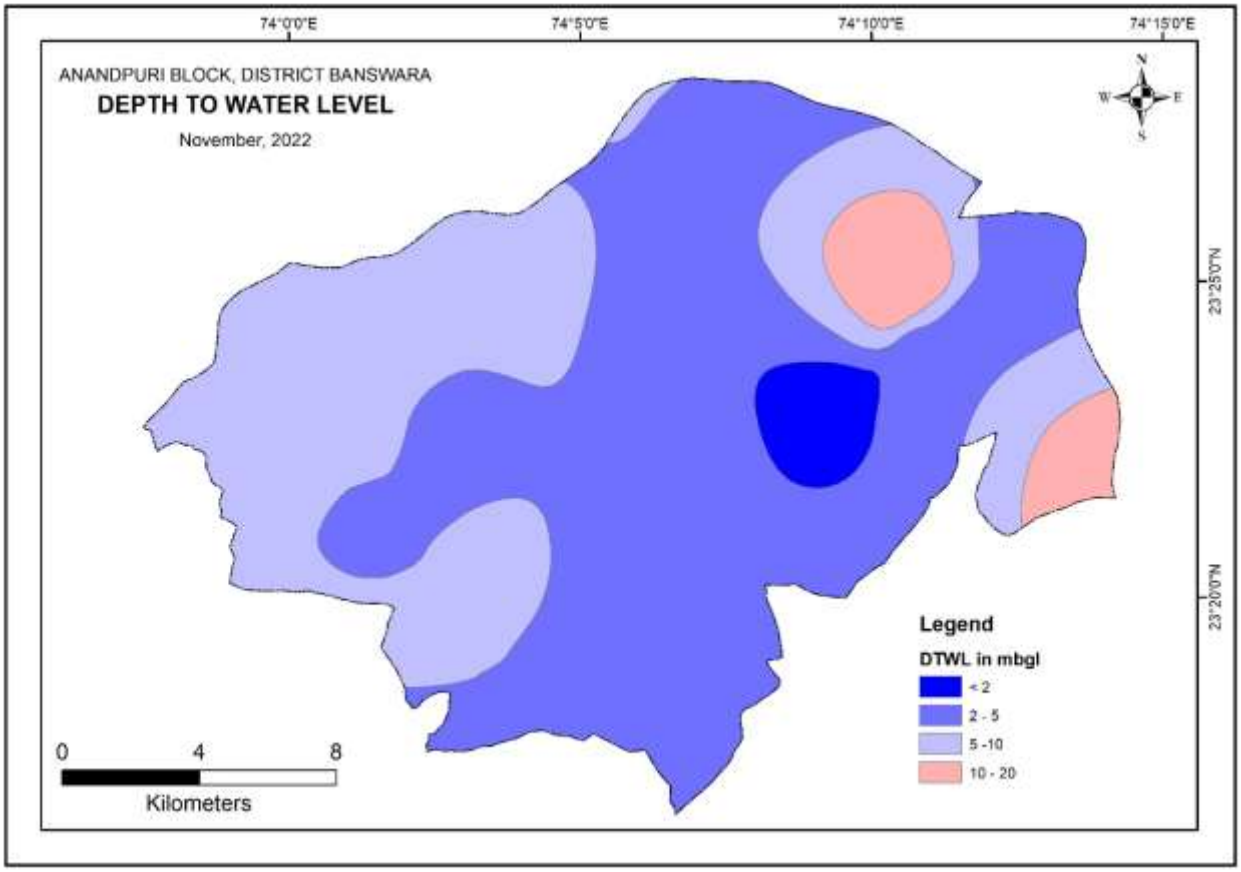


Fig 67: Depth to water Level Map Post-Monsoon 2022, Anandipur Block Banswara District

5. Management Interventions

In order to manage the ground water resources and to control further decline in water levels, a management plan has been proposed. The management plan comprises two components- supply side management and demand side management. The area identified for artificial recharge under supply side management is the subsurface space/unsaturated aquifer that have declining decadal trend, EC less than 2500 microseamen's/cm at 25°C and post monsoon depth water level below 3 m from ground level. On the above criteria the area identified covers -------sq.kmand is presented in figure 3.

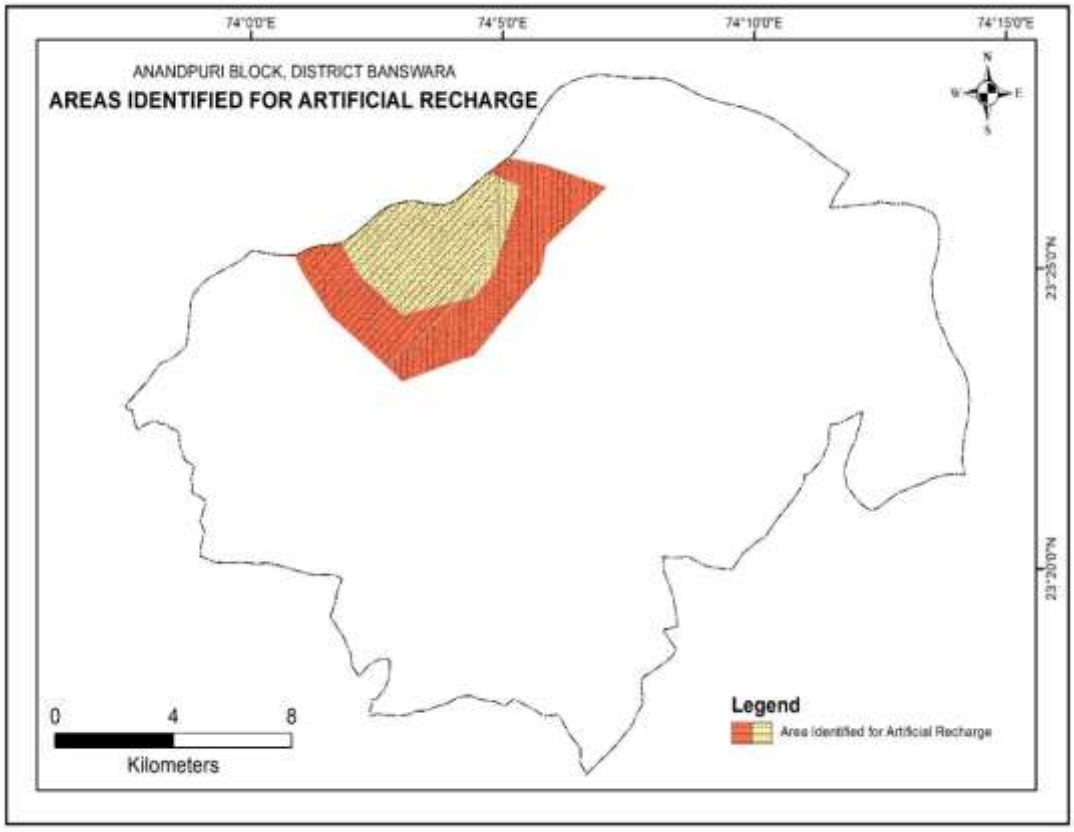
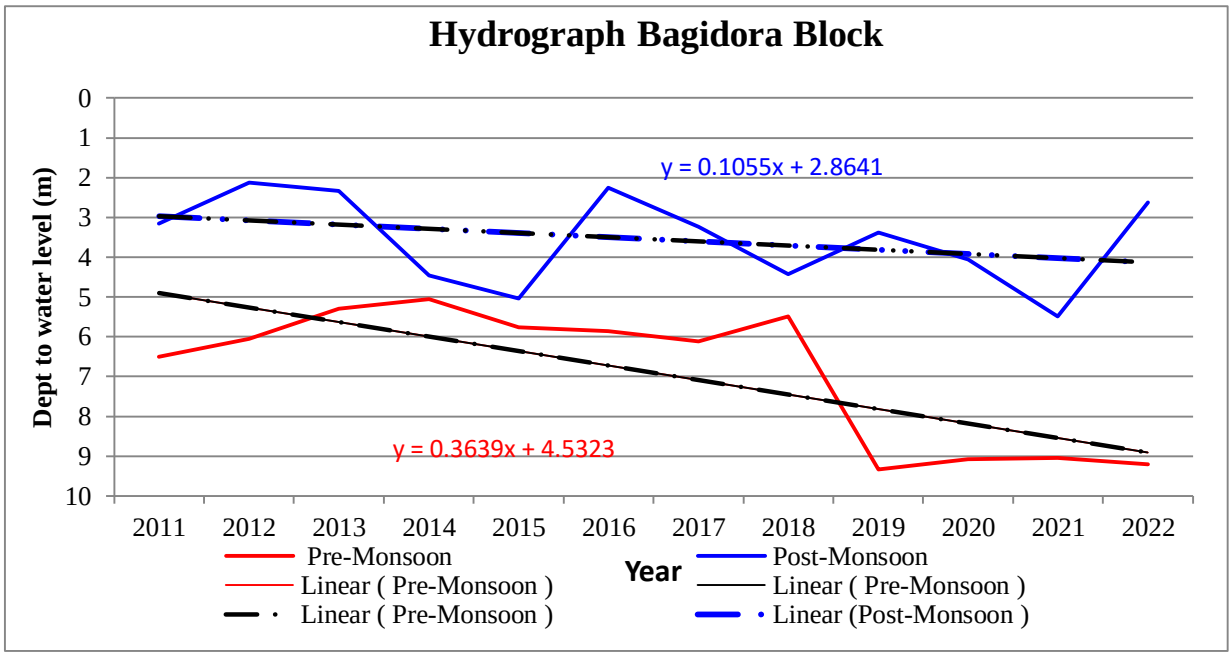


Fig 68: Area Identified for Artificial Recharge



Ghatol Block at a Glance

Salient Information	**Block**	**Ghatol**
	Geographical Area (km2)	778.4
	Potential Area (Sq.km)	680.91
Climate & Rainfall	Climate	Dry with hot summer and cold winter
	Average Rainfall (1992-2022)	931.4 mm
Ground Water Issues	Aquifer Characteristics	Gneiss, Basalt
	Main Aquifers in the area	Covered by Hard rocks, therefore, weathered, fractured and jointed rock.
Aquifer System	Aquifer Disposition	Weathered zone followed by Gneiss, Basalt
	Geology	Gneiss, Basalt
	Maximum Depth of Aquifer in meter	30
	Type of Aquifer	Unconfined Aquifer
	Hydraulic Characters (sp.Yield %)	0.023

Salient Information	Block	Ghatol
Water Level Behavior, DTW (m)	Depth to Water Level (m BGL)	3.15
	Trend (m/yr)	-0.30
Ground Water Quality	General	
	Electrical Conductivity in micro S/cm (Min/Max)	455/1780
	Nitrate in mg/liter (Min/Max)	1/120
	Fluoride in mg/liter (Min/Max)	0.15/1.78
Groundwater Resources	Total annual ground water recharge(mcm)	3.826
	Natural discharge during non-monsoon season(mcm)	0.382
	Net ground water availability(mcm)	3.443
	Existing gross ground water draft for irrigation(mcm)	1.466
	Existing gross ground water draft for domestic & industrial uses(mcm)	0.272
	Existing gross ground water draft for all uses(mcm)	1.740
	Allocation for domestic & industrial requirement(mcm)	0.272
	Net ground water availability for future irrigation development(mcm)	1.703
	State of ground water development	50.54
	Category	Safe
Supply Side Management		

Salient Information	**Block**	**Ghatol**
	Geographical Area of Block (Sq.km.)	778.4
	Potential area suitable for recharge (Sq.km.)	680.91
	Thickness of unsaturated zone 3 m below ground level (m)	0.23
	Volume of sub surface storage space available for artificial recharge (MCM)	2.21
	Surplus Runoff Availability(mcm)	39.44
	Surface water available (mcm)	39.77
	No of Recharge/Farm ponds	0
	Mini Percolation Tanks Proposed	400
Demand side Management	Use of Advanced Irrigation Practices to be promoted	
	(i) Use of Sprinklers	
	Total Irrigated Area (ha)	3556
	Irrigated Area (ha) proposed for irrigation through sprinkler	0
	Water Saving by Use of Sprinklers	0
	Irrigated Area under wheat (ha)	13225
	Irrigated Area (ha) under wheat proposed for Gram cultivation	0
	Water Saving by change in cropping pattern	0
Expected Benefits	Net G.W. Availability (MCM)	17.03
	Total Net G.W. Availability after intervention (MCM)	18.29
	Existing G.W Draft for all purpose (MCM)	17.40
	Saving of Ground water through demand side intervention (MCM)	0

Salient Information	Block	Ghatol
	Net GW draft after interventions (MCM)	17.40
	Present stage of G.W. development (in %)	50.54
	Expected stage of G.W. Dev. (in %)	48.76
Other Interventions proposed, if any	Alternate water Sources available	Canal Network

1. Assessment Unit at a Glance

The groundwater development in the Ghatol block of Banswara district is 50.54 the total area of the block is 778.4 km sq. out of which 680.91 km sq is potential recharge worthy. The block covers 71.16% of the total district area. As per census 2011, the total population of the block is 28, 7101 including 14, 4092 males and 14, 3009 females.

(b) Rainfall and Climate

Average annual rainfall (1992-2022) of the block is 904.30 mm. The climate of the block is dry except in

S-W monsoon season. The cold season is from December to February and is followed by summer from March to June. From mid of September to end of November constitutes post monsoon season.

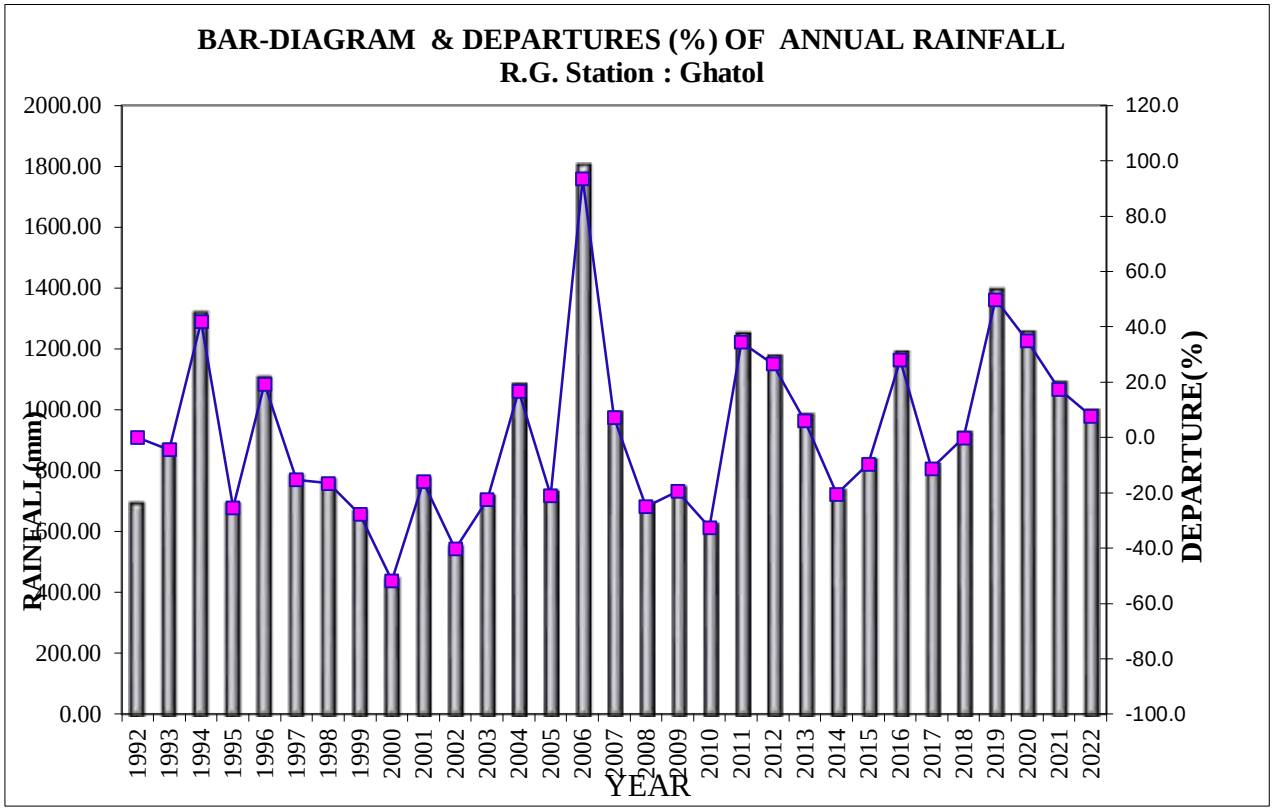


Fig.69: Bar Diagrame of Anandipur block, Banswara

c) Geomorphology

The block being a part of Anandpuri district, exhibits various geomorphological landforms occurring in the district viz.Burried Pediments, Pediplain, Valley fills, Ravines, Structural hills and water bodies.

3. General Hydrogeology

(a) Groundwater Conditions

Anandpuri block is occupied by Phyllite and Schist of Aravalli Super Group. The rocks are generally soft and susceptible to weathering. The rocks have varied mineralogical and physical character. Groundwater occurs under unconfined condition in saturated zone of rock formation. Its occurrence is controlled by topography, physiography and structural features of the geological formations. Movement of groundwater in hard rock areas is governed by size, interconnection and continuity of structurally weak planes.

Pre Monsoon (May 2022):

The depth to water level varies widely depending upon topography, drainage, bed rock geology etc.During Pre-monsoon (May, 2022), depth to water level was found to vary from3mbg1to more than 40 mbgl (Figure 70).The depth to water level map of the block shows that in central part very small pockets have water levels between 2 and 5 m bgl. Eastern, central parts of the blocks had water levels between 5 and 10mbgl, rest of the area has water levels between 10 and 20 m and a very small northern and southern part has water levels between 20 and 40mbgl

Post Monsoon (November 2022):

During Post-monsoon (November, 2022), depth to water level in major part of the district was observed to be between 20 and 40mbgl (Figure 71).This map depicts that only north eastern and northern – southern parts show water levels below 2mbgl and 2 and 5mbgl, 5 and 10mbgl Rest all the area extending from western, eastern and southern10 and 20mbgl. Only small pocket is having water levels within 20 and 40mbgl from Eastern side.

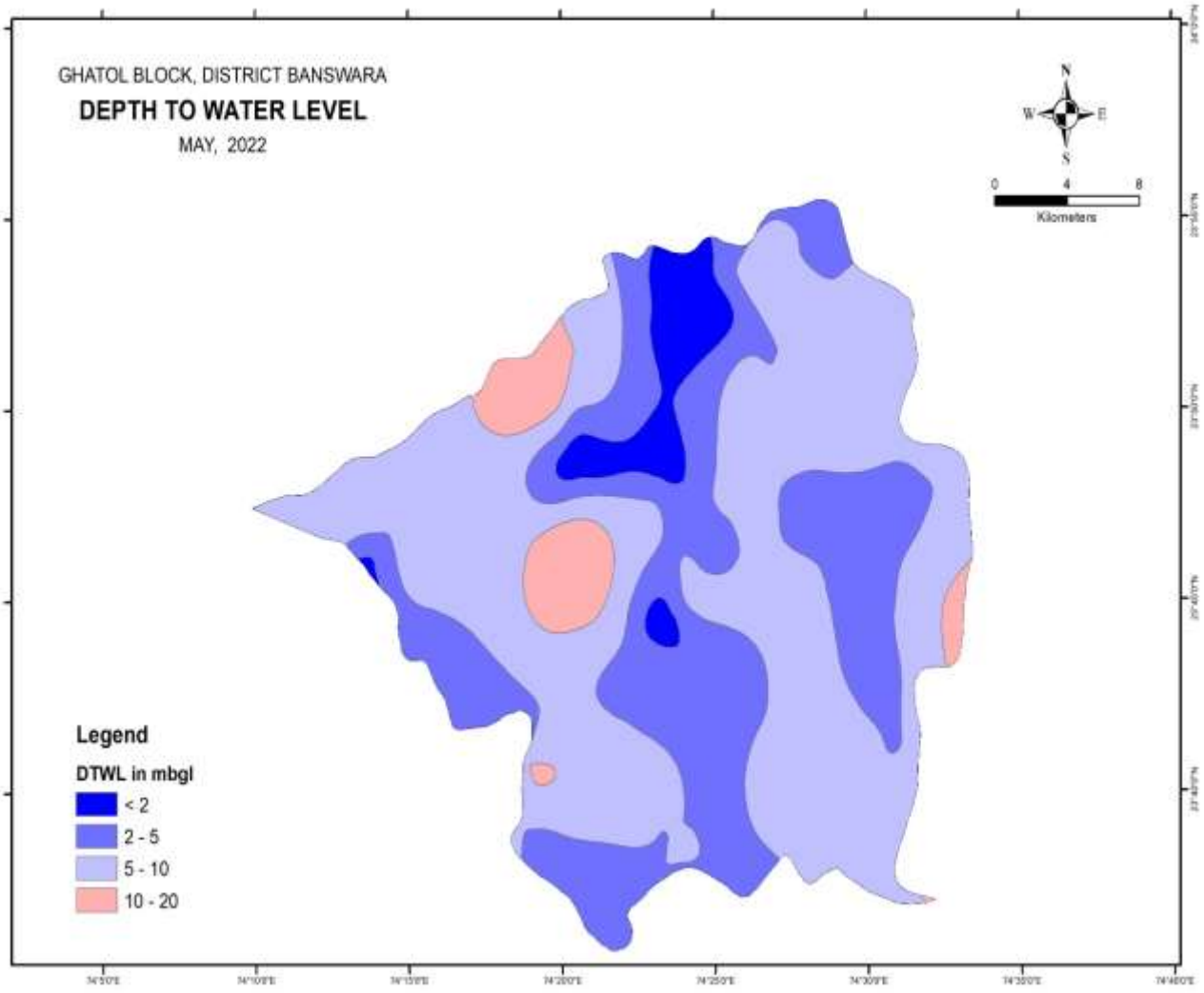


Fig 70: Depth to water Level Map Pre-Monsoon 2022, Ghatol Block Banswara District

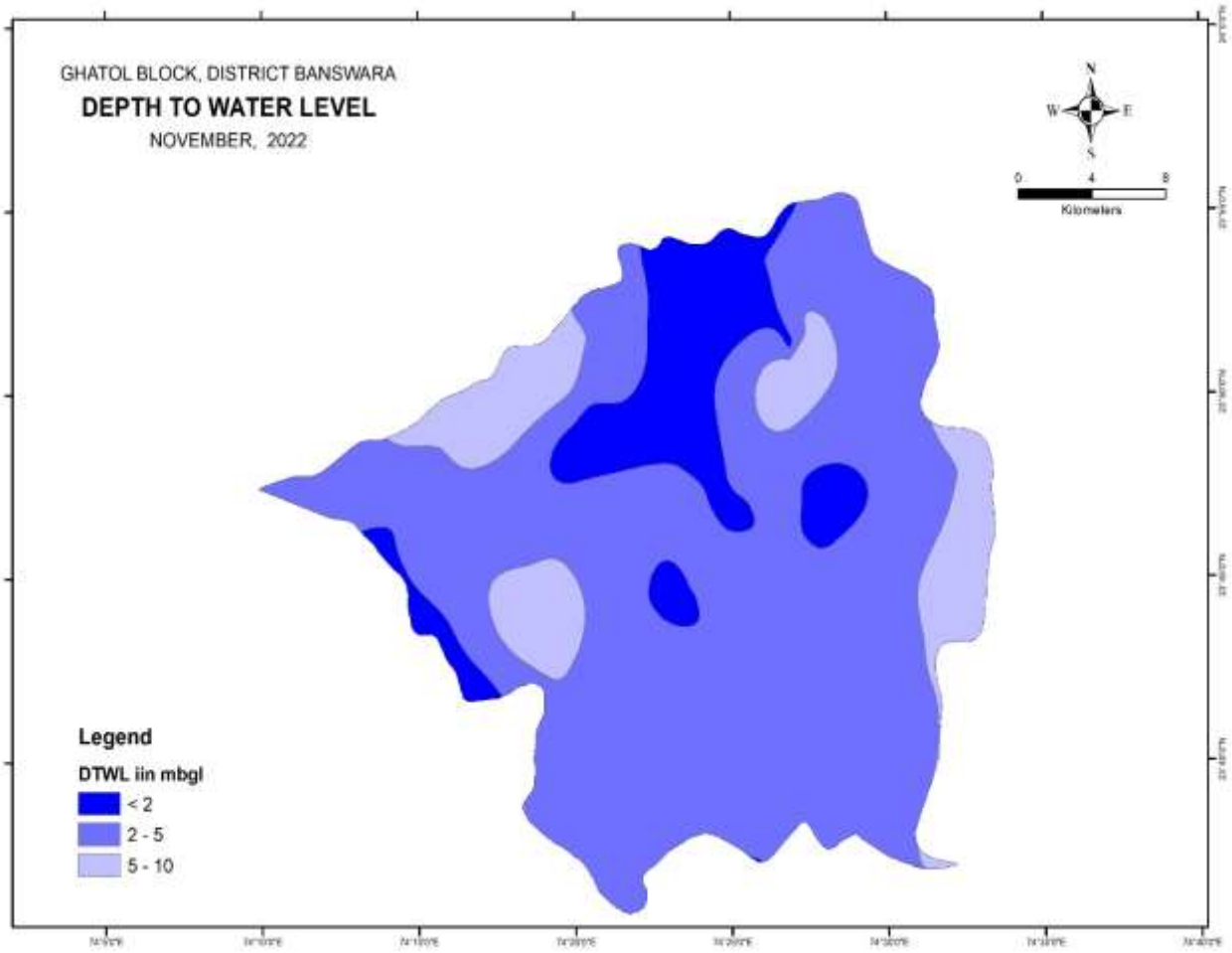


Fig 71: Depth to water Level Map Post-Monsoon 2022, Ghatol Block Banswara District

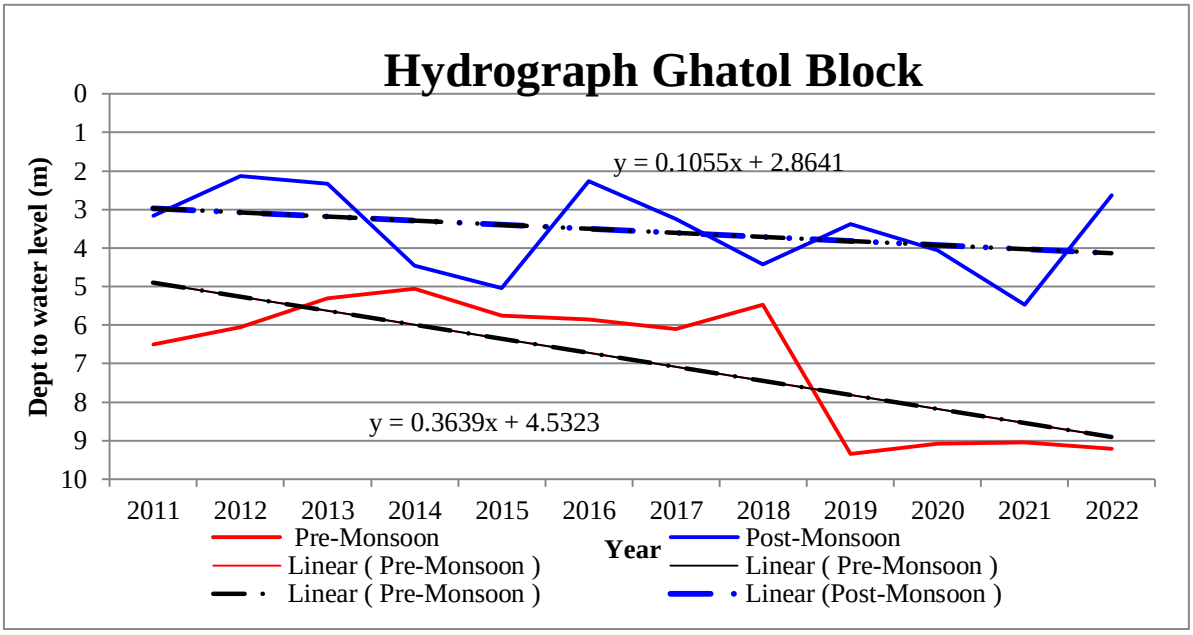


Fig 72: Hydrograph of Ghatol Block

Sajjangarh Block at a Glance

Salient Information	**Block**	**Sajjangarh**
	Geographical Area (km2)	392.29
	Potential Area (Sq.km)	349.97
Climate & Rainfall	Climate	Dry with hot summer and cold winter
	Average Rainfall (1992-2022)	918.6 mm
Ground Water Issues	Aquifer Characteristics	Phyllite, Gneiss
	Main Aquifers in the area	Covered by Hard rocks, therefore, weathered, fractured and jointed rock.
Aquifer System	Aquifer Disposition	Weathered zone followed by Phyllite Gneiss
	Geology	Phyllite Gneiss

Salient Information	**Block**	**Sajjangarh**
	Maximum Depth of Aquifer in meter	30
	Type of Aquifer	Unconfined Aquifer
	Hydraulic Characters (sp.Yield %)	0.030
Water Level Behavior, DTW (m)	Depth to Water Level (m BGL)	4.04
	Trend (m/yr)	-0.01
Ground Water Quality	General	
	Electrical Conductivity in micro S/cm (Min/Max)	475/1780
	Nitrate in mg/liter (Min/Max)	13/38
	Fluoride in mg/liter (Min/Max)	0.40/1.41
Groundwater Resources	Total annual ground water recharge(mcm)	1.441
	Natural discharge during non-monsoon season(mcm)	0.144
	Net ground water availability(mcm)	1.297
	Existing gross ground water draft for irrigation(mcm)	0.593
	Existing gross ground water draft for domestic & industrial uses(mcm)	0.190
	Existing gross ground water draft for all uses(mcm)	0.784
	Allocation for domestic & industrial requirement(mcm)	0.190

Salient Information	Block	Sajjangarh
	Net ground water availability for future irrigation development(mcm)	0.513
	State of ground water development	60.44
	Category	Safe
Supply Side Management		
	Geographical Area of Block (Sq.km.)	392.29
	Potential area suitable for recharge (Sq.km.)	349.97
	Thickness of unsaturated zone 3 m below ground level (m)	0.01
	Volume of sub surface storage space available for artificial recharge (MCM)	0.03
	Surplus Runoff Availability(mcm)	18.02
	Surface water available (mcm)	18.18
	No of Recharge/Farm ponds	0
	Mini Percolation Tanks Proposed	150
Demand side Management	Use of Advanced Irrigation Practices to be promoted	
	(i) Use of Sprinklers	
	Total Irrigated Area (ha)	1642
	Irrigated Area (ha) proposed for irrigation through sprinkler	0
	Water Saving by Use of Sprinklers	0
	Irrigated Area under wheat (ha)	5746

Salient Information	**Block**	**Sajjangarh**
	Irrigated Area (ha) under wheat proposed for Gram cultivation	0
	Water Saving by change in cropping pattern	0
Expected Benefits	Net G.W. Availability (MCM)	5.13
	Total Net G.W. Availability after intervention (MCM)	5.87
	Existing G.W Draft for all purpose (MCM)	7.48
	Saving of Ground water through demand side intervention (M CM)	0
	Net GW draft after interventions (MCM)	7.84
	Present stage of G.W. development (in %)	60.44
	Expected stage of G.W. Dev. (in %)	57.18
Other Interventions proposed, if any	Alternate water Sources available	Canal Network

1. Assessment Unit at a Glance

The groundwater development in the Sajjangarh block of Banswara district is 60.54%. The total area of the block is 392.29 km sq. out of which 349.97 km sq is potential recharge worthy. The block covers 71.16% of the total district area. As per census 2011, the total population of the block is 181430 including 91600 males and 89830 females.

b) Rainfall and Climate

Average annual rainfall (1992-2022) of the block is 904.30 mm. The climate of the block is dry except in S-W monsoon season. The cold season is from December to February and is followed by summer from March to June. From mid of September to end of November constitutes post monsoon season.

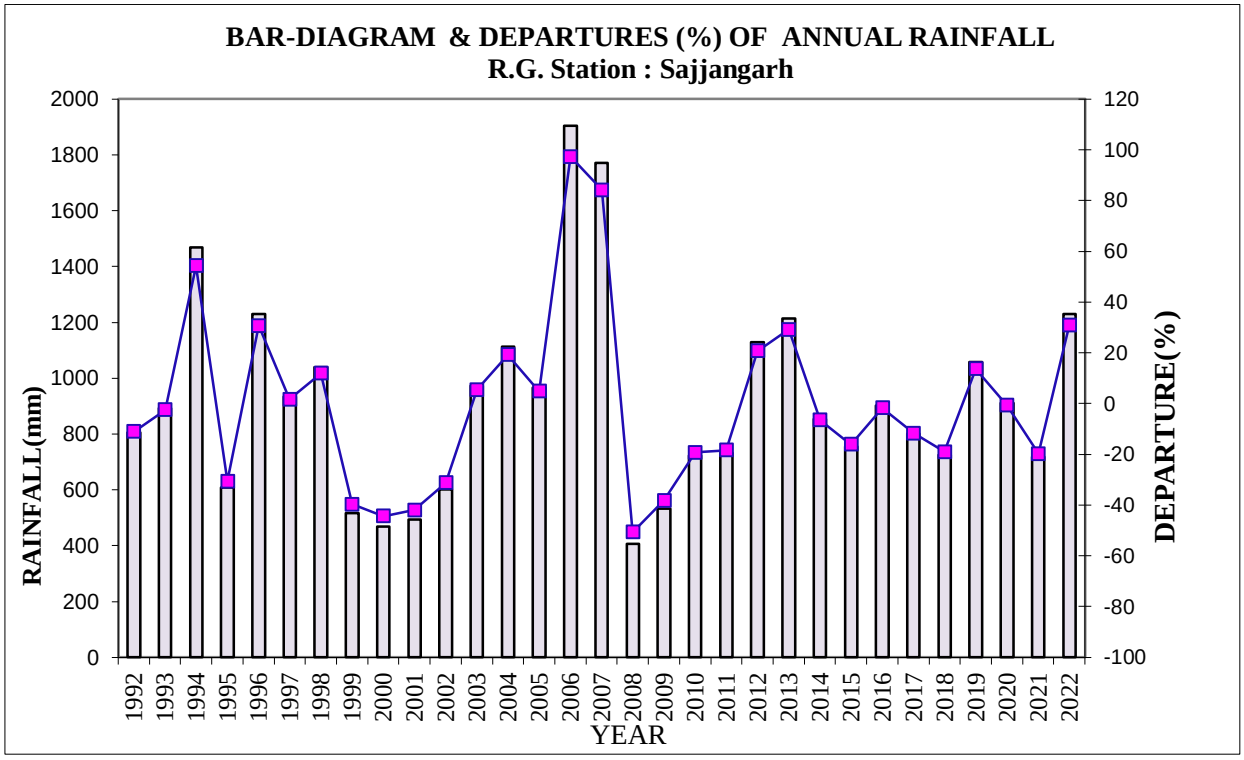


Fig.73: Bar Diagrame of Sajjangarh block, Banswara

c) Geomorphology

The block being a part of Banswara district, exhibits various geomorphological landforms occurring in the district viz.Burried Pediments, Pediplain, Valley fills, Ravines, Structural hills and water bodies..

3. General Hydrogeology

(a) Groundwater Conditions

The block is occupied by Phyllite and Schist of Aravalli Super Group. The rocks are generally soft and susceptible to weathering. The rocks have varied mineralogical and physical character. Groundwater occurs under unconfined condition in saturated zone of rock formation. Its occurrence is controlled by topography, physiography and structural features of the geological formations. Movement of groundwater in hard rock areas is governed by size, interconnection and continuity of structurally weak planes.

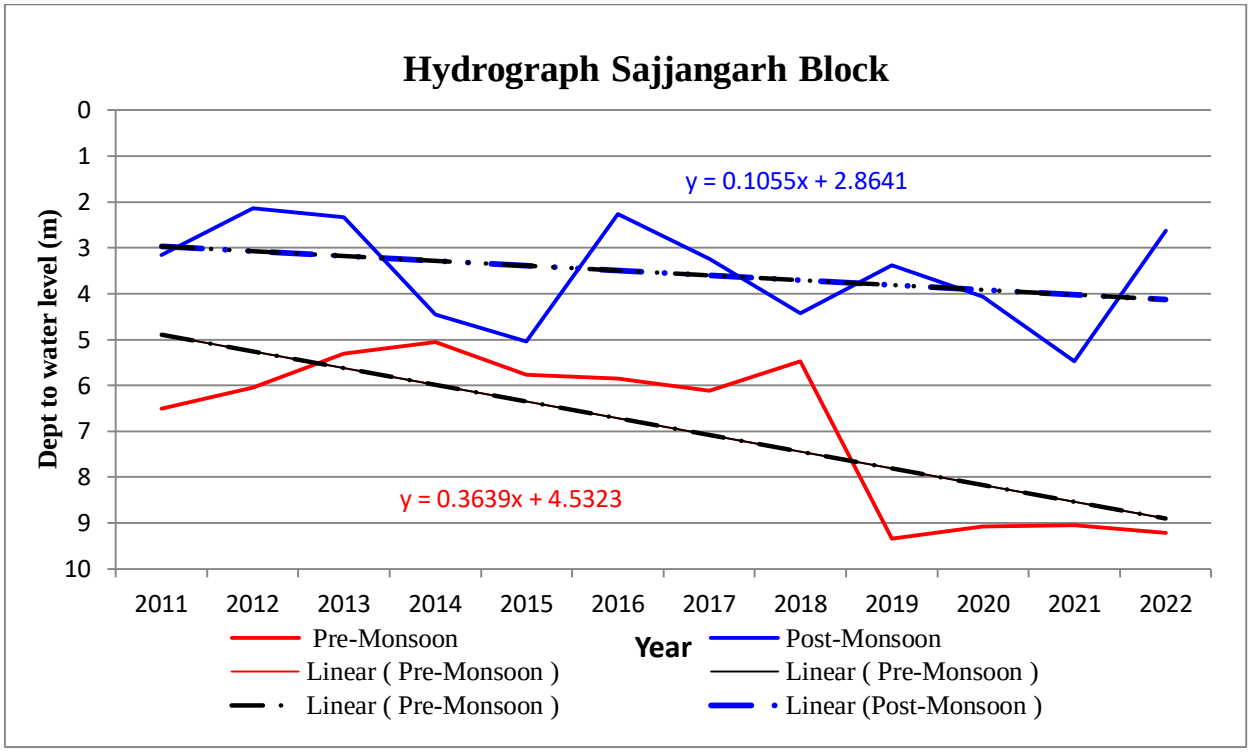


Fig 74: Hydrograph of Sajjangarh Block

Chhoti sarwa Block at a Glance

Salient Information	**Block**	**Chhoti sarwa**
	Geographical Area (km2)	383.37
	Potential Area (Sq.km)	294.95
Climate & Rainfall	Climate	Dry with hot summer and cold winter
	Average Rainfall (1992-2022)	988.5 mm
Ground Water Issues	Aquifer Characteristics	Gneiss, Basalt
	Main Aquifers in the area	Covered by Hard rocks, therefore, weathered, fractured and jointed rock.
Aquifer System	Aquifer Disposition	Weathered zone followed by Gneiss, Basalt
	Geology	Gneiss,

Salient Information	**Block**	**Chhoti sarwa**
		Basalt
	Maximum Depth of Aquifer in meter	30
	Type of Aquifer	Unconfined Aquifer
	Hydraulic Characters (sp.Yield %)	0.023
Water Level Behavior, DTW (m)	Depth to Water Level (m BGL)	8.20
	Trend (m/yr)	-0.14
Ground Water Quality	General	
	Electrical Conductivity in micro S/cm (Min/Max)	280/803
	Nitrate in mg/liter (Min/Max)	1/110
	Fluoride in mg/liter (Min/Max)	0.20/1.40
Groundwater Resources	Total annual ground water recharge(mcm)	1.517
	Natural discharge during non-monsoon season(mcm)	0.1517
	Net ground water availability(mcm)	1.366
	Existing gross ground water draft for irrigation(mcm)	0.749
	Existing gross ground water draft for domestic & industrial uses(mcm)	0.127
	Existing gross ground water draft for all uses(mcm)	0.877
	Allocation for domestic & industrial requirement(mcm)	0.127
	Net ground water availability for future irrigation development(mcm)	0.488
	State of ground water development	64.22
	Category	Safe
Supply Side		

Salient Information	Block	Chhoti sarwa
Management		
	Geographical Area of Block (Sq.km.)	383.37
	Potential area suitable for recharge (Sq.km.)	294.95
	Thickness of unsaturated zone 3 m below ground level (m)	5.20
	Volume of sub surface storage space available for artificial recharge (MCM)	34.53
	Surplus Runoff Availability(mcm)	17.72
	Surface water available (mcm)	18.02
	No of Recharge/Farm ponds	0
	Mini Percolation Tanks Proposed	200
Demand side Management	Use of Advanced Irrigation Practices to be promoted	
	(i) Use of Sprinklers	
	Total Irrigated Area (ha)	827
	Irrigated Area (ha) proposed for irrigation through sprinkler	0
	Water Saving by Use of Sprinklers	0
	Irrigated Area under wheat (ha)	2932
	Irrigated Area (ha) under wheat proposed for Gram cultivation	0
	Water Saving by change in cropping pattern	0
Expected Benefits	Net G.W. Availability (MCM)	4.83
	Total Net G.W. Availability after intervention (MCM)	5.74
	Existing G.W Draft for all purpose (MCM)	8.7
	Saving of Ground water through demand side intervention (MCM)	0
	Net GW draft after interventions (MCM)	9.266

Salient Information	Block	Chhoti sarwa
	Present stage of G.W. development (in %)	64.22
	Expected stage of G.W. Dev. (in %)	60.46
Other Interventions proposed, if any	Alternate water Sources available	Canal Network

1. Assessment Unit at a Glance

The groundwater development in the Chhoti sarwa block of Banswara district is 64.22%. The total area of the block is 383.37 km sq. out of which 294.95 km sq is potential recharge worthy. The block covers 71.16% of the total district area. As per census 2011, the total population of the block is 91114 including 46410males and 44704 females.

b) Rainfall and Climate

Average annual rainfall (1992-2022) of the block is 988.5 mm. The climate of the block is dry except in

S-W monsoon season. The cold season is from December to February and is followed by summer from March to June. From mid of September to end of November constitutes post monsoon season.

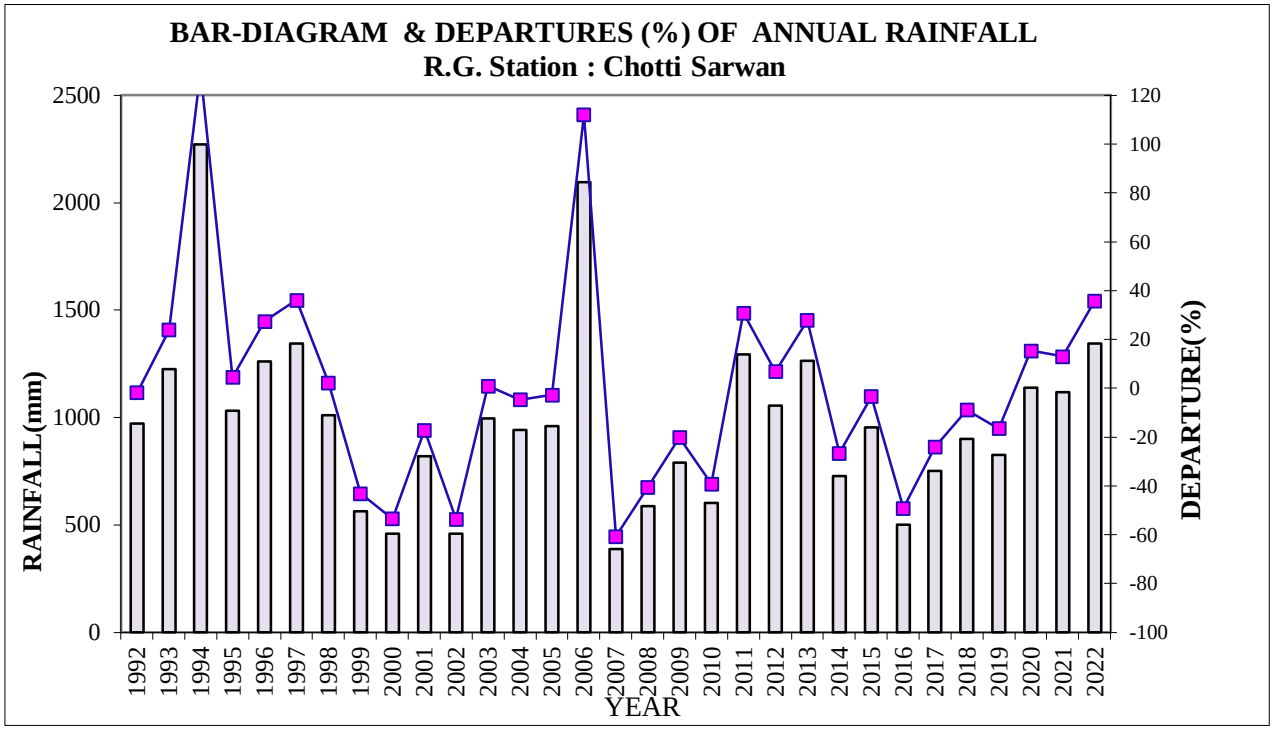


Fig.75: Bar Diagrame of Chhotisarwa block, Banswara

c) Geomorphology

The block being a part of Banswara district, exhibits various geomorphological landforms occurring in the district viz.Burried Pediments, Pediplain, Valley fills, Ravines, Structural hills and water bodies.

3. General Hydrogeology

(a) Groundwater Conditions

The block is occupied by Phyllite and Schist of Aravalli Super Group. The rocks are generally soft and susceptible to weathering. The rocks have varied mineralogical and physical character. Groundwater occurs under unconfined condition in saturated zone of rock formation. Its occurrence is controlled by topography, physiography and structural features of the geological formations. Movement of groundwater in hard rock areas is governed by size, interconnection and continuity of structurally weak planes.

Pre Monsoon (May 2022):

The depth to water level varies widely depending upon topography, drainage, bed rock geology etc.During Pre-monsoon (May, 2022), depth to water level was found to vary from3mbg1to more than 40 mbgl (Figure 76).The depth to water level map of the block shows that in central part very small pockets have water levels between 2 and 5 m bgl. Eastern, central parts of the blocks had water levels between 5 and 10mbgl, rest of the area has water levels between 10 and 20 m and a very small northern and southern part has water levels between 20 and 40mbgl

Post Monsoon (November 2022):

During Post-monsoon (November, 2022), depth to water level in major part of the district was observed to be between 20 and 40mbgl (Figure 77).This map depicts that only north eastern and northern – southern parts show water levels below 2mbgl and 2 and 5mbgl, 5 and 10mbgl Rest all the area extending from western, eastern and southern10 and 20mbgl. Only small pocket is having water levels within 20 and 40mbgl from Eastern side.

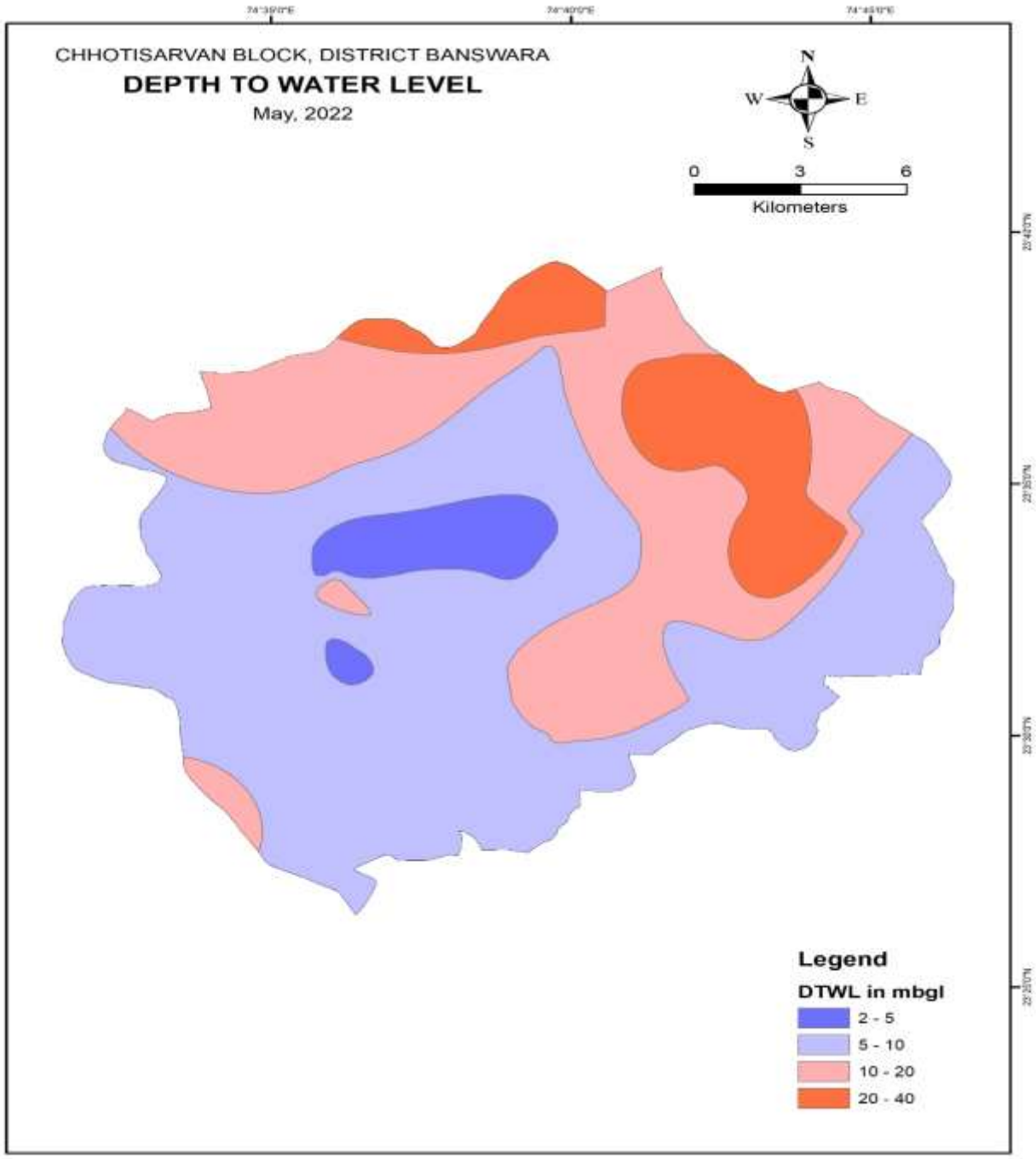


Fig 76: Depth to water Level Map Pre-Monsoon 2022, Chhotisarwa Block Banswara District

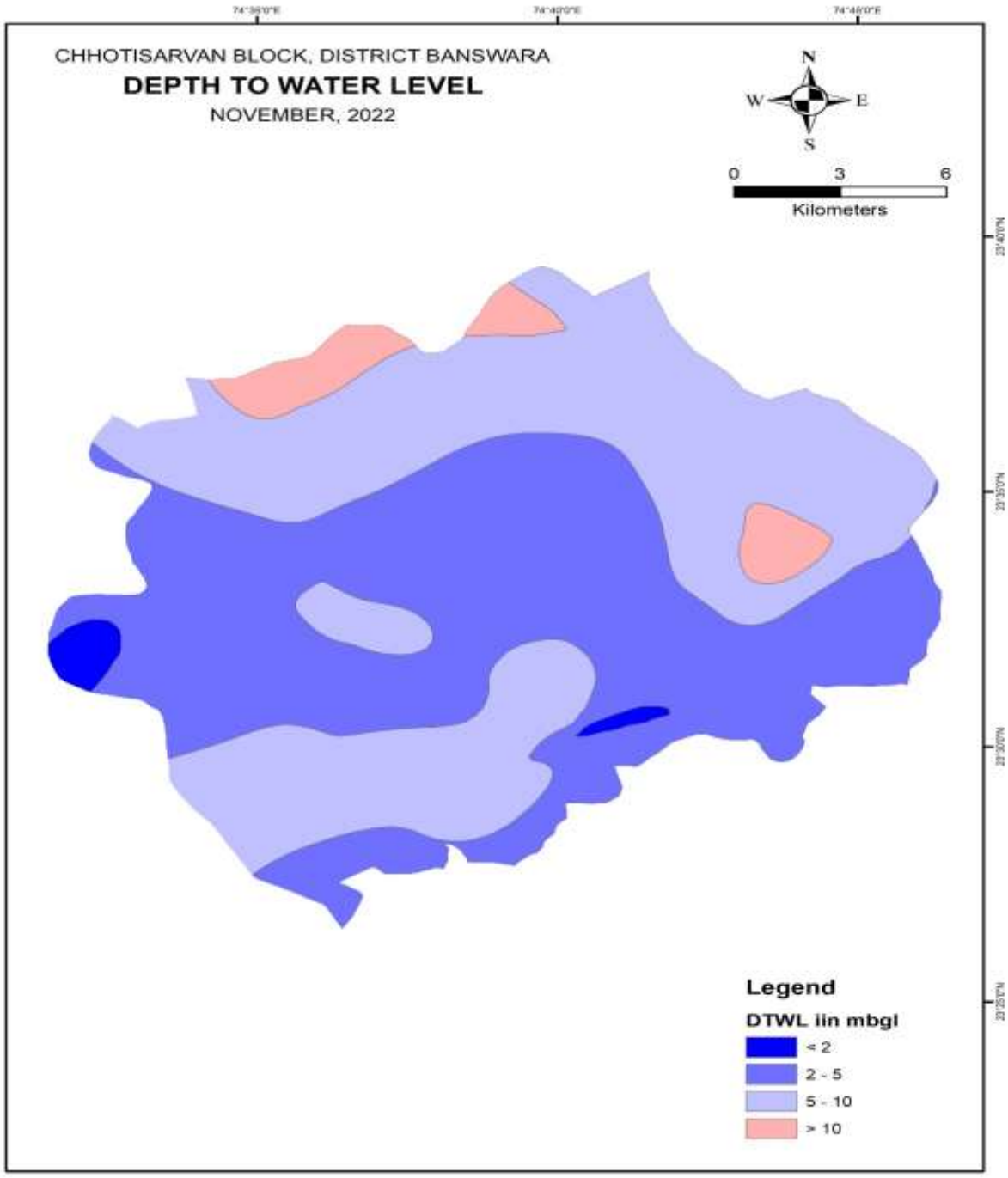


Fig 77: Depth to water Level Map Post-Monsoon 2022, Chhotisarwa Block Banswara District

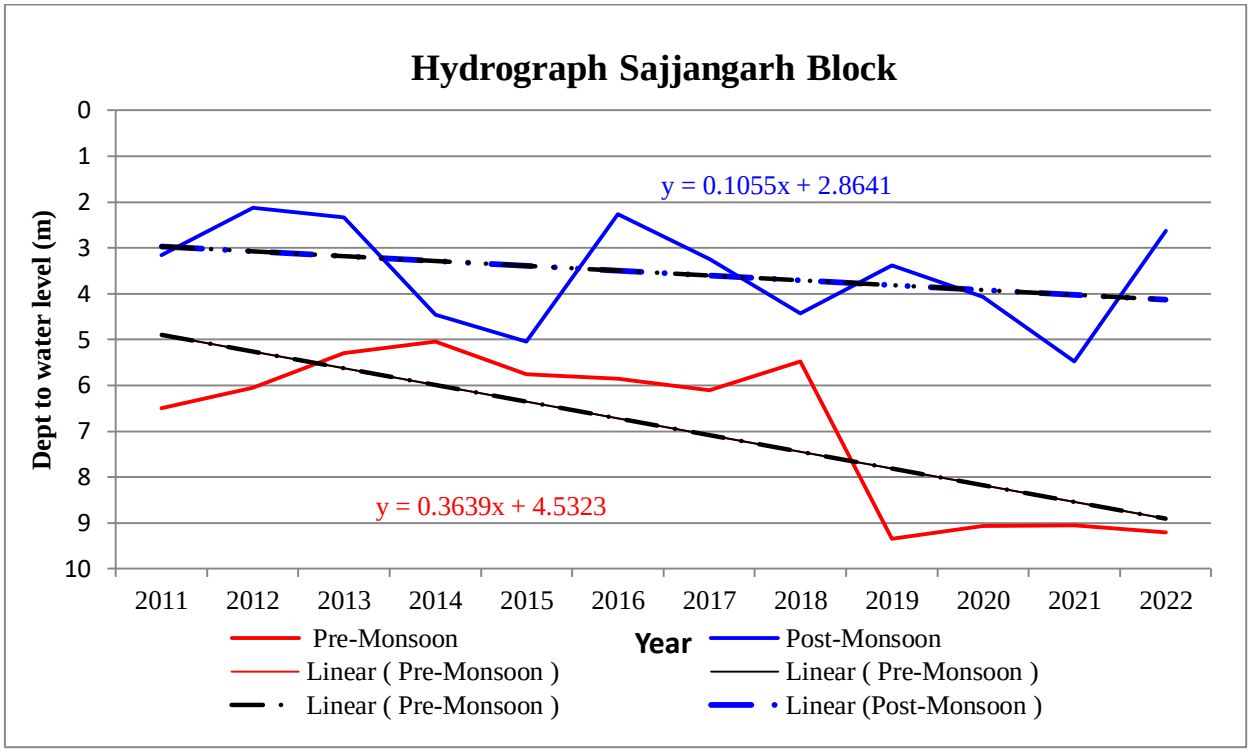


Fig 78: Hydrograph of Sajjangarh Block

Banswara Block at a Glance

Salient Information	**Block**	**Banswara**
	Geographical Area (km2)	516.75
	Potential Area (Sq.km)	448.83
Climate & Rainfall	Climate	Dry with hot summer and cold winter
	Average Rainfall (1992-2022)	1091 mm
Ground Water Issues	Aquifer Characteristics	Gneiss, Basalt
	Main Aquifers in the area	Covered by Hard rocks, therefore, weathered, fractured and jointed rock.
Aquifer System	Aquifer Disposition	Weathered zone followed by Gneiss, Basalt
	Geology	Gneiss, Basalt
	Maximum Depth of Aquifer in meter	30
	Type of Aquifer	Unconfined Aquifer
	Hydraulic Characters (sp.Yield %)	0.018

Salient Information	**Block**	**Banswara**
Water Level Behavior, DTW (m)	Depth to Water Level (m BGL)	3.98
	Trend (m/yr)	-0.07
Ground Water Quality	General	
	Electrical Conductivity in micro S/cm (Min/Max)	413/1113
	Nitrate in mg/liter (Min/Max)	1/53
	Fluoride in mg/liter (Min/Max)	0.014/1.6
Groundwater Resources	Total annual ground water recharge(mcm)	3.812
	Natural discharge during non-monsoon season(mcm)	0.381
	Net ground water availability(mcm)	3.430
	Existing gross ground water draft for irrigation(mcm)	1.573
	Existing gross ground water draft for domestic & industrial uses(mcm)	0.213
	Existing gross ground water draft for all uses(mcm)	1.791
	Allocation for domestic & industrial requirement(mcm)	0.213
	Net ground water availability for future irrigation development(mcm)	1.639
	State of ground water development	52.21
	Category	Safe
Supply Side Management		

Salient Information	**Block**	**Banswara**
	Geographical Area of Block (Sq.km.)	516.75
	Potential area suitable for recharge (Sq.km.)	448.83
	Thickness of unsaturated zone 3 m below ground level (m)	0.73
	Volume of sub surface storage space available for artificial recharge (MCM)	2.59
	Surplus Runoff Availability(mcm)	23.38
	Surface water available (mcm)	23.78
	No of Recharge/Farm ponds	0
	Mini Percolation Tanks Proposed	500
Demand side Management	Use of Advanced Irrigation Practices to be promoted	
	(i) Use of Sprinklers	
	Total Irrigated Area (ha)	3120
	Irrigated Area (ha) proposed for irrigation through sprinkler	0
	Water Saving by Use of Sprinklers	0
	Irrigated Area under wheat (ha)	15152
	Irrigated Area (ha) under wheat proposed for Gram cultivation	0
	Water Saving by change in cropping pattern	0
Expected Benefits	Net G.W. Availability (MCM)	16.40
	Total Net G.W. Availability after intervention (MCM)	17.51
	Existing G.W Draft for all purpose (MCM)	17.91
	Saving of Ground water through demand side intervention (MCM)	0

Salient Information	Block	Banswara
	Net GW draft after interventions (MCM)	17.91
	Present stage of G.W. development (in %)	52.21
	Expected stage of G.W. Dev. (in %)	50.57
Other Interventions proposed, if any	Alternate water Sources available	Canal Network

1. Assessment Unit at a Glance

The groundwater development in the Banswara block of Banswara district is 52.21%. The total area of the block is 516.17 km sq. out of which 448.83 km sq is potential recharge worthy. The block covers 71.16% of the total district area. As per census 2011, the total population of the block is 156695 including 78931 males and 77764 females.

b) Rainfall and Climate

Average annual rainfall (1992-2022) of the block is 1091. mm. The climate of the block is dry except in S-W monsoon season. The cold season is from December to February and is followed by summer from March to June. From mid of September to end of November constitutes post monsoon season.

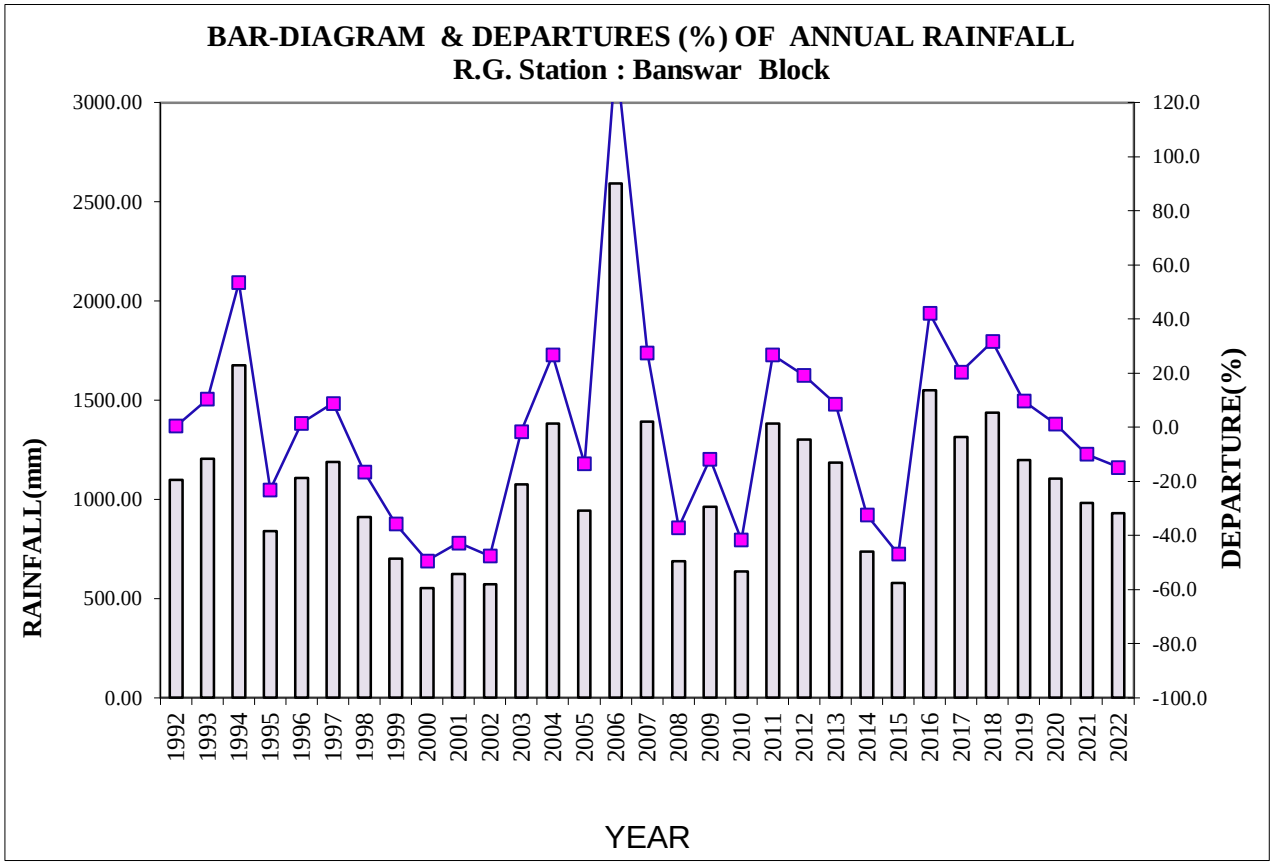


Fig.79: Bar Diagrame of Banswara block, Banswara

(c) Geomorphology

The block being a part of Banswara district, exhibits various geomorphological landforms occurring in the district viz.Burried Pediments, Pediplain, Valley fills, Ravines, Structural hills and water bodies.

3. General Hydrogeology

(a) Groundwater Conditions

The block is occupied by Phyllite and Schist of Aravalli Super Group. The rocks are generally soft and susceptible to weathering. The rocks have varied mineralogical and physical character. Groundwater occurs under unconfined condition in saturated zone of rock formation. Its occurrence is controlled by topography, physiography and structural features of the geological formations. Movement of groundwater in hard rock areas is governed by size, interconnection and continuity of structurally weak planes.

Pre Monsoon (May 2022):

The depth to water level varies widely depending upon topography, drainage, bed rock geology etc.During Pre-monsoon (May, 2022), depth to water level was found to vary from3mbg1to more than 40 mbgl (Figure 80).The depth to water level map of the block shows that in central part very small pockets have water levels between 2 and 5 m bgl. Eastern, central parts of the blocks had water levels between 5 and 10mbgl, rest of the area has water levels between 10 and 20 m and a very small northern and southern part has water levels between 20 and 40mbgl

Post Monsoon (November 2022):

During Post-monsoon (November, 2022), depth to water level in major part of the district was observed to be between 20 and 40mbgl (Figure 81).This map depicts that only north eastern and northern – southern parts show water levels below 2mbgl and 2 and 5mbgl, 5 and 10mbgl Rest all the area extending from western, eastern and southern10 and 20mbgl. Only small pocket is having water levels within 20 and 40mbgl from Eastern side.

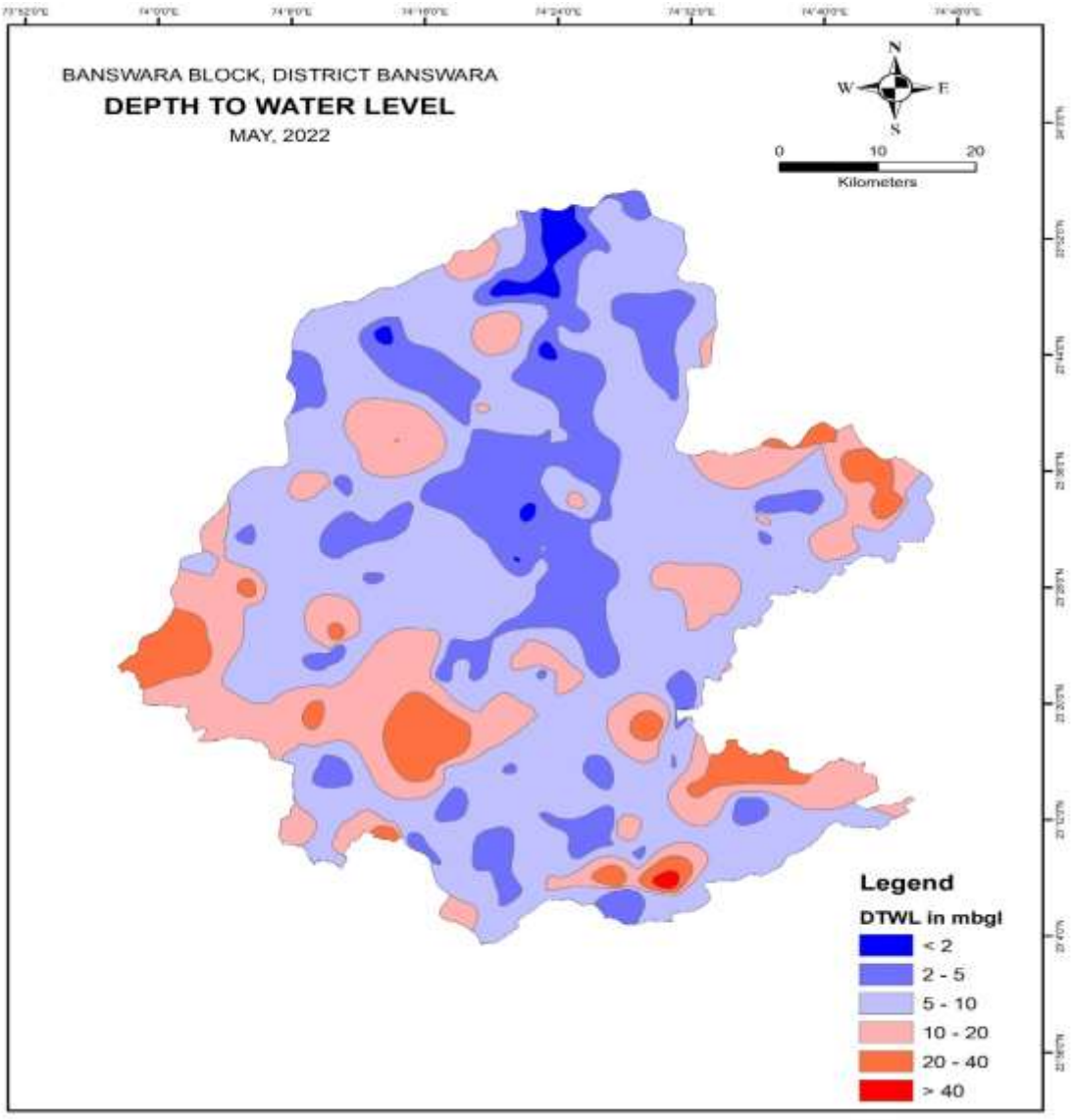


Fig 80: Depth to water Level Map Pre-Monsoon 2022, Banswara Block Banswara District

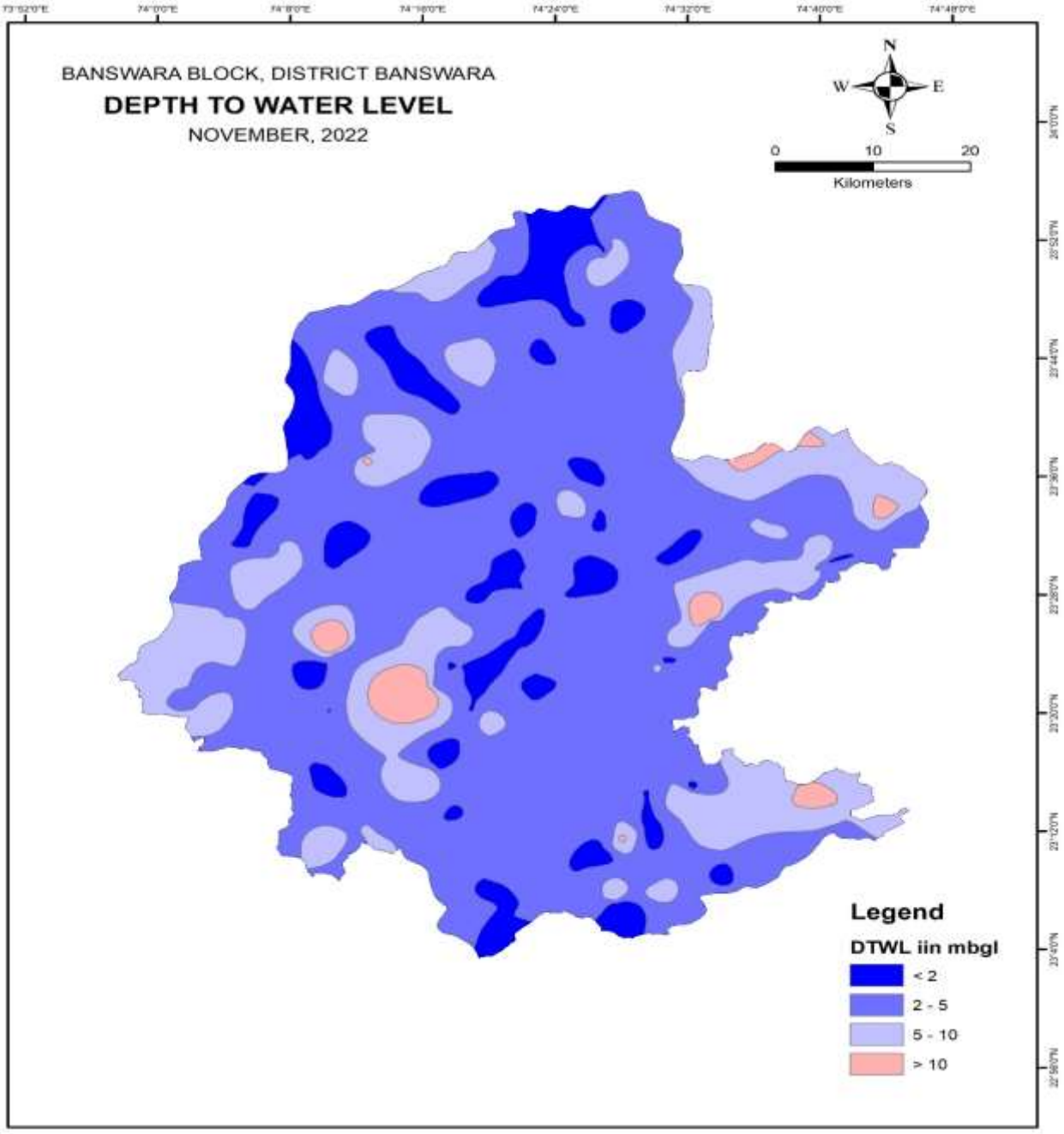


Fig 81: Depth to water Level Map Post-Monsoon 2022, Banswara Block Banswara District

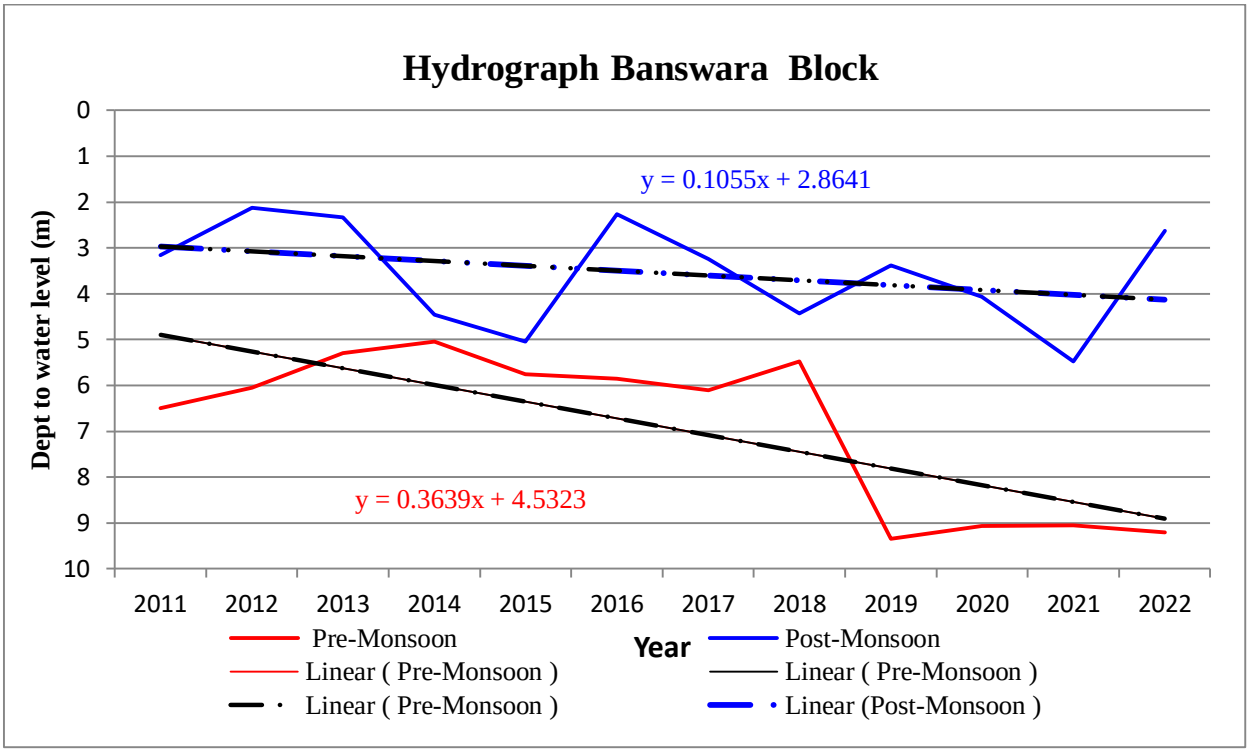


Fig 82: Hydrograph Banswara Block

Arthoona Block at a Glance

Salient Information	**Block**	**Arthoona**
	Geographical Area (km2)	248.7
	Potential Area (Sq.km)	245.15
Climate & Rainfall	Climate	Dry with hot summer and cold winter
	Average Rainfall (1992-2022)	879.8
Ground Water Issues	Aquifer Characteristics	Basalt, Gneiss
	Main Aquifers in the area	Covered by Hard rocks, therefore, weathered, fractured and jointed rock.
Aquifer System	Aquifer Disposition	Weathered zone followed by Phyllite. Schist
	Geology	Phyllite, Schist
	Maximum Depth of Aquifer in meter	50
	Type of Aquifer	Unconfined Aquifer
	Hydraulic Characters (sp.Yield %)	0.023

Salient Information	**Block**	**Arthoona**
Water Level Behavior, DTW (m)	Depth to Water Level (m BGL)	5.79
	Trend (m/yr)	-0.95
Ground Water Quality	General	
	Electrical Conductivity in micro S/cm (Min/Max)	570/780
	Nitrate in mg/litre (Min/Max)	9/38
	Fluoride in mg/litre (Min/Max)	0.40/1.04
Groundwater Resources	Total annual ground water recharge(mcm)	16.5022
	Natural discharge during non-monsoon season(mcm)	1.6502
	Net ground water availability(mcm)	14.852
	Existing gross ground water draft for irrigation(mcm)	0.587
	Existing gross ground water draft for domestic & industrial uses(mcm)	0.1514
	Existing gross ground water draft for all uses(mcm)	0.7389
	Allocation for domestic & industrial requirement(mcm)	0.1514
	Net ground water availability for future irrigation development(mcm)	0.746
	State of ground water development	49.75
	Category	Safe
Supply Side Management		

Salient Information	**Block**	**Arthoona**
	Geographical Area of Block (Sq.km.)	248.7
	Potential area suitable for recharge (Sq.km.)	245.15
	Thickness of unsaturated zone 3 m below ground level (m)	2.79
	Volume of sub surface storage space available for artificial recharge (MCM)	15.38
	Surplus Runoff Availability	10.89
	Volume of water stored/conserved under MJSA (MCM)	
	Cumulative storage created (considering 2-3 fillings)	
	Surface water available (mcm)	10.88
	No of Recharge/Farm ponds	0
	Mini Percolation Tanks Proposed	200
Demand side Management	Use of Advanced Irrigation Practices to be promoted	
	(i) Use of Sprinklers	
	Total Irrigated Area (ha)	1386
	Irrigated Area (ha) proposed for irrigation through sprinkler	0
	Water Saving by Use of Sprinklers	
	(ii)Use of Drip Irrigation	
	Total Irrigated Area (ha)	4958
	Irrigated Area (ha) proposed for irrigation through drip	0
	Water Saving by Use of Drip	
	(iii)Change in Cropping pattern	0

Salient Information	**Block**	**Arthoona**
	Irrigated Area under wheat (ha)	0
	Irrigated Area (ha) under wheat proposed for Gram cultivation	0
	Water Saving by change in cropping pattern	0
Expected Benefits	Net G.W. Availability (MCM)	7.46
	Additional Recharge from RWH & water conservation (MCM)	
	Total Net G.W. Availability after intervention (MCM)	7.87
	Existing G.W Draft for all purpose (MCM)	7.389
	Saving of Ground water through demand side intervention (MCM)	0
	Net GW draft after interventions (MCM)	7.389
	Present stage of G.W. development (in %)	49.75
	Expected stage of G.W. Dev. (in %)	48.42
Other Interventions proposed, if any	Alternate water Sources available	Canal Network

1. Assessment Unit at a Glance

The groundwater development in the Arthoona block of Banswara district is 49.75%. The total area of the block is 248.7 km sq. out of which 245.15 km sq is potential recharge worthy. The block covers 71.16% of the total district area. As per census 2011, the total population of the block is 110096 including 555684 males and 54412 females.

2. Background Information

b) Rainfall and Climate

Average annual rainfall (1992-2022) of the block is 879.8 mm. The climate of the block is dry except in S-W monsoon season. The cold season is from December to February and is followed by summer from March to June. From mid of September to end of November constitutes post monsoon season.

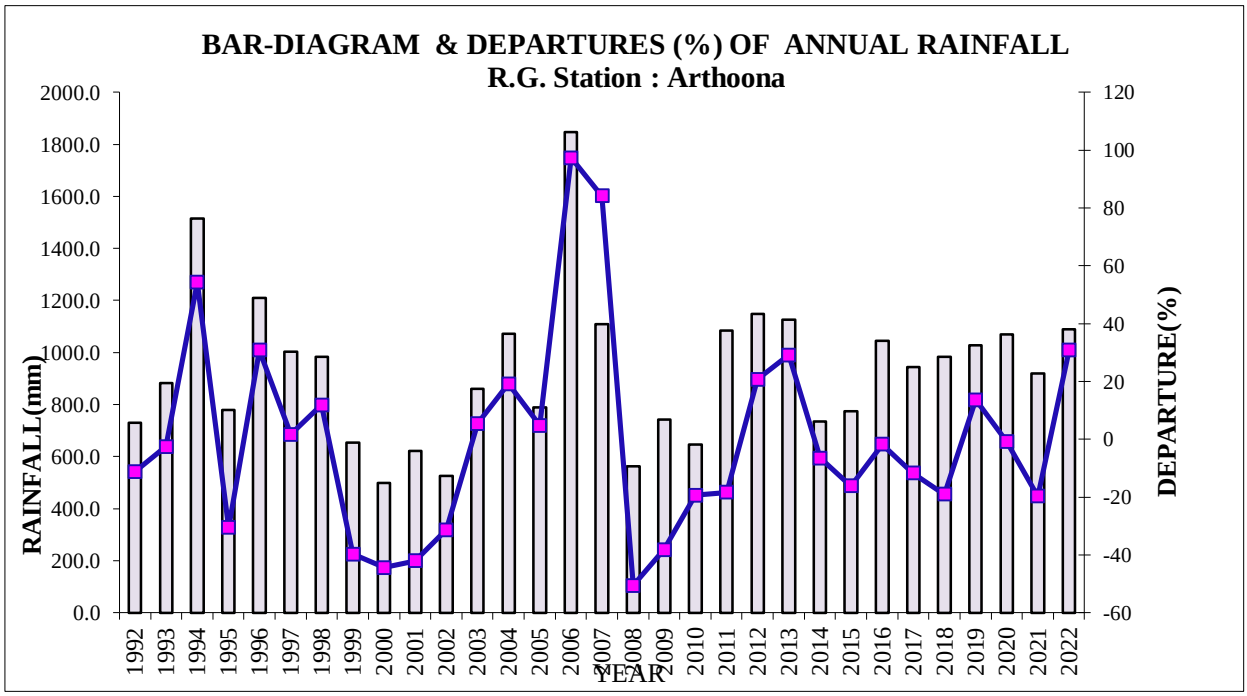


Fig.83: Bar Diagrame of Arthoona block, Banswara

(c) Geomorphology

The block being a part of Banswara district, exhibits various geomorphological landforms occurring in the district viz.Burried Pediments, Pediplain, Valley fills, Ravines, Structural hills and water bodies..

3. General Hydrogeology

(a) Groundwater Conditions

The block is occupied by Phyllite and Schist of Aravalli Super Group. The rocks are generally soft and susceptible to weathering. The rocks have varied mineralogical and physical character. Groundwater occurs under unconfined condition in saturated zone of rock formation. Its occurrence is controlled by topography, physiography and structural features of the geological formations. Movement of groundwater in hard rock areas is governed by size, interconnection and continuity of structurally weak planes.

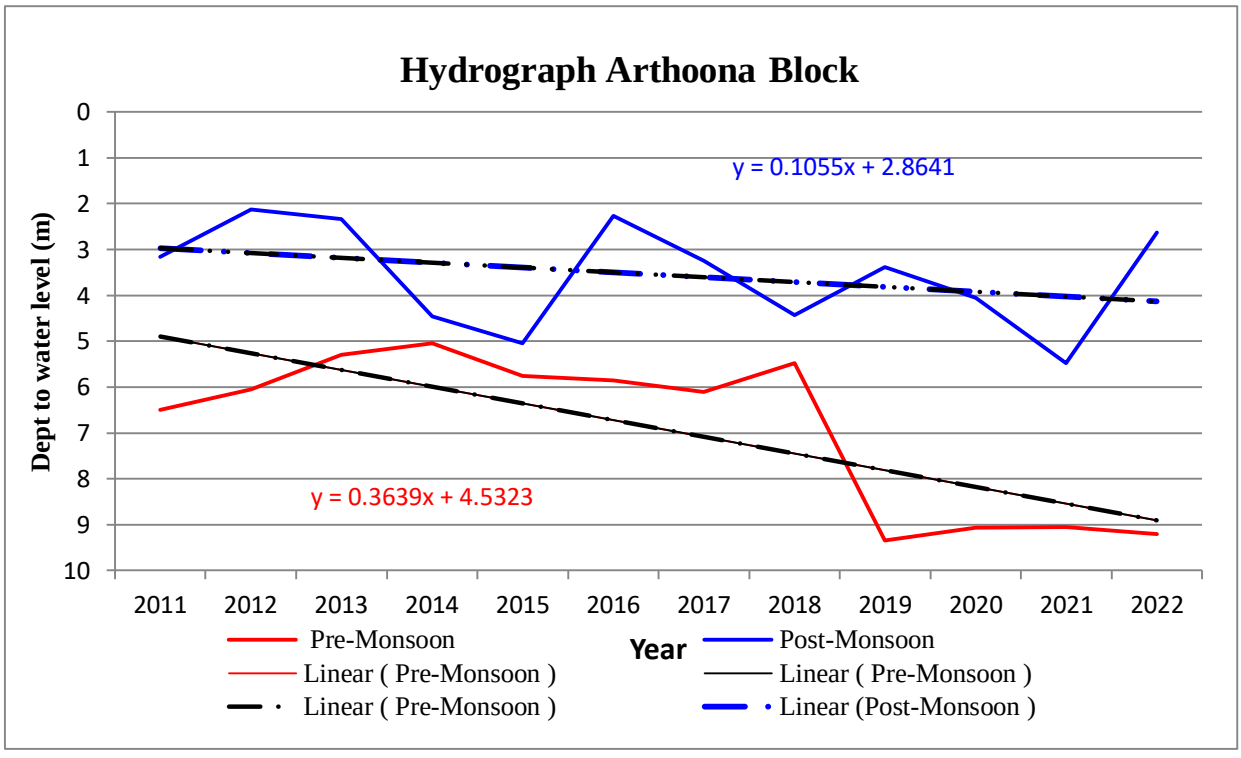


Fig 84: Hydrograph Arthoona Block

Talwara Block at a Glance

Salient Information	**Block**	**Talwara**
	Geographical Area (km2)	243.18
	Potential Area (Sq.km)	167.10
Climate & Rainfall	Climate	Dry with hot summer and cold winter
	Average Rainfall (1992-2022)	881.5 mm
Ground Water Issues	Aquifer Characteristics	Gneiss, Basalt
	Main Aquifers in the area	Covered by Hard rocks, therefore, weathered, fractured and jointed rock.
Aquifer System	Aquifer Disposition	Weathered zone followed by Gneiss, Basalt
	Geology	Gneiss, Basalt
	Maximum Depth of Aquifer in meter	50
	Type of Aquifer	Unconfined Aquifer

Salient Information	**Block**	**Talwara**
	Hydraulic Characters (sp.Yield %)	0.020
Water Level Behavior, DTW (m)	Depth to Water Level (m BGL)	4.36
	Trend (m/yr)	0.03
Ground Water Quality	General	
	Electrical Conductivity in micro S/cm (Min/Max)	738/970
	Nitrate in mg/liter (Min/Max)	8.2/49
	Fluoride in mg/liter (Min/Max)	0.40/1.63
Groundwater Resources	Total annual ground water recharge(mcm)	1.5773
	Natural discharge during non-monsoon season(mcm)	0.1577
	Net ground water availability(mcm)	1.419
	Existing gross ground water draft for irrigation(mcm)	0.6489
	Existing gross ground water draft for domestic & industrial uses(mcm)	0.2762
	Existing gross ground water draft for all uses(mcm)	0.9266
	Allocation for domestic & industrial requirement(mcm)	0.276
	Net ground water availability for future irrigation development(mcm)	0.493
	State of ground water development	60.44
	Category	Safe
Supply Side		

Salient Information	Block	Talwara
Management		
	Geographical Area of Block (Sq.km.)	243.18
	Potential area suitable for recharge (Sq.km.)	167.10
	Thickness of unsaturated zone 3 m below ground level (m)	1.52
	Volume of sub surface storage space available for artificial recharge (MCM)	3.42
	Surplus Runoff Availability(mcm)	11.86
	Surface water available (mcm)	12.04
	No of Recharge/Farm ponds	0
	Mini Percolation Tanks Proposed	150
Demand side Management	Use of Advanced Irrigation Practices to be promoted	
	(i) Use of Sprinklers	
	Total Irrigated Area (ha)	1536
	Irrigated Area (ha) proposed for irrigation through sprinkler	0
	Water Saving by Use of Sprinklers	0
	Irrigated Area under wheat (ha)	9557
	Irrigated Area (ha) under wheat proposed for Gram cultivation	5931
	Water Saving by change in cropping pattern	0
Expected Benefits	Net G.W. Availability (MCM)	4.93
	Total Net G.W. Availability after intervention (MCM)	5.68
	Existing G.W Draft for all purpose (MCM)	9.266

Salient Information	Block	Talwara
	Saving of Ground water through demand side intervention (MCM)	0
	Net GW draft after interventions (MCM)	9.266
	Present stage of G.W. development (in %)	62.00
	Expected stage of G.W. Dev. (in %)	65.27
Other Interventions proposed, if any	Alternate water Sources available	Canal Network

1. Assessment Unit at a Glance

The groundwater development in the Talwara block of Banswara district is 62.00%. The total area of the block is 243.18 km sq. out of which 167.10 km sq is potential recharge worthy. The block covers 71.16% of the total district area. As per census 2011, the total population of the block is 109761 including 55578 males and 54183 females.

b) Rainfall and Climate

Average annual rainfall (1992-2022) of the block is 881.5 mm. The climate of the block is dry except in S-W monsoon season. The cold season is from December to February and is followed by summer from March to June. From mid of September to end of November constitutes post monsoon season.

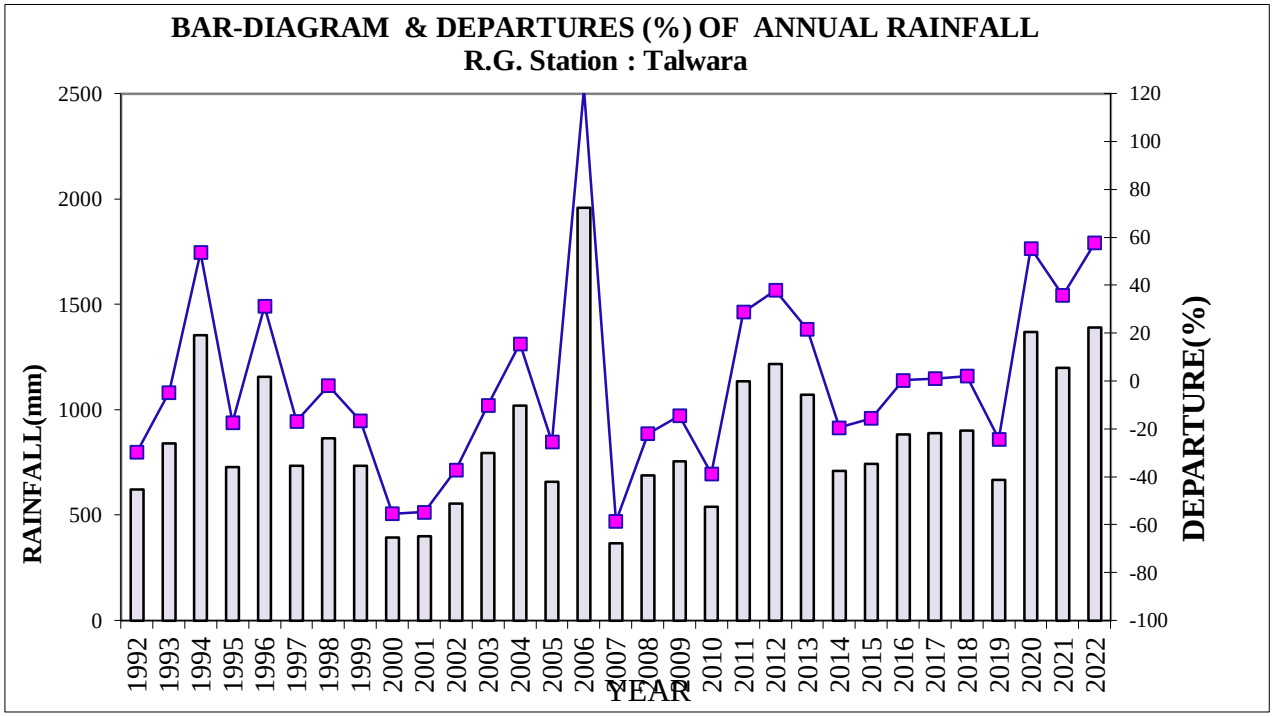


Fig.85: Bar Diagrame of Talwara block, Banswara

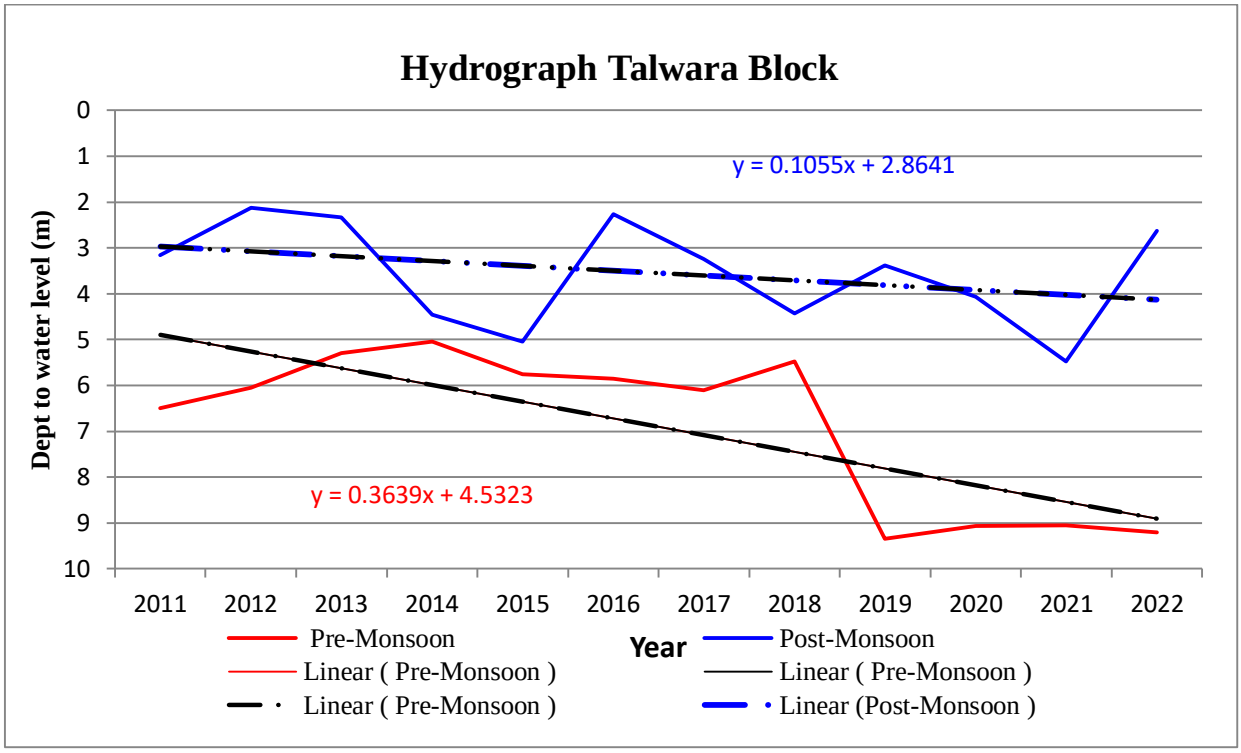
(c) Geomorphology

The block being a part of Banswara district, exhibits various geomorphological landforms occurring in the district viz.Burried Pediments, Pediplain, Valley fills, Ravines, Structural hills and water bodies..

3. General Hydrogeology

(a) Groundwater Conditions

The block is occupied by Phyllite and Schist of Aravalli Super Group. The rocks are generally soft and susceptible to weathering. The rocks have varied mineralogical and physical character. Groundwater occurs under unconfined condition in saturated zone of rock formation. Its occurrence is controlled by topography, physiography and structural features of the geological formations. Movement of groundwater in hard rock areas is governed by size, interconnection and continuity of structurally weak planes.


Hydrograph Talwara Block
Dept to water level (m)
0
1
2
3
4
5
6
7
8
9
10
y = 0.1055x + 2.8641
y = 0.3639x + 4.5323
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year
Pre-Monsoon
Linear (Pre-Monsoon)
Linear (Pre-Monsoon)
Post-Monsoon
Linear (Pre-Monsoon)
Linear (Post-Monsoon)

CGWB Monitoring Wells Used for Data Gap Analysis in NAQUIM Study Annexure I

District	Block	Village	Agency	Well Type	Latitude	Longitude	WL_pre_2021	WL_post_2021
BANSWARA	Garhi	ARTHUNA	CGWB	Dug	23.4958	74.1	7.8	6.1
BANSWARA	Garhi	Arthuna1	CGWB	PZ	23.5	74.1	9.3	7.2
BANSWARA	Bagidora	Bagidora	CGWB	Dug	23.4042	74.2667	14.43	4.43
BANSWARA	Chhotisarwan	Bagtalav	CGWB	Dug	23.5503	74.6858	11.3	5.1
BANSWARA	Bagidora	Bansla	CGWB	PZ	23.4211	74.2919	6.3	6.1
BANSWARA	Banswara	Banswara1	CGWB	Dug	23.5333	74.45	6	4.6
BANSWARA	Bagidora	Barodiya	CGWB	Dug	23.4167	74.3503	5.5	4.3
BANSWARA	Garhi	Bhimpur	CGWB	PZ	23.7153	74.2628	10.1	7
BANSWARA	Ghatol	Bhoongra	CGWB	Dug	23.6686	74.5056		6.45
BANSWARA	Sajjangarh	Bhura Kua	CGWB	Dug	23.225	74.31	8.4	5.1
BANSWARA	Sajjangarh	Bilari	CGWB	Dug	23.3269	74.3617	11.1	1.1
BANSWARA	Garhi	Borigoan	CGWB	PZ	23.575	74.1167	8.8	6
BANSWARA	Banswara	Borwat	CGWB	PZ	23.5092	74.3844	5.1	3.9
BANSWARA	Kushalgarh	Charakni	CGWB	Dug	23.3128	74.3797	10.3	3.3
BANSWARA	Anandpuri	CHHAJA	CGWB	PZ	23.4333	74.0586	12.4	2.5
BANSWARA	Sajjangarh	Chhinch	CGWB	PZ	23.3	74.3167	2.1	
BANSWARA	Kushalgarh	Chhoti Sarwa	CGWB	PZ	23.2197	74.5833	3.4	2.9
BANSWARA	Banswara	Chiriyawasa	CGWB	Dug	23.5092	74.3775	4.5	2.4
BANSWARA	Sajjangarh	CHOTA DUNGRA	CGWB	Dug	23.1722	74.2903	6.03	5.23

BANSWARA	Chhotisarwan	Danakshari	CGWB	Dug	23.5575	74.6011	3.5	3.2
BANSWARA	Chhotisarwan	Danpur	CGWB	Dug	23.5167	74.7167	0.65	1.65
BANSWARA	Ghatol	DUNGARIA	CGWB	Dug	23.8639	74.4583	8.6	10.8
BANSWARA	Ghatol	GANORA	CGWB	Dug	23.7667	74.2528	7.44	0.84
BANSWARA	Garhi	GARHI PARTAPURA	CGWB	Dug	23.59	74.175	4.3	3.6
BANSWARA	Kushalgarh	Kalakhet_Pz	CGWB	PZ	23.2097	74.4814	4.1	1
BANSWARA	Banswara	Khera Dahar	CGWB	Dug	23.6167	74.5083		2
BANSWARA	Garhi	Kotra1	CGWB	PZ	23.4544	74.075	9.8	8.9
BANSWARA	Kushalgarh	KUSALGARH	CGWB	Dug	23.2	74.45	3.88	3.97
BANSWARA	Kushalgarh	Kusalgarh_Pz	CGWB	PZ	23.2	74.4519	6.2	5.5
BANSWARA	Ghatol	NARWALI	CGWB	Dug	23.8944	74.4431	5.85	2.55
BANSWARA	Banswara	Padla Barora	CGWB	Dug	23.5361	74.5194	6.9	2.1
BANSWARA	Garhi	Raiyana	CGWB	Dug	23.5147	74.17	3.61	5.5
BANSWARA	Bagidora	RAKHO	CGWB	Dug	23.3683	74.2792	3.69	2.29
BANSWARA	Ghatol	Sadri	CGWB	Dug	23.7833	74.4844		2.15
BANSWARA	Kushalgarh	Saran	CGWB	Dug	23.2644	74.4319	3.7	2.6
BANSWARA	Ghatol	SENWASA	CGWB	Dug	23.6561	74.3897	6.37	5.47
BANSWARA	Talwara	Sera Pada Sandoh	CGWB	PZ	23.4833	74.3667		
BANSWARA	Banswara	Surwania	CGWB	Dug	23.4417	74.3689	2.7	2.1
BANSWARA	Garhi	Wajwana	CGWB	PZ	23.6167	74.2833	7.8	5

GWD Monitoring Wells Used for Data Gap Analysis in NAQUIM Study **Annexure II**

District	Block	Village	Agency	Well_Type	Latitude	Longitude	WL_pre_2021	WL_post_2021
Banswara	Talwara	Kohala	GWD	DW	23.6254	74.3132	4.1	1.60
Banswara	Banswara	Maheshpura	GWD	DW	23.3444	74.5206	5.45	3.40
Banswara	Chhotisarwan	Adi Bheet	GWD	DW	23.5266	74.6025	3.75	4.00
Banswara	Garhi	Agarpura @	GWD	DW	23.6576	74.1504	7.1	2.80
Banswara	Kushalgarh	Ambapada	GWD	DW	23.2686	74.3943	10.2	5.60
Banswara	Sajjangarh	Amlipada	GWD	DW	23.2668	74.2639		4.90
Banswara	Sajjangarh	Amlipada	GWD	PZ	23.2636	74.2683	20.9	8.70
Banswara	Arthoona	Anjana	GWD	DW	23.5319	74.0813	4	2.44
Banswara	Arthoona	Arthoona	GWD	PZ	23.5004	74.0961	5.35	5.50
Banswara	Talwara	Badgaon	GWD	DW	23.5913	74.3955	6.6	5.30
Banswara	Sajjangarh	Badhamuska	GWD	DW	23.1380	74.3264	4.5	0.15
Banswara	Ghatol	Badliya	GWD	DW	23.6201	74.3646	5	4.00
Banswara	Bagidora	Bagidora	GWD	PZ	23.4062	74.2692	11.65	
Banswara	Bagidora	Bagidora	GWD	DW	23.4068	74.2690		10.12
Banswara	Bagidora	Balawada	GWD	DW	23.4335	74.2811		8.80
Banswara	Ghatol	Baman Para	GWD	PZ	23.7683	74.3346	11.8	6.60
Banswara	Ghatol	Baman Para	GWD	DW	23.7695	74.3375		6.56
Banswara	Ghatol	Banicha	GWD	DW	23.7418	74.3879	1.1	1.25
Banswara	Banswara	Banswara	GWD	DW	23.5480	74.4616	2.15	4.35
Banswara	Banswara	Banswara (Pw)	GWD	DW	23.5542	74.4440	4.7	1.60

Banswara	Anandpuri	Bareth	GWD	DW	23.3292	74.0470	11.6	5.50
Banswara	Anandpuri	Bareth	GWD	PZ	23.3295	74.0480	14.4	11.05
Banswara	Ghatol	Bargun	GWD	DW	23.7147	74.5114	4.2	2.90
Banswara	Chhotisarwan	Bari	GWD	DW	23.5464	74.5849	7.15	2.05
Banswara	Banswara	Bari Badrel	GWD	DW	23.4527	74.5113	6.45	3.20
Banswara	Bagidora	Barigama	GWD	DW	23.3721	74.3831	5.35	1.65
Banswara	Bagidora	Barigama	GWD	PZ	23.3705	74.3896	6.7	1.83
Banswara	Ghatol	Baripadal	GWD	DW	23.7805	74.4174	1.2	0.70
Banswara	Bagidora	Barlipada(Badlipara)	GWD	DW	23.3883	74.2939	3.7	2.20
Banswara	Bagidora	Barodiya	GWD	DW	23.4270	74.3498	5.25	2.55
Banswara	Kushalgarh	Barwas Chhoti	GWD	DW	23.2260	74.4082		3.50
Banswara	Talwara	Bhagatpura	GWD	DW	23.6432	74.4003	6.9	6.30
Banswara	Anandpuri	Bhaler	GWD	DW	23.3777	74.1714		4.60
Banswara	Kushalgarh	Bhamarkot (Bhanwarkot)	GWD	DW	23.1206	74.4598	4.3	2.20
Banswara	Kushalgarh	Bharatgarh	GWD	DW	23.1771	74.4421		1.90
Banswara	Banswara	Bhartalia	GWD	DW	23.3882	74.5024	7.8	6.20
Banswara	Arthoona	Bhatar	GWD	PZ	23.5216	74.1654	28.1	24.11
Banswara	Sajjangarh	Bheelkuan	GWD	PZ	23.2832	74.2784	30.55	3.00
Banswara	Sajjangarh	Bheelkuan	GWD	DW	23.2797	74.2803		2.00
Banswara	Talwara	Bheelwan	GWD	PZ	23.6272	74.3871	4.65	4.50
Banswara	Garhi	Bheempur	GWD	DW	23.7117	74.2600	2.7	1.80
Banswara	Sajjangarh	Bhimkhora	GWD	PZ	23.1330	74.3009	5.67	3.05
Banswara	Kushalgarh	Bhimpura	GWD	DW	23.2455	74.4884		7.60

Banswara	Ghatol	Bhoongra	GWD	DW	23.6897	74.5165	3.35	3.25
Banswara	Sajjangarh	Bhoora Kua	GWD	PZ	23.2227	74.3106	2.45	2.00
Banswara	Bagidora	Bhoyan	GWD	DW	23.3741	74.3243	3.4	0.20
Banswara	Bagidora	Bhoyan	GWD	PZ	23.3728	74.3280	8.65	1.94
Banswara	Anandpuri	Bhukia	GWD	DW	23.3863	74.0234		2.15
Banswara	Sajjangarh	Bhura Kuan (Bhoora Kua)	GWD	DW	23.2250	74.3027	2.9	1.40
Banswara	Kushalgarh	Bijori Kalan	GWD	DW	23.2504	74.5337		2.10
Banswara	Kushalgarh	Bijori Khurd	GWD	PZ	23.2400	74.5319	19.35	14.36
Banswara	Sajjangarh	Bilari	GWD	DW	23.3258	74.3631		3.30
Banswara	Bagidora	Bodigama	GWD	DW	23.4709	74.2782	11.7	7.00
Banswara	Talwara	Bodla	GWD	DW	23.4969	74.3812	5.8	3.90
Banswara	Kushalgarh	Bolia Pada	GWD	DW	23.1951	74.5622		9.50
Banswara	Ghatol	Borda	GWD	DW	23.7759	74.2988	6.3	3.20
Banswara	Garhi	Bori	GWD	PZ	23.5725	74.1109	7.35	5.70
Banswara	Talwara	Borkhedi	GWD	DW	23.5001	74.3563	2.4	1.60
Banswara	Gangartalai	Borkunda	GWD	PZ	23.2772	74.1469	6.7	3.42
Banswara	Anandpuri	Borwania	GWD	DW	23.4196	74.1091		4.90
Banswara	Talwara	Borwat	GWD	DW	23.5112	74.3803	6	4.20
Banswara	Anandpuri	Chandarwara	GWD	DW	23.4459	74.1093	5.6	4.00
Banswara	Ghatol	Chanduji Ka Gara	GWD	PZ	23.6707	74.3339	2.1	0.50
Banswara	Sajjangarh	Channawala (Chanawla)	GWD	DW	23.3403	74.3128	7.1	2.40
Banswara	Kushalgarh	Charakni	GWD	PZ	23.3158	74.3869		3.90

Banswara	Kushalgarh	Bijori Khurd	GWD	PZ	23.2400	74.5319	19.35	14.36
Banswara	Ghatol	Charla	GWD	DW	23.7121	74.4257	2.5	0.80
Banswara	Ghatol	Charna Bhundwai	GWD	DW	23.8862	74.4055	0.2	0.10
Banswara	Ghatol	Charna Bhundwai	GWD	PZ	23.8887	74.3992	9.5	2.60
Banswara	Garhi	Chaupasanga	GWD	DW	23.6056	74.1347	8.2	3.20
Banswara	Chhotisarwan	Chayan	GWD	DW	23.5687	74.7504		4.20
Banswara	Banswara	Cheeb	GWD	PZ	23.6108	74.5022	6.55	
Banswara	Banswara	Cheeb	GWD	DW	23.6108	74.5022		2.23
Banswara	Gangartalai	Chelkari	GWD	PZ	23.3287	74.1559	21.6	4.56
Banswara	Anandpuri	Chhaja	GWD	PZ	23.4254	74.0588	13.45	10.70
Banswara	Bagidora	Chheench	GWD	DW	23.4677	74.3145		4.30
Banswara	Anandpuri	Chhota udaipura	GWD	PZ	23.4435	74.1867	24.6	14.45
Banswara	Sajjangarh	Chhotaloharia	GWD	DW	23.1380	74.3264	5.5	1.40
Banswara	Ghatol	Chhoti Padal	GWD	DW	23.7903	74.4340	7.5	3.20
Banswara	Chhotisarwan	Chhoti Sarwan	GWD	DW	23.5220	74.6472	5.7	5.10
Banswara	Garhi	Chibra Talai	GWD	DW	23.5723	74.2513	5.4	3.40
Banswara	Anandpuri	ChikhliTeja	GWD	PZ	23.3042	74.0749	8.27	2.92
Banswara	Talwara	Chiriwasa	GWD	DW	23.6076	74.3776	4.9	3.45
Banswara	Kushalgarh	Chokhwara	GWD	PZ	23.2589	74.5944	27.9	14.60
Banswara	Sajjangarh	Chora	GWD	DW	23.0755	74.3277	8.5	0.40
Banswara	Anandpuri	Chordi	GWD	DW	23.3870	74.1636	3.6	1.60
Banswara	Sajjangarh	Chowki Doongri	GWD	DW	23.2453	74.3630	5.2	2.90
Banswara	Gangartalai	Dabri Chhoti	GWD	DW	23.3216	74.1223	11.5	3.90

Banswara	Ghatol	Daduka (Doodka)	GWD	DW	23.8118	74.3412	2.05	1.05
Banswara	Garhi	Dakarkundi	GWD	PZ	23.5469	74.2445	2.95	1.48
Banswara	Chhotisarwan	Danpur	GWD	DW	23.5128	74.7179	6.1	2.05
Banswara	Chhotisarwan	Danpur	GWD	PZ	23.5022	74.7025	39.11	0.72
Banswara	Talwara	Deolia	GWD	DW	23.5788	74.3450	4.8	3.75
Banswara	Kushalgarh	Devda Sath	GWD	PZ	23.1880	74.3899	6.75	4.28
Banswara	Ghatol	Dewada	GWD	PZ	23.7183	74.3714	4.25	3.95
Banswara	Chhotisarwan	Dhanakshri (Danakshari)	GWD	PZ	23.5513	74.6004	12.8	9.57
Banswara	Kushalgarh	Doongar Bheet	GWD	PZ	23.1278	74.3905	10.1	6.64
Banswara	Sajjangarh	Doongra Chhota	GWD	DW	23.1630	74.3253	6.6	2.60
Banswara	Ghatol	Dungria	GWD	DW	23.8652	74.4568	6.8	4.70
Banswara	Talwara	Fathikhan	GWD	PZ	23.5537	74.2933		3.48
Banswara	Ghatol	Gadra	GWD	PZ	23.7447	74.5377	13.7	9.38
Banswara	Kushalgarh	Galwani	GWD	PZ	23.1278	74.4545	35.05	10.81
Banswara	Bagidora	Gamana	GWD	DW	23.1838	74.1941	12.4	5.70
Banswara	Banswara	Ganau (Ganaoo)	GWD	DW	23.4526	74.4693	5.9	3.10
Banswara	Gangartalai	Gangar Talai	GWD	DW	23.2573	74.1698	1.3	0.40
Banswara	Ghatol	Gangji Ka Khera	GWD	DW	23.8555	74.4479	3.85	0.60
Banswara	Garhi	Garha Gopi Nath	GWD	DW	23.5702	74.2197	6.4	3.10
Banswara	Garhi	Garhi	GWD	PZ	23.5916	74.1494	6.8	4.95
Banswara	Ghatol	Ghatol	GWD	DW	23.7604	74.4193	3.25	3.05
Banswara	Kushalgarh	Ghodadara	GWD	DW	23.2075	74.4902	4.9	1.20
Banswara	Chhotisarwan	GodiTejpur	GWD	PZ	23.6367	74.6885	21.15	8.76

Banswara	Ghatol	Gorcha	GWD	PZ	23.6731	74.4906		2.95
Banswara	Chhotisarwan	Goth Ka Mahura	GWD	PZ	23.5680	74.7347	34.9	16.10
Banswara	Arthoona	Govindpura	GWD	PZ	23.4688	74.1608	8.1	4.90
Banswara	Ghatol	Guliawada	GWD	DW	23.7439	74.4555	6.5	2.65
Banswara	Sajjangarh	Gundi	GWD	DW	23.0926	74.3055	12.5	3.85
Banswara	Arthoona	Herapadatimurwa	GWD	PZ	23.4937	74.2396	6.3	3.80
Banswara	Sajjangarh	Himmatgarh	GWD	DW	23.1194	74.3497	4.4	2.10
Banswara	Chhotisarwan	Hiriya Garhi	GWD	DW	23.5718	74.7138		8.50
Banswara	Chhotisarwan	Hiriya Garhi	GWD	PZ	23.5726	74.7146		16.40
Banswara	Ghatol	Isarwala	GWD	DW	23.6460	74.3238	5.4	3.75
Banswara	Ghatol	Jagpura	GWD	PZ	23.8607	74.3462	8.7	
Banswara	Ghatol	Jagpura	GWD	DW	23.8665	74.3473		4.35
Banswara	Sajjangarh	Jalampura	GWD	DW	23.1752	74.2491	4.7	3.10
Banswara	Ghatol	Jamboi	GWD	PZ	23.6902	74.4570	5.3	2.62
Banswara	Gangartalai	Sallo Pat	GWD	DW	23.1793	74.1626	8.2	6.80
Banswara	Talwara	Janawari	GWD	PZ	23.5646	74.4162	11.1	5.20
Banswara	Banswara	Jaswantpura	GWD	DW	23.4441	74.5202		8.50
Banswara	Ghatol	Jetpura	GWD	DW	23.8465	74.5082	5.5	1.60
Banswara	Ghatol	Jetpura	GWD	PZ	23.8466	74.5063	7.4	2.87
Banswara	Sajjangarh	Jhalakiya	GWD	DW	23.2056	74.2378	5.65	3.00
Banswara	Banswara	Jharniya	GWD	PZ	23.0996	74.5556	2.8	3.10
Banswara	Arthoona	Jolana	GWD	DW	23.4926	74.1990	1.35	2.75
Banswara	Arthoona	Jolana	GWD	PZ	23.4920	74.1986	8	6.00

Banswara	Anandpuri	Jooni Timbi	GWD	DW	23.3001	74.1287		1.60
Banswara	Anandpuri	Jooni Timbi	GWD	PZ	23.2977	74.1274	10.4	6.85
Banswara	Bagidora	Kakanwani	GWD	PZ	23.3712	74.4031	15.18	2.78
Banswara	Chhotisarwan	Kala Khet	GWD	PZ	23.5672	74.6525	3.81	2.55
Banswara	Bagidora	Kalinjara	GWD	PZ	23.3454	74.2998	8.65	
Banswara	Bagidora	Kalinjara	GWD	DW	23.3504	74.3102		4.54
Banswara	Bagidora	Karji	GWD	PZ	23.4008	74.3874	36.4	6.57
Banswara	Sajjangarh	Kasarwadi	GWD	DW	23.1147	74.3315	5.7	2.80
Banswara	Sajjangarh	Kasarwadi	GWD	PZ	23.1168	74.3293	5.85	
Banswara	Sajjangarh	Kasarwadi	GWD	PZ	23.1194	74.3280		2.20
Banswara	Chhotisarwan	Katumbi	GWD	DW	23.5368	74.6187	7	2.30
Banswara	Banswara	Kesarpura	GWD	PZ	23.4932	74.5096	10.5	4.68
Banswara	Kushalgarh	Khajoora	GWD	PZ	23.2800	74.4915	8.35	4.05
Banswara	Ghatol	Khamera	GWD	DW	23.7886	74.4620	2.4	1.10
Banswara	Ghatol	Khamera	GWD	PZ	23.7945	74.4670	19.3	10.30
Banswara	Banswara	Khedavarli Pada	GWD	DW	23.3582	74.4420	4.1	2.80
Banswara	Garhi	Khera	GWD	DW	23.6296	74.2113	7.5	5.25
Banswara	Bagidora	Khokharwa	GWD	DW	23.4647	74.2303	5.45	4.10
Banswara	Gangartalai	Khoonta Galia	GWD	DW	23.1945	74.1344	12.4	5.80
Banswara	Bagidora	Khoontamachar	GWD	PZ	23.3621	74.2592	18.5	15.25
Banswara	Garhi	Khum Ji Ka Parda	GWD	DW	23.6165	74.1481	4.9	2.10
Banswara	Sajjangarh	Khundani-Hala	GWD	DW	23.2360	74.2542		3.20
Banswara	Kushalgarh	Kotra	GWD	DW	23.2983	74.5062	7.95	8.30

Banswara	Arthoona	Kotra	GWD	PZ	23.4615	74.0698	11.57	12.40
Banswara	Arthoona	Kotra	GWD	DW	23.4629	74.0697	12.3	2.20
Banswara	Kushalgarh	Kotri	GWD	PZ	23.1285	74.5052	15.15	10.75
Banswara	Chhotisarwan	Kundal	GWD	PZ	23.6053	74.7056	28.35	7.17
Banswara	Talwara	Kupra	GWD	DW	23.5583	74.3937	4.65	4.15
Banswara	Arthoona	Kushal Kot	GWD	DW	23.5047	74.0455	9.2	6.80
Banswara	Kushalgarh	Kushalapara	GWD	PZ	23.1945	74.4626	19.9	7.10
Banswara	Kushalgarh	Kushalgarh	GWD	PZ	23.2041	74.4389	5.9	3.15
Banswara	Kushalgarh	Kushalgarh	GWD	DW	23.1908	74.4497	3.25	2.96
Banswara	Talwara	Kushalpura	GWD	DW	23.5906	74.2812	3.2	1.50
Banswara	Ghatol	Kuwania (Koniya)	GWD	DW	23.6561	74.4051	4.5	4.30
Banswara	Garhi	Lasara	GWD	PZ	23.7852	74.1686	7.6	6.90
Banswara	Talwara	Lodha	GWD	DW	23.5541	74.4085	4.7	4.10
Banswara	Garhi	Lohariya	GWD	DW	23.7640	74.2232	1	1.20
Banswara	Arthoona	Majiya	GWD	PZ	23.4626	74.1954	6.25	7.85
Banswara	Ghatol	Mandela	GWD	PZ	23.8459	74.3228	12.55	10.83
Banswara	Talwara	Masatia (Masotiya)	GWD	DW	23.5935	74.3305	2.3	1.40
Banswara	Chhotisarwan	Matashula	GWD	PZ	23.6183	74.5844	18.8	10.85
Banswara	Garhi	Metwala	GWD	PZ	23.7154	74.1688	9.2	8.21
Banswara	Kushalgarh	Mokhampura	GWD	DW	23.1624	74.5608	9.15	2.50
Banswara	Sajjangarh	Molan	GWD	DW	23.3035	74.3315		6.00
Banswara	Ghatol	Mota Tanda	GWD	PZ	23.7876	74.2427	5.1	1.60
Banswara	Ghatol	Motagaon	GWD	DW	23.8014	74.2517	7.1	5.70

Banswara	Arthoona	Moti Bassi	GWD	DW	23.5194	74.0563	10.7	7.10
Banswara	Gangartalai	Moti Timbi	GWD	DW	23.2745	74.1525	6.6	0.25
Banswara	Anandpuri	Mundri	GWD	DW	23.3748	74.0834	7.2	3.55
Banswara	Kushalgarh	Mundri	GWD	DW	23.2274	74.4503	5.6	8.72
Banswara	Anandpuri	Mundri	GWD	PZ	23.3731	74.0840	11.05	4.70
Banswara	Ghatol	Mungana	GWD	DW	23.6771	74.3176	7.8	3.40
Banswara	Ghatol	Mungana	GWD	PZ	23.6826	74.3123	4.85	5.25
Banswara	Ghatol	Murasel	GWD	DW	23.7982	74.5336	3.85	2.30
Banswara	Ghatol	Murasel	GWD	PZ	23.8001	74.5402		5.48
Banswara	Bagidora	Nagawada	GWD	DW	23.3840	74.2975	6.6	4.25
Banswara	Kushalgarh	Nagdabari	GWD	DW	23.1613	74.4778	4.4	2.58
Banswara	Banswara	Nal	GWD	DW	23.4571	74.4804		2.80
Banswara	Banswara	Nalada (Nalda)	GWD	DW	23.3931	74.5072	4.5	1.80
Banswara	Talwara	Nalraghawa	GWD	DW	23.6217	74.4485	4.2	3.70
Banswara	Ghatol	Narwali	GWD	DW	23.8961	74.4417	5.45	1.50
Banswara	Bagidora	Naugama	GWD	DW	23.4388	74.2617	6.7	5.70
Banswara	Garhi	Nawa Gaon	GWD	DW	23.6205	74.1954	4.95	2.30
Banswara	Garhi	Nawa Gaon	GWD	PZ	23.6060	74.1898	10.7	8.50
Banswara	Banswara	Nawagaon	GWD	DW	23.4837	74.4294	3.85	2.45
Banswara	Anandpuri	Obla	GWD	DW	23.3532	74.0299	12.25	5.50
Banswara	Ghatol	Odwal	GWD	DW	23.8058	74.3884	0.7	0.50
Banswara	Garhi	Ora	GWD	PZ	23.7704	74.1920	6.45	5.03
Banswara	Banswara	Padla	GWD	DW	23.5033	74.5095	6.35	1.60

Banswara	Kushalgarh	Padla	GWD	DW	23.1276	74.4416		4.40
Banswara	Sajjangarh	Padla-Katara	GWD	DW	23.3236	74.3308		4.50
Banswara	Sajjangarh	Padla-Katara	GWD	PZ	23.3216	74.3313	13.3	9.19
Banswara	Banswara	Palaswani	GWD	PZ	23.4342	74.5692	8.85	3.80
Banswara	Garhi	Panasichhoti	GWD	PZ	23.5334	74.2530	9.1	4.48
Banswara	Banswara	Pari Bari	GWD	DW	23.4503	74.3587	5.1	4.80
Banswara	Kushalgarh	Patan	GWD	PZ	23.2398	74.6597	23.65	12.95
Banswara	Kushalgarh	Patan	GWD	PZ	23.2395	74.6596	18.75	13.08
Banswara	Garhi	Pateliya	GWD	PZ	23.5662	74.2523	1.65	0.30
Banswara	Talwara	Peeplod	GWD	DW	23.5727	74.4386	4.3	
Banswara	Anandpuri	Phalwan	GWD	PZ	23.4682	74.0864	25.45	
Banswara	Anandpuri	Phalwan	GWD	DW	23.3116	74.0968		13.11
Banswara	Chhotisarwan	Phepher	GWD	DW	23.4926	74.6518	4.7	3.20
Banswara	Garhi	Pratapur	GWD	PZ	23.5909	74.1680	10.6	
Banswara	Garhi	Pratapur	GWD	DW	23.5910	74.1653		6.68
Banswara	Arthoona	Raiyana	GWD	DW	23.5147	74.1775	2.2	1.60
Banswara	Gangartalai	Ram Ka Munna	GWD	PZ	23.2472	74.1476	6.25	3.30
Banswara	Gangartalai	Ram Ka Munna	GWD	DW	23.2449	74.1491		2.57
Banswara	Anandpuri	Ramela	GWD	DW	23.3762	74.0421		1.35
Banswara	Ghatol	Rathoron Ki Padoli	GWD	DW	23.7071	74.3557		7.35
Banswara	Ghatol	Rawatpura	GWD	DW	23.8444	74.4479	8.6	4.95
Banswara	Gangartalai	Rohanwari	GWD	DW	23.3011	74.1806		5.20
Banswara	Banswara	Rooppura	GWD	DW	23.4503	74.5474		1.10

Banswara	Banswara	Rooppura	GWD	PZ	23.4441	74.5488	18.37	14.58
Banswara	Ghatol	Runjia (Roojiya)	GWD	DW	23.7962	74.3874	4	1.15
Banswara	Banswara	Saga	GWD	DW	23.4376	74.4143		4.70
Banswara	Bagidora	Sagdungri(Sanga Doongri)	GWD	DW	23.3974	74.2433	2.9	2.30
Banswara	Talwara	Sagrod	GWD	DW	23.4800	74.3638	5.2	4.25
Banswara	Banswara	Sagwadeeya	GWD	DW	23.4737	74.4188	3.65	3.50
Banswara	Sajjangarh	Sajjangarh	GWD	PZ	23.2569	74.2895	6.15	
Banswara	Sajjangarh	Sajjangarh	GWD	DW	23.2571	74.2876		4.05
Banswara	Chhotisarwan	Salarapada	GWD	PZ	23.5059	74.6734	10.35	1.73
Banswara	Chhotisarwan	Saliabari	GWD	PZ	23.5172	74.6570	18.09	9.90
Banswara	Chhotisarwan	Saliabari	GWD	DW	23.5124	74.6666	15	7.92
Banswara	Banswara	Saliya	GWD	DW	23.4631	74.3889	3.8	2.50
Banswara	Banswara	Saliya	GWD	PZ	23.3770	74.4369	2.95	2.80
Banswara	Gangartalai	Saliya	GWD	DW	23.3479	74.1747	9.5	4.20
Banswara	Gangartalai	Sallo Pat	GWD	DW	23.1793	74.1626	8.2	6.80
Banswara	Bagidora	Sambhoopura	GWD	PZ	23.5059	74.3196	13.65	2.62
Banswara	Banswara	Sangesri	GWD	PZ	23.4079	74.5426		4.40
Banswara	Banswara	Sangesri	GWD	DW	23.4068	74.5432	8.5	2.40
Banswara	Kushalgarh	Saran	GWD	DW	23.2798	74.4255	3.95	3.20
Banswara	Ghatol	Sarodiya	GWD	DW	23.9115	74.4749	2.6	1.80
Banswara	Kushalgarh	Sarwa Kalan	GWD	DW	23.2053	74.6867	5.8	4.45
Banswara	Kushalgarh	Sarwachhoti	GWD	DW	23.2186	74.5795		2.15

Banswara	Kushalgarh	Sarwachhoti (Chhoti Sarwa)	GWD	PZ	23.2232	74.5887	36.75	11.87
Banswara	Bagidora	Seona (Sewana)	GWD	PZ	23.3888	74.3752	13.55	3.60
Banswara	Bagidora	Seona (Sewana)	GWD	DW	23.3879	74.3747		2.58
Banswara	Gangartalai	Shergarh	GWD	DW	23.3421	74.1718	8.8	2.30
Banswara	Talwara	Shivpura	GWD	DW	23.5589	74.3701	1.65	1.25
Banswara	Banswara	Siyapur	GWD	DW	23.4839	74.3910	4.8	4.40
Banswara	Kushalgarh	Sooliyamalpara	GWD	PZ	23.3059	74.4923	17.3	38.85
Banswara	Garhi	Sujaji Ka Gara	GWD	DW	23.6995	74.1567	1.4	0.80
Banswara	Garhi	Sundani	GWD	DW	23.6845	74.3065	2.5	2.60
Banswara	Talwara	Surpur	GWD	DW	23.6286	74.4001	2.8	2.00
Banswara	Banswara	Surwaniya	GWD	DW	23.4390	74.3732	3.8	2.20
Banswara	Ghatol	Takhtaji Ka Tanda	GWD	DW	23.8219	74.2723	8.1	7.70
Banswara	Ghatol	Takhtaji Ka Tanda	GWD	PZ	23.8219	74.2723	11.37	7.27
Banswara	Arthoona	Tamatiya Rathod	GWD	DW	23.4824	74.2073	6.7	5.00
Banswara	Sajjangarh	Tambesara	GWD	DW	23.2635	74.3488	6.2	2.70
Banswara	Kushalgarh	Tandavadla	GWD	PZ	23.1652	74.4166	1.1	2.01
Banswara	Anandpuri	Tarwa	GWD	PZ	23.3985	74.1740	8.5	3.44
Banswara	Talwara	Tejpur	GWD	DW	23.6088	74.4263	2.25	7.60
Banswara	Chhotisarwan	Tejpur	GWD	DW	23.6301	74.6590	11.8	
Banswara	Chhotisarwan	Tejpur	GWD	PZ	23.6369	74.6615	21.15	8.55
Banswara	Chhotisarwan	Tejpur	GWD	PZ	23.6369	74.6615		1.80
Banswara	Anandpuri	Thapra	GWD	DW	23.4199	74.2042	9.45	5.75

Banswara	Banswara	Thikria	GWD	DW	23.5201	74.4107	2.8	2.70
Banswara	Kushalgarh	Thummath	GWD	PZ	23.1966	74.4001	35.55	
Banswara	Kushalgarh	Thummath	GWD	DW	23.1977	74.3911		27.55
Banswara	Sajjangarh	Thunthi	GWD	PZ	23.1353	74.1305	5	2.85
Banswara	Chhotisarwan	Ubapan	GWD	PZ	23.5838	74.7070	10.3	1.48
Banswara	Anandpuri	Udaipur Bada	GWD	PZ	23.4132	74.1777	22.7	22.16
Banswara	Kushalgarh	Udaipuria	GWD	DW	23.2182	74.5951		1.90
Banswara	Ghatol	Udpura	GWD	DW	23.6485	74.3882	4.2	3.30
Banswara	Kushalgarh	Umar Jhonka	GWD	DW	23.2635	74.5074		1.05
Banswara	Kushalgarh	Umar Jhonka	GWD	PZ	23.2643	74.5118	5.25	4.93
Banswara	Talwara	Umrai	GWD	PZ	23.5332	74.3217	4.45	4.09
Banswara	Banswara	Umrianala	GWD	PZ	23.4120	74.4824	43.2	6.80
Banswara	Banswara	Umrianala	GWD	DW	23.4120	74.4824	8.05	24.70
Banswara	Ghatol	Undwela	GWD	DW	23.7494	74.5004	3.2	2.60
Banswara	Kushalgarh	Vasooni	GWD	DW	23.1388	74.4283		3.10
Banswara	Banswara	Veerpur	GWD	DW	23.4191	74.5276	9.7	6.70
Banswara	Kushalgarh	Wagaicha	GWD	DW	23.1135	74.5152	7.35	2.65
Banswara	Kushalgarh	Wagaicha	GWD	PZ	23.1130	74.5187	64.55	44.65
Banswara	Gangartalai	Wagkhora	GWD	PZ	23.3098	74.2445	7.71	1.65
Banswara	Kushalgarh	Wakaner (Bakaner)	GWD	DW	23.2501	74.3918		6.60
Banswara	Kushalgarh	Wakaner (Bakaner)	GWD	PZ	23.2429	74.3968	10.15	6.03
Banswara	Bagidora	Wansla	GWD	DW	23.4248	74.2914	8.55	7.30
Banswara	Talwara	Surpur	GWD	DW	23.6286	74.4001	2.8	2.00

GWD and CGWB, KEYWELLS Monitoring Wells in NAQUIM Study **Annexure III**

District	Block	Village	Latitude	AGENCY	Longitude	Pre Monsoon 2022	Post Monsoon 2022
Banswara	Anandpuri	Chandarwara	23.4459	Keywell	74.1093	5.8	2.5
Banswara	Anandpuri	Mundri	23.3748	Keywell	74.0834	10.35	7
Banswara	Anandpuri	Udaipur Bada	23.4132	Keywell	74.1777	21.85	14.9
Banswara	Anandpuri	Anandpuri	23.3864	Keywell	74.0238	30	16
Banswara	Garhi	Ora	23.7704	Keywell	74.1920	6.9	3.4
Banswara	Garhi	Agarpura	23.6576	Keywell	74.1504	6.9	0.9
Banswara	Garhi	Bheempur	23.7117	Keywell	74.2600	3.1	1.2
Banswara	Garhi	Chibra Talai	23.5723	Keywell	74.2513	5.3	2.2
Banswara	Garhi	Garhi	23.5908	Keywell	74.1674	7.7	4.2
Banswara	Garhi	Wajwana	23.6167	Keywell	74.2833	9.7	3.3
Banswara	Garhi	Nawa Gaon	23.6205	Keywell	74.1954	10.7	6.6
Banswara	Arthoona	Govindpura	23.4688	Keywell	74.1608	9.6	3.7
Banswara	Arthoona	Anjana	23.5319	Keywell	74.0813	3.7	1.3
Banswara	Bagidora	Wansla	23.4248	Keywell	74.2914	7.8	6.4
Banswara	Bagidora	Chheench	23.4677	Keywell	74.3145	0	1.8
Banswara	Gangartalai	Ram Ka Munna	23.2449	Keywell	74.1491	5.1	2.5
Banswara	Gangartalai	Sallo Pat	23.1793	Keywell	74.1626	8.9	9.1
Banswara	Gangartalai	Gangar Talai	23.2573	Keywell	74.1698	2.1	0.3

Banswara	Sajjangarh	Bhura Kuan	23.2250	Keywell	74.3027	3.4	1.7
Banswara	Sajjangarh	Doongra Chhota	23.1630	Keywell	74.3253	4.1	2.8
Banswara	Sajjangarh	Himmatgarh	23.1194	Keywell	74.3497	3.7	1.4
Banswara	Sajjangarh	Sajjangarh	23.2571	Keywell	74.2876	6.3	3.7
Banswara	Kushalgarh	Bijori Khurd	23.2400	Keywell	74.5319	21.5	9.05
Banswara	Kushalgarh	Charakni	23.3158	Keywell	74.3869	9.5	3.6
Banswara	Kushalgarh	Galwani	23.1278	Keywell	74.4545	28.9	9.6
Banswara	Kushalgarh	Khajoora	23.2800	Keywell	74.4915	11	3.8
Banswara	Kushalgarh	Kushalgarh	23.1908	Keywell	74.4497	4.9	2.9
Banswara	Kushalgarh	Patan	23.2395	Keywell	74.6596	18.8	11.3
Banswara	Ghatol	Jagpura	23.8665	Keywell	74.3473	8	4
Banswara	Ghatol	Jamboi	23.6902	Keywell	74.4570	6.6	2.2
Banswara	Ghatol	Narwali	23.8961	Keywell	74.4417	7.8	1.4
Banswara	Ghatol	Baman Para	23.7695	Keywell	74.3375	14.15	4.6
Banswara	Ghatol	Khamera	23.7886	Keywell	74.4620	3.6	1.7
Banswara	Ghatol	Ghatol	23.7550	Keywell	74.4044	6.05	4.5
Banswara	Ghatol	Jetpura	23.8465	Keywell	74.5082	7.7	4
Banswara	Talwara	TALWARA	23.6088	Keywell	74.4263	3.7	2.6
Banswara	Talwara	Shivpura	23.5589	Keywell	74.3701	1.65	1.15
Banswara	Chhotisarwan	Chhoti Sarwan	23.5270	Keywell	74.6408	6.1	4.2
Banswara	Chhotisarwan	Danpur	23.5128	Keywell	74.7179	6.2	2.2
Banswara	Chhotisarwan	Bari	23.5464	Keywell	74.5849	7.15	2.15
Banswara	Chhotisarwan	Katumbi	23.5368	Keywell	74.6187	12.05	9.3

Banswara	Chhotisarwan	Phepher	23.4926	Keywell	74.6518	7.5	5.4
Banswara	Chhotisarwan	Kundal	23.6053	Keywell	74.7056	37.5	5.7
Banswara	Banswara	Cheeb	23.6108	Keywell	74.5022	7.4	2.05
Banswara	Banswara	Kesarpura	23.4932	Keywell	74.5096	11.9	4.4
Banswara	Banswara	Banswara	23.5480	Keywell	74.4616	8.7	6.7
Banswara	Banswara	Veerpur	23.4191	GWD	74.5276	10	7
Banswara	Anandpuri	Bareth	23.329150	GWD	74.047025	13	5.9
Banswara	Anandpuri	Bareth	23.329483	GWD	74.048003	15.4	9.3
Banswara	Anandpuri	Bhaler	23.377736	GWD	74.171425	0	2.6
Banswara	Anandpuri	Bhukia	23.386264	GWD	74.023425	0	2.2
Banswara	Anandpuri	Borwania	23.419636	GWD	74.109083	0	3.05
Banswara	Anandpuri	ChikhliTeja	23.304169	GWD	74.074850	13.38	2.4
Banswara	Anandpuri	Chhaja	23.425356	GWD	74.058789	15.8	7.9
Banswara	Anandpuri	Chordi	23.387000	GWD	74.163647	4.3	1.25
Banswara	Anandpuri	Jooni Timbi	23.300050	GWD	74.128703	0	1.3
Banswara	Anandpuri	Jooni Timbi	23.297722	GWD	74.127444	12.25	6.63
Banswara	Anandpuri	Mundri	23.374836	GWD	74.083378	6.2	2.15
Banswara	Anandpuri	Obla	23.353189	GWD	74.029933	11.6	3.3
Banswara	Anandpuri	Phalwan	23.468169	GWD	74.086428	28.15	9.85
Banswara	Anandpuri	Ramela	23.376236	GWD	74.042064	0	2.2
Banswara	Anandpuri	Tarwa	23.398458	GWD	74.174039	2.95	2.9
Banswara	Anandpuri	Thapra	23.419925	GWD	74.204239	9.35	3.25
Banswara	Garhi	BHIMSOR	23.638694	GWD	74.236556	20.03	8.1

Banswara	Garhi	Metwala	23.715447	GWD	74.168794	8.45	6.15
Banswara	Garhi	Sujaji Ka Gara	23.699489	GWD	74.156714	2	1.2
Banswara	Garhi	Bori	23.572461	GWD	74.110922	9.75	1.81
Banswara	Garhi	Chaupasanga	23.605592	GWD	74.134656	9.9	3
Banswara	Garhi	Dakarkundi	23.546878	GWD	74.244450	2.76	2.15
Banswara	Garhi	Garha Gopi Nath	23.570183	GWD	74.219686	7	2.7
Banswara	Garhi	Khera	23.629553	GWD	74.211347	0	4.25
Banswara	Garhi	Khum Ji Ka Parda	23.616506	GWD	74.148119	7.8	2.1
Banswara	Garhi	Lasara	23.785194	GWD	74.168597	9.65	2.5
Banswara	Garhi	Lohariya	23.763972	GWD	74.223217	1.3	1.05
Banswara	Garhi	Nawa Gaon	23.620539	GWD	74.195356	5.1	1.3
Banswara	Garhi	SAKARIYA	23.622583	GWD	74.207500	13.65	10.72
Banswara	Garhi	Panasichhoti	23.533408	GWD	74.253019	8.01	4
Banswara	Garhi	Pratapur	23.590917	GWD	74.168000	14.9	4.2
Banswara	Garhi	Sundani	23.684519	GWD	74.306539	2.9	2.1
Banswara	Arthoona	Dungar	23.516628	GWD	74.128528	6.8	5.85
Banswara	Arthoona	Herapadatimurwa	23.493689	GWD	74.239628	6.25	3.15
Banswara	Arthoona	Jolana	23.492608	GWD	74.199006	0	2.55
Banswara	Arthoona	Jolana	23.492000	GWD	74.198556	8.3	4.6
Banswara	Arthoona	Kotra	23.462881	GWD	74.069669	12.3	2.95
Banswara	Arthoona	Kotra	23.461517	GWD	74.069797	11.58	2.1
Banswara	Arthoona	Koiwav	23.521750	GWD	74.111444	6.9	3.95
Banswara	Arthoona	Kushal Kot	23.504656	GWD	74.045478	9.35	3.2

Banswara	Arthoona	Majiya	23.462619	GWD	74.195419	9.5	4.22
Banswara	Arthoona	Moti Bassi	23.519394	GWD	74.056344	11.3	3.35
Banswara	Arthoona	Raiyana	23.514697	GWD	74.177486	4	1.3
Banswara	Arthoona	Tamatiya Rathod	23.482436	GWD	74.207308	3.7	2
Banswara	Bagidora	Barigama	23.372131	GWD	74.383106	4.05	1.65
Banswara	Bagidora	Barigama	23.370519	GWD	74.389578	6.95	1.45
Banswara	Bagidora	Barlipada	23.388333	GWD	74.293883	2.7	1.7
Banswara	Bagidora	Bhoyan	23.374081	GWD	74.324256	3.1	0.4
Banswara	Bagidora	Bhoyan	23.372806	GWD	74.328000	7.95	1.95
Banswara	Bagidora	Gamana	23.183811	GWD	74.194131	12.5	3.6
Banswara	Bagidora	Kakanwani	23.371158	GWD	74.403100	13.93	2.26
Banswara	Bagidora	Kalinjara	23.345444	GWD	74.299750	8.05	4.35
Banswara	Bagidora	Khoontamachar	23.362050	GWD	74.259158	18.7	15.9
Banswara	Bagidora	Nagawada	23.384014	GWD	74.297461	6.5	2.5
Banswara	Bagidora	Seona	23.387944	GWD	74.374722	0	3
Banswara	Bagidora	Seona	23.388836	GWD	74.375161	14.4	1.55
Banswara	Bagidora	Balawada	23.433531	GWD	74.281111	0	7.9
Banswara	Bagidora	Barodiya	23.427006	GWD	74.349806	4.5	3
Banswara	Bagidora	Bagidora	23.406167	GWD	74.269222	11.9	10.05
Banswara	Bagidora	Bodigama	23.470883	GWD	74.278242	9.2	3.7
Banswara	Bagidora	Khokharwa	23.464650	GWD	74.230267	7.3	3
Banswara	Bagidora	Naugama	23.438833	GWD	74.261731	6.3	5.1
Banswara	Bagidora	Sambhoopura	23.505928	GWD	74.319558	7	2.75

Banswara	Gangartalai	Borkunda	23.277178	GWD	74.146889	7.05	3.15
Banswara	Gangartalai	Chelkari	23.328669	GWD	74.155928	24.1	4
Banswara	Gangartalai	Dabri Chhoti	23.321583	GWD	74.122322	10.8	2.4
Banswara	Gangartalai	Jambudi	23.237750	GWD	74.191975	5.45	2.15
Banswara	Gangartalai	Khoonta Galia	23.194486	GWD	74.134431	12.9	3.9
Banswara	Gangartalai	LANKAI	23.204389	GWD	74.207833	12.7	5.4
Banswara	Gangartalai	Moti Timbi	23.274531	GWD	74.152514	6.4	1.2
Banswara	Gangartalai	Mehndi khera	23.181861	GWD	74.228250	33.18	6.9
Banswara	Gangartalai	Rohanwari	23.301092	GWD	74.180606	0	4.45
Banswara	Gangartalai	Saliya	23.347939	GWD	74.174717	10.6	4.05
Banswara	Gangartalai	Shergarh	23.342086	GWD	74.171750	0	1.75
Banswara	Sajjangarh	Amlipada	23.263639	GWD	74.268278	23.9	8
Banswara	Sajjangarh	Bheelkuan	23.283203	GWD	74.278389	35.4	0.9
Banswara	Sajjangarh	Bhimkhora	23.132989	GWD	74.300939	5.3	2.95
Banswara	Sajjangarh	Bhoora Kua	23.222728	GWD	74.310619	3.4	1.75
Banswara	Sajjangarh	Channawala	23.340344	GWD	74.312794	6.9	1.8
Banswara	Sajjangarh	Chora	23.075547	GWD	74.327733	6.8	0.4
Banswara	Sajjangarh	Gundi	23.092647	GWD	74.305544	11.6	4.5
Banswara	Sajjangarh	Jalampura	23.175233	GWD	74.249092	4	2.9
Banswara	Sajjangarh	Jhalakiya	23.205592	GWD	74.237833	6.1	2.2
Banswara	Sajjangarh	Molan	23.303469	GWD	74.331525	12.3	3.6
Banswara	Sajjangarh	Padla-Katara	23.321639	GWD	74.331306	13.6	9
Banswara	Sajjangarh	Sajjangarh	23.256856	GWD	74.289531	6.38	3.7

Banswara	Sajjangarh	Tambesara	23.263461	GWD	74.348806	4.9	2.4
Banswara	Sajjangarh	Thunthi	23.135330	GWD	74.130572	4.32	1.95
Banswara	Sajjangarh	Badhamuska	23.137961	GWD	74.326361	4.25	1
Banswara	Sajjangarh	Chhotaloharia	23.137961	GWD	74.326361	6.3	1.3
Banswara	Sajjangarh	Chowki Doongri	23.245319	GWD	74.363003	5.3	3
Banswara	Sajjangarh	Himmatgarh	23.119414	GWD	74.349694	3.7	1.4
Banswara	Sajjangarh	Kasarwadi	23.114669	GWD	74.331494	6	2.5
Banswara	Sajjangarh	Kasarwadi	23.116750	GWD	74.329278	5.25	2.15
Banswara	Kushalgarh	Ambapada	23.268578	GWD	74.394283	0	2.3
Banswara	Kushalgarh	Barwas Chhoti	23.226022	GWD	74.408208	0	2.7
Banswara	Kushalgarh	Wakaner	23.242894	GWD	74.396781	9.95	3.7
Banswara	Kushalgarh	Bhamarkot	23.120550	GWD	74.459833	3.6	1.6
Banswara	Kushalgarh	Bharatgarh	23.177128	GWD	74.442147	4.7	1.6
Banswara	Kushalgarh	Bhimpura	23.245456	GWD	74.488439	0	1.95
Banswara	Kushalgarh	Bijori Kalan	23.250353	GWD	74.533694	0	1.7
Banswara	Kushalgarh	Bolia Pada	23.195103	GWD	74.562219	0	7.65
Banswara	Kushalgarh	Chokhwara	23.258861	GWD	74.594444	27.9	5.9
Banswara	Kushalgarh	Devda Sath	23.187972	GWD	74.389917	6.5	3.8
Banswara	Kushalgarh	Doongar Bheet	23.127806	GWD	74.390472	10.35	4.5
Banswara	Kushalgarh	Ghodadara	23.207494	GWD	74.490244	6.2	1.5
Banswara	Kushalgarh	Gokulpada	23.236500	GWD	74.701722	11.7	8.15
Banswara	Kushalgarh	Khajoora	23.279950	GWD	74.491539	11	3.85
Banswara	Kushalgarh	Kotra	23.298325	GWD	74.506219	5	2.6

Banswara	Kushalgarh	Kotri	23.128472	GWD	74.505222	53	6.8
Banswara	Kushalgarh	Kushalapara	23.194500	GWD	74.462611	17.3	10.5
Banswara	Kushalgarh	Mokhampura	23.162394	GWD	74.560817	7.95	1.9
Banswara	Kushalgarh	Mundri	23.227397	GWD	74.450303	5.3	4
Banswara	Kushalgarh	Nagdabari	23.161281	GWD	74.477794	4.5	2.3
Banswara	Kushalgarh	Padla	23.127631	GWD	74.441639	0	4.4
Banswara	Kushalgarh	Saran	23.279772	GWD	74.425481	5.4	3
Banswara	Kushalgarh	Sarwa Kalan	23.205328	GWD	74.686719	8.2	4.5
Banswara	Kushalgarh	Sooliyamalpara	23.305869	GWD	74.492250	26.4	2
Banswara	Kushalgarh	Tandavadla	23.165189	GWD	74.416569	4.25	1.75
Banswara	Kushalgarh	Thummath	23.197694	GWD	74.391092	4.7	2.9
Banswara	Kushalgarh	Umar Jhonka	23.264306	GWD	74.511806	4.85	4.75
Banswara	Kushalgarh	Wagaicha	23.113519	GWD	74.515169	8.15	2.65
Banswara	Ghatol	Baman Para	23.768286	GWD	74.334608	14.15	4.65
Banswara	Ghatol	Bargun	23.714722	GWD	74.511356	4.1	3.75
Banswara	Ghatol	Bhoongra	23.689706	GWD	74.516450	4.95	4.15
Banswara	Ghatol	Borda	23.775892	GWD	74.298756	7.3	3.05
Banswara	Ghatol	Gadra	23.744728	GWD	74.537678	9.87	9.15
Banswara	Ghatol	Khamera	23.788592	GWD	74.461961	3.6	1.7
Banswara	Ghatol	Murasel	23.798247	GWD	74.533556	3.7	2.7
Banswara	Ghatol	Murasel	23.800061	GWD	74.540167	9.1	7.6
Banswara	Ghatol	Narwali	23.896086	GWD	74.441711	7.8	1.45
Banswara	Ghatol	Sarodiya	23.911544	GWD	74.474883	4.2	2

Banswara	Ghatol	Undwela	23.749406	GWD	74.500369	3.25	2.6
Banswara	Ghatol	Bassi Ada	23.735822	GWD	74.307575	0	6.3
Banswara	Ghatol	Badliya	23.620119	GWD	74.364586	4.1	3.3
Banswara	Ghatol	Banicha	23.741844	GWD	74.387883	1.1	1.05
Banswara	Ghatol	Baripadal	23.780458	GWD	74.417383	2.2	1.2
Banswara	Ghatol	Charla	23.712064	GWD	74.425728	2.6	2.55
Banswara	Ghatol	Dewada	23.718281	GWD	74.371408	4.1	3.22
Banswara	Ghatol	Guliawada	23.743867	GWD	74.455483	6.6	2.2
Banswara	Ghatol	Isarwala	23.646000	GWD	74.323803	4.6	3.2
Banswara	Ghatol	Kuwania	23.656064	GWD	74.405081	4.35	3.3
Banswara	Ghatol	Mungana	23.677072	GWD	74.317597	10.9	5
Banswara	Ghatol	Mungana	23.682639	GWD	74.312278	5.3	4.68
Banswara	Ghatol	Rathoron Ki Padoli	23.707053	GWD	74.355694	0	4
Banswara	Ghatol	Udpura	23.648481	GWD	74.388247	4.8	2.1
Banswara	Ghatol	Charna Bhundwai	23.886222	GWD	74.405478	0.3	0.2
Banswara	Ghatol	Chhoti Padal	23.790275	GWD	74.434025	8.2	3.15
Banswara	Ghatol	Daduka	23.811772	GWD	74.341161	1	0.85
Banswara	Ghatol	Dungria	23.865236	GWD	74.456783	9.4	6.3
Banswara	Ghatol	Gangji Ka Khera	23.855450	GWD	74.447889	3.7	1.7
Banswara	Ghatol	Jagpura	23.860722	GWD	74.346194	8	4
Banswara	Ghatol	Mandela	23.845917	GWD	74.322750	15.5	7.3
Banswara	Ghatol	Odwal	23.805786	GWD	74.388428	1.45	0.9

Banswara	Ghatol	Runjia	23.796172	GWD	74.387358	4.9	3.1
Banswara	Ghatol	Rawatpura	23.844353	GWD	74.447883	9.2	6.4
Banswara	Ghatol	Motagaon	23.801425	GWD	74.251692	6.4	3.5
Banswara	Ghatol	Mota Tanda	23.787583	GWD	74.242681	5.7	3.3
Banswara	Ghatol	Takhtaji Ka Tanda	23.821911	GWD	74.272261	8.4	7.1
Banswara	Talwara	Kohala	23.625406	GWD	74.313206	4.05	2.9
Banswara	Talwara	Kushalpura	23.590597	GWD	74.281194	3.25	1.3
Banswara	Talwara	Masatia	23.593533	GWD	74.330486	2.9	1.4
Banswara	Talwara	Sagrod	23.479967	GWD	74.363839	5.15	1.9
Banswara	Talwara	Umrai	23.533178	GWD	74.321736	4.65	4.17
Banswara	Talwara	Nalraghawa	23.621747	GWD	74.448525	4.6	2.2
Banswara	Talwara	Bhagatpura	23.643222	GWD	74.400339	6.3	3.5
Banswara	Talwara	Badgaon	23.591300	GWD	74.395458	6.6	4.5
Banswara	Talwara	Bheelwan	23.627208	GWD	74.387100	5	4.92
Banswara	Talwara	Bodla	23.496914	GWD	74.381206	5.4	4.15
Banswara	Talwara	Borkhedi	23.500142	GWD	74.356294	1.9	0.65
Banswara	Talwara	Borwat	23.511183	GWD	74.380256	5.2	5.1
Banswara	Talwara	Chiriwasa	23.607614	GWD	74.377581	4.6	3.85
Banswara	Talwara	Deolia	23.578767	GWD	74.345008	4.2	3.4
Banswara	Talwara	Janawari	23.564628	GWD	74.416178	11.9	8.25
Banswara	Talwara	Kupra	23.558283	GWD	74.393722	4.8	3.9
Banswara	Talwara	Lodha	23.554067	GWD	74.408525	4.7	3.9
Banswara	Talwara	Surpur	23.628561	GWD	74.400089	3.2	2.3

Banswara	Talwara	Tejpur	23.608761	GWD	74.426281	2.2	0.3
Banswara	Chhotisarwan	Adi Bheet	23.526569	GWD	74.602539	4.4	3.6
Banswara	Chhotisarwan	Bari	23.546433	GWD	74.584875	7.15	2.15
Banswara	Chhotisarwan	Chayan	23.568694	GWD	74.750367	7.2	5.1
Banswara	Chhotisarwan	Danpur	23.512778	GWD	74.717856	6.2	2.2
Banswara	Chhotisarwan	Dhanakshri	23.551339	GWD	74.600394	12.05	9.35
Banswara	Chhotisarwan	GodiTejpur	23.636658	GWD	74.688519	13.55	7.85
Banswara	Chhotisarwan	Goth Ka Mahura	23.567989	GWD	74.734658	33.9	14.2
Banswara	Chhotisarwan	Hiriya Garhi	23.571808	GWD	74.713828	0	9.5
Banswara	Chhotisarwan	Kala Khet	23.567150	GWD	74.652481	4.52	2.27
Banswara	Chhotisarwan	Katumbi	23.536797	GWD	74.618714	7.2	2.35
Banswara	Chhotisarwan	Matashula	23.618256	GWD	74.584367	17.85	10.3
Banswara	Chhotisarwan	Nadiya	23.484167	GWD	74.596000	9.1	6.2
Banswara	Chhotisarwan	Phepher	23.492550	GWD	74.651844	7.5	5.4
Banswara	Chhotisarwan	Saliabari	23.512411	GWD	74.666558	15	9.1
Banswara	Chhotisarwan	Saliabari	23.517164	GWD	74.657036	17.2	7.53
Banswara	Chhotisarwan	Salarapada	23.505928	GWD	74.673428	16.3	1.6
Banswara	Chhotisarwan	Tejpur	23.630067	GWD	74.659006	9.9	6.9
Banswara	Chhotisarwan	Tejpur	23.636889	GWD	74.661472	28.8	10.55
Banswara	Chhotisarwan	Ubapan	23.583819	GWD	74.707006	14.5	5.7
Banswara	Banswara	Pari Bari	23.450278	GWD	74.358667	6.5	3.85
Banswara	Banswara	Saliya	23.463056	GWD	74.388889	4.5	2.2
Banswara	Banswara	Surwaniya	23.438953	GWD	74.373197	2.95	1.4

Banswara	Banswara	Ganau	23.452594	GWD	74.469253	6.15	2.75
Banswara	Banswara	Nal	23.457144	GWD	74.480408	0	2.3
Banswara	Banswara	Padla	23.503314	GWD	74.509525	8.05	1.8
Banswara	Banswara	Saga	23.437622	GWD	74.414308	0	4.05
Banswara	Banswara	Banswara	23.547969	GWD	74.461556	4.55	3.15
Banswara	Banswara	Banswara	23.554231	GWD	74.443953	4.3	1.4
Banswara	Banswara	Nawagaon	23.483719	GWD	74.429439	3.2	1.6
Banswara	Banswara	Sagwadeeya	23.473722	GWD	74.418819	3.95	1.7
Banswara	Banswara	Siyapur	23.483922	GWD	74.391003	4.8	4
Banswara	Banswara	Thikria	23.520061	GWD	74.410708	3.5	2.25
Banswara	Banswara	Bari Badrel	23.452686	GWD	74.511275	7.7	2.45
Banswara	Banswara	Bhartalia	23.388239	GWD	74.502358	7.7	5.1
Banswara	Banswara	Jharniya	23.437234	GWD	74.556001	7.65	2.05
Banswara	Banswara	Khedavarli Pada	23.358222	GWD	74.441994	5.7	4.4
Banswara	Banswara	Maheshpura	23.344408	GWD	74.520575	3.25	3.15
Banswara	Banswara	Nalada (Nalda)	23.393147	GWD	74.507175	6.4	1.7
Banswara	Banswara	Palaswani	23.434167	GWD	74.569158	9.02	2.45
Banswara	Banswara	Rooppura	23.444139	GWD	74.548833	18.47	14.3
Banswara	Banswara	Saliya	23.376969	GWD	74.436878	3.3	3.18
Banswara	Banswara	Sangesri	23.406817	GWD	74.543231	8.8	2.6
Banswara	Banswara	Umrianala	23.412003	GWD	74.482350	9.1	2.8
Banswara	Garhi	ARTHUNA	23.4958	CGWB	74.1	6.8	6.9
Banswara	Bagidora	Bagidora	23.4042	CGWB	74.2667	14.33	2.43

Banswara	Chhoti Sarwan	Bagtalav	23.5503	CGWB	74.6858	10.2	3.5
Banswara	Bagidora	Bansla	23.4211	CGWB	74.2919	5.5	0
Banswara	Banswara	Banswara1	23.5333	CGWB	74.45	6.6	2.25
Banswara	Bagidora	Barodiya	23.4167	CGWB	74.3503	5.2	1.9
Banswara	Ghatol	Bhoongra	23.6686	CGWB	74.5056	0	3.95
Banswara	Sajjangarh	Bhura Kua	23.225	CGWB	74.31	9	4.4
Banswara	Sajjangarh	Bilari	23.3269	CGWB	74.3617	10.4	2.5
Banswara	Banswara	Borwat	23.5092	CGWB	74.3844	4.5	2.55
Banswara	Ghatol	ChanduJi Ka Guda	23.6667	CGWB	74.33	0	0
Banswara	Kushalgarh	Charakni	23.3128	CGWB	74.3797	9.5	3.5
Banswara	Kushalgarh	Chhoti Sarwa	23.2197	CGWB	74.5833	2.9	0
Banswara	Banswara	Chiriyawasa	23.5092	CGWB	74.3775	4.2	3.7
Banswara	Sajjangarh	CHOTA DUNGRA	23.1722	CGWB	74.2903	6.83	4.33
Banswara	Chhoti Sarwan	Danakshari	23.5575	CGWB	74.6011	3.5	3.2
Banswara	Ghatol	DUNGARIA	23.8639	CGWB	74.4583	7	4
Banswara	Ghatol	GANORA	23.7667	CGWB	74.2528	6.24	3.14
Banswara	Garhi	GARHI PARTAPURA	23.59	CGWB	74.175	4	3.1
Banswara	Banswara	Khera Dahar	23.6167	CGWB	74.5083	0	4.6
Banswara	Kushalgarh	KUSALGARH	23.2	CGWB	74.45	3.97	2.17
Banswara	Ghatol	NARWALI	23.8944	CGWB	74.4431	5.25	3.85
Banswara	Bagidora	RAKHO	23.3683	CGWB	74.2792	3.39	3.64

Banswara	Ghatol	Rathor Ki Phadoli	23.8944	CGWB	74.4431	0	0
Banswara	Ghatol	Sadri	23.7833	CGWB	74.4844	4.15	0
Banswara	Kushalgarh	Saran	23.2644	CGWB	74.4319	3	2.4
Banswara	Ghatol	SENWASA	23.6561	CGWB	74.3897	6.27	2.77
Banswara	Talwara	Sera Pada Sandoh	23.4833	CGWB	74.3667	0	3.6
Banswara	Banswara	Talwara	23.5667	CGWB	74.3333	0	0

List of Exploratory Wells Used NAQUIM Study in Banswara District Annexure IV

Bore	File	Easting	Northing	Elevation	Collar Elevation	Total Depth	Block	Agency	WL Pre Monsoon
Ganora	Ganora	74.2528	23.7611	174.5	174.5	138	GHATOL	CGWB	9
Chandu Ji Ka	Chandu Ji Ka	74.3333	23.65	165	165	86.2	GHATOL	CGWB	15
Narwali	Narwali	74.3333	23.8833	172	172	147.1	GHATOL	CGWB	14
SOMPURA	SOMPURA	74.5089	23.6606	255.8	255.8	50	GHATOL	GWD	15
BAMANPADA	BAMANPADA	74.3411	23.7756	219	219	70	GHATOL	GWD	16
Tajpur	Tajpur	74.4167	23.6	193	193	114.3	TALWARA	CGWB	20
NALDA	NALDA	74.5881	23.5144	299.3	299.3	150	TALWARA	GWD	15
SANGESRI	SANGESRI	74.5542	23.4033	376	376	50	TALWARA	GWD	15
BADRAIL	BADRAIL	74.5075	23.4511	308.7	308.7	50	TALWARA	GWD	12
ANANDPURI	ANANDPURI	74.0228	23.3800	150.3	150.3	71	ANANDPURI	GWD	11
PHALWA	PHALWA	74.0944	23.1422	230.8	230.8	150	ANANDPURI	GWD	10
BARETH	BARETH	74.0500	23.3300	226	226	70	ANANDPURI	GWD	18
UDAIPURA	UDAIPURA	74.1744	23.4108	225	225	50	ANANDPURI	GWD	12
ARTHOONA	ARTHOONA	74.1	23.4833	147	147	140	ARTHOONA	CGWB	13
Kushalkot	Kushalkot	74.0333	23.5	134	134	119.5	ARTHOONA	CGWB	12
Kalinjara	Kalinjara	74.3011	23.3433	205.6	205.6	126.3	BAGIDORA	CGWB	11
Burwa	Burwa	74.3667	23.3833	245.2	245.2	93.5	BAGIDORA	CGWB	14
SEONA	SEONA	74.3722	23.3906	236.4	236.4	70	BAGIDORA	GWD	12

KARJI	KARJI	74.3803	23.4508	213	213	50	BAGIDORA	GWD	7
Wirpur	Wirpur	74.6167	23.4667	331.6	331.6	56.3	CHHOTISARVAN	CGWB	11
Choti Sarwan	Choti Sarwan	74.6369	23.5256	340.8	340.8	113.55	CHHOTISARVAN	CGWB	13
PEPHER	PEPHER	74.6486	23.4894	354.7	354.7	50	CHHOTISARVAN	GWD	8
DANPUR	DANPUR	74.7264	23.5069	394.7	394.7	60	CHHOTISARVAN	GWD	12
Rupji Ka Khunta	Rupji Ka Khunta	74.2167	23.1667	226	226	73.8	GANGAR TALAI	CGWB	12
Timbi Moti	Timbi Moti	74.1333	23.2833	248	248	101.35	GANGAR TALAI	CGWB	13
KOTRA	KOTRA	74.0689	23.4594	147.2	147.2	70	GARHI	GWD	10
JOLANA	JOLANA	74.1950	23.4944	183.3	183.3	70	GARHI	GWD	12
Garhi	Garhi	74.15	23.5833	138	138	144.7	GARHI	CGWB	15
TANDA MANGLA	TANDA MANGLA	74.2861	23.2578	230.9	230.9	82	SAJJANGARH	GWD	12
JHALKIA	JHALKIA	74.2325	23.2197	222	222	40	SAJJANGARH	GWD	10
CHOTTA DUNGRA	CHOTTA DUNGRA	74.3167	23.1678	248.7	248.7	50	SAJJANGARH	GWD	8
SAJJANGARH	SAJJANGARH	74.2861	23.2567	230.3	230.3	70	SAJJANGARH	GWD	13
NAGDA BARI	NAGDA BARI	74.4744	23.1553	298	298	150	KUSHALGARH	GWD	15
KUSHALGARH	KUSHALGARH	74.4528	23.1958	284	284	51	KUSHALGARH	GWD	12
SARWA BARI	SARWA BARI	74.6900	23.2089	394	394	162	KUSHALGARH	GWD	11
SARWACHOTTI	SARWACHOTTI	74.5856	23.2233	413.3	413.3	215	KUSHALGARH	GWD	18
Banswara	Banswara	74.45	23.55	226	226	100	BANSWARA	CGWB	15
Abapura	Abapura	74.5167	23.4167	304.8	304.8	68.5	BANSWARA	CGWB	14
Surwania	Surwania	74.5245	23.3419	360.2	360.2	129	BANSWARA	CGWB	13

List of Lithology of ExploratoryWells Used NAQUIM Study in Banswara District **Annexure V**

Bore	Depth1	Depth2	Lithology	Thickness	Agency
Ganora	0	4	TOP SOIL	4	CGWB
Ganora	4	13	DESATURATED WEATHER PHYLLITE	9	CGWB
Ganora	13	30	SATURATED WEATHERED PHYLLITE	17	CGWB
Ganora	30	50	COMPACT PHYLLITE WITH ISOLATED FRACTURE	20	CGWB
Ganora	50	138	COMPACT PHYLLITE	88	CGWB
Chandu Ji Ka Gurha	0	7	TOP SOIL	7	CGWB
Chandu Ji Ka Gurha	7	15	DESATURATED WEATHER GNEIESS	8	CGWB
Chandu Ji Ka Gurha	15	49	SATURATED WEATHERED GNEISSES	34	CGWB
Chandu Ji Ka Gurha	49	60	COMPACT GNEIESS WITH ISOLATED FRACTURE	11	CGWB
Chandu Ji Ka Gurha	60	80.2	COMPACT GNEISSES	20.2	CGWB
Narwali	0	5	TOP SOIL	5	CGWB
Narwali	5	14	DESATURATED WEATHER GNEIESS	9	CGWB
Narwali	14	60	SATURATED WEATHERED GNEISSES	46	CGWB
Narwali	60	120	COMPACT GNEIESS WITH ISOLATED FRACTURE	60	CGWB
Narwali	120	147	COMPACT GNEISSES	27	CGWB
SOMPURA	0	5	TOP SOIL	5	GWD
SOMPURA	5	15	DESATURATED WEATHER GNEIESS	10	GWD
SOMPURA	15	30	SATURATED WEATHERED GNEISSES	15	GWD

SOMPURA	30	40	COMPACT GNEIESS WITH ISOLATED FRACTURE	10	GWD
SOMPURA	40	50	COMPACT GNEISSES	10	GWD
BAMANPADA	0	5	TOP SOIL	5	GWD
BAMANPADA	5	16	DESATURATED WEATHER GNEIESS	11	GWD
BAMANPADA	16	45	SATURATED WEATHERED GNEISSES	29	GWD
BAMANPADA	45	70	COMPACT GNEISSES	25	GWD
Tajpur	0	5	TOP SOIL	5	CGWB
Tajpur	5	20	DESATURATED WEATHER GNEIESS	15	CGWB
Tajpur	20	50	SATURATED WEATHERED GNEISSES	30	CGWB
Tajpur	50	70	COMPACT GNEIESS WITH ISOLATED FRACTURE	20	CGWB
Tajpur	70	114.3	COMPACT GNEISSES	44.3	CGWB
NALDA	0	5	TOP SOIL	5	GWD
NALDA	5	15	DESATURATED WEATHER BASALT	10	GWD
NALDA	15	60	SATURATED WEATHERED BASALT	45	GWD
NALDA	60	90	COMPACT GNEIESS WITH ISOLATED FRACTURE	30	GWD
NALDA	90	150	COMPACT GNEISSES	60	GWD
SANGESRI	0	5	TOP SOIL	5	GWD
SANGESRI	5	15	DESATURATED WEATHER BASALT	10	GWD
SANGESRI	15	30	SATURATED WEATHERED BASALT	15	GWD
SANGESRI	30	40	COMPACT GNEIESS WITH ISOLATED FRACTURE	10	GWD
SANGESRI	40	50	COMPACT GNEISSES	10	GWD
BADRAIL	0	5	TOP SOIL	5	GWD
BADRAIL	5	12	DESATURATED WEATHER BASALT	7	GWD

BADRAIL	12	24	SATURATED WEATHERED BASALT	12	GWD
BADRAIL	24	35	COMPACT GNEIESS WITH ISOLATED FRACTURE	11	GWD
BADRAIL	35	50	COMPACT GNEISSES	15	GWD
ANANDPURI	0	7	TOP SOIL	7	GWD
ANANDPURI	7	11	DESATURATED WEATHER PHYLLITE	4	GWD
ANANDPURI	11	28	SATURATED WEATHERED PHYLLITE	17	GWD
ANANDPURI	28	52	COMPACT PHYLLITE WITH ISOLATED FRACTURE	24	GWD
ANANDPURI	52	71	COMPACT PHYLLITE	19	GWD
PHALWA	0	7	TOP SOIL	7	GWD
PHALWA	7	10	DESATURATED WEATHER PHYLLITE	3	GWD
PHALWA	10	53	SATURATED WEATHERED PHYLLITE	43	GWD
PHALWA	53	80	COMPACT PHYLLITE WITH ISOLATED FRACTURE	27	GWD
PHALWA	80	150	COMPACT PHYLLITE	70	GWD
BARETH	0	7	TOP SOIL	7	GWD
BARETH	7	18	DESATURATED WEATHER PHYLLITE	11	GWD
BARETH	18	30	SATURATED WEATHERED PHYLLITE	12	GWD
BARETH	30	50	COMPACT PHYLLITE WITH ISOLATED FRACTURE	20	GWD
BARETH	50	70	COMPACT PHYLLITE	20	GWD
UDAIPURA BADA	0	5	TOP SOIL	5	GWD
UDAIPURA BADA	5	12	DESATURATED WEATHER PHYLLITE	7	GWD

UDAIPURA BADA	12	23	SATURATED WEATHERED PHYLLITE	11	GWD
UDAIPURA BADA	23	35	COMPACT PHYLLITE WITH ISOLATED FRACTURE	12	GWD
UDAIPURA BADA	40	50	COMPACT PHYLLITE	10	GWD
ARTHOONA	0	5	TOP SOIL	5	CGWB
ARTHOONA	5	13	DESATURATED WEATHER PHYLLITE	8	CGWB
ARTHOONA	13	50	SATURATED WEATHERED PHYLLITE	37	CGWB
ARTHOONA	50	109	COMPACT PHYLLITE WITH ISOLATED FRACTURE	59	CGWB
ARTHOONA	109	140	COMPACT PHYLLITE	31	CGWB
Kushalkot	0	5	TOP SOIL	5	CGWB
Kushalkot	5	12	DESATURATED WEATHER PHYLLITE	7	CGWB
Kushalkot	12	50	SATURATED WEATHERED PHYLLITE	38	CGWB
Kushalkot	50	85	COMPACT PHYLLITE WITH ISOLATED FRACTURE	35	CGWB
Kushalkot	85	119.5	COMPACT PHYLLITE	34.5	CGWB
Kalinjara	0	5	TOP SOIL	5	CGWB
Kalinjara	5	11	DESATURATED WEATHER PHYLLITE	6	CGWB
Kalinjara	11	30	SATURATED WEATHERED PHYLLITE	19	CGWB
Kalinjara	30	50	COMPACT PHYLLITE WITH ISOLATED FRACTURE	20	CGWB
Kalinjara	50	126.3	COMPACT PHYLLITE	76.3	CGWB
Burwa	0	5	TOP SOIL	5	CGWB

Burwa	5	14	DESATURATED WEATHER PHYLLITE	9	CGWB
Burwa	14	35	SATURATED WEATHERED PHYLLITE	21	CGWB
Burwa	35	53	COMPACT PHYLLITE WITH ISOLATED FRACTURE	18	CGWB
Burwa	53	93.5	COMPACT PHYLLITE	40.5	CGWB
SEONA	0	5	TOP SOIL	5	
SEONA	5	12	DESATURATED WEATHER PHYLLITE	7	
SEONA	12	30	SATURATED WEATHERED PHYLLITE	18	GWD
SEONA	30	50	COMPACT PHYLLITE WITH ISOLATED FRACTURE	20	
SEONA	50	70	COMPACT PHYLLITE	20	GWD
KARJI	0	5	TOP SOIL	5	
KARJI	5	7	DESATURATED WEATHER PHYLLITE	2	GWD
KARJI	7	35	SATURATED WEATHERED PHYLLITE	28	GWD
KARJI	35	40	COMPACT PHYLLITE WITH ISOLATED FRACTURE	5	
KARJI	40	50	COMPACT PHYLLITE	10	GWD
Wirpur	0	5	TOP SOIL	5	GWD
Wirpur	5	11	DESATURATED WEATHER BASALT	6	GWD
Wirpur	11	35	SATURATED WEATHERED BASALT	24	GWD
Wirpur	35	45	COMPACT GNEIESS WITH ISOLATED FRACTURE	10	
Wirpur	45	56.3	COMPACT GNEISSES	11.3	GWD
Choti Sarwan	0	5	TOP SOIL	5	GWD

Choti Sarwan	5	13	DESATURATED WEATHER BASALT	8	
Choti Sarwan	13	40	SATURATED WEATHERED BASALT	27	
Choti Sarwan	40	75	COMPACT GNEIESS WITH ISOLATED FRACTURE	35	GWD
Choti Sarwan	75	113.55	COMPACT GNEISSES	38.55	
PEPHER	0	3	TOP SOIL	3	GWD
PEPHER	3	8	DESATURATED WEATHER BASALT	5	GWD
PEPHER	8	20	SATURATED WEATHERED BASALT	12	
PEPHER	20	30	COMPACT GNEIESS WITH ISOLATED FRACTURE	10	GWD
PEPHER	30	50	COMPACT GNEISSES	20	GWD
DANPUR	0	5	TOP SOIL	5	
DANPUR	5	12	DESATURATED WEATHER BASALT	7	GWD
DANPUR	12	30	SATURATED WEATHERED BASALT	18	
DANPUR	30	45	COMPACT GNEIESS WITH ISOLATED FRACTURE	15	CGWB
DANPUR	45	60	COMPACT GNEISSES	15	
Rupji Ka Khunta	0	5	TOP SOIL	5	CGWB
Rupji Ka Khunta	5	12	DESATURATED WEATHER PHYLLITE	7	CGWB
Rupji Ka Khunta	12	30	SATURATED WEATHERED PHYLLITE	18	
Rupji Ka Khunta	30	45	COMPACT PHYLLITE WITH ISOLATED FRACTURE	15	
Rupji Ka Khunta	45	73.8	COMPACT PHYLLITE	28.8	CGWB
Timbi Moti	0	5	TOP SOIL	5	
Timbi Moti	5	13	DESATURATED WEATHER PHYLLITE	8	GWD
Timbi Moti	13	40	SATURATED WEATHERED PHYLLITE	27	

Timbi Moti	40	75	COMPACT PHYLLITE WITH ISOLATED FRACTURE	35	GWD
Timbi Moti	75	101.35	COMPACT PHYLLITE	26.35	GWD
KOTRA	0	5	TOP SOIL	5	
KOTRA	5	10	DESATURATED WEATHER PHYLLITE	5	
KOTRA	10	30	SATURATED WEATHERED PHYLLITE	20	GWD
KOTRA	30	50	COMPACT PHYLLITE WITH ISOLATED FRACTURE	20	
KOTRA	50	70	COMPACT PHYLLITE	20	GWD
JOLANA	0	5	TOP SOIL	5	
JOLANA	5	12	DESATURATED WEATHER PHYLLITE	7	GWD
JOLANA	12	30	SATURATED WEATHERED PHYLLITE	18	
JOLANA	30	45	COMPACT PHYLLITE WITH ISOLATED FRACTURE	15	GWD
JOLANA	45	70	COMPACT PHYLLITE	25	
Garhi	0	5	TOP SOIL	5	
Garhi	5	15	DESATURATED WEATHER PHYLLITE	10	GWD
Garhi	15	35	SATURATED WEATHERED PHYLLITE	20	GWD
Garhi	35	60	COMPACT PHYLLITE WITH ISOLATED FRACTURE	25	GWD
Garhi	60	144.7	COMPACT PHYLLITE	84.7	
TANDA MANGLA	0	5	TOP SOIL	5	
TANDA MANGLA	5	12	DESATURATED WEATHER PHYLLITE	7	GWD

TANDA MANGLA	12	36	SATURATED WEATHERED PHYLLITE	24	GWD
TANDA MANGLA	36	50	COMPACT PHYLLITE WITH ISOLATED FRACTURE	14	
TANDA MANGLA	50	82	COMPACT PHYLLITE	32	GWD
JHALKIA	0	6	TOP SOIL	6	GWD
JHALKIA	6	10	DESATURATED WEATHER PHYLLITE	4	GWD
JHALKIA	10	25	SATURATED WEATHERED PHYLLITE	15	
JHALKIA	25	30	COMPACT PHYLLITE WITH ISOLATED FRACTURE	5	
JHALKIA	30	40	COMPACT PHYLLITE	10	GWD
CHOTTA DUNGRA	0	5	TOP SOIL	5	GWD
CHOTTA DUNGRA	5	8	DESATURATED WEATHER PHYLLITE	3	
CHOTTA DUNGRA	8	25	SATURATED WEATHERED PHYLLITE	17	GWD
CHOTTA DUNGRA	25	40	COMPACT PHYLLITE WITH ISOLATED FRACTURE	15	GWD
CHOTTA DUNGRA	40	50	COMPACT PHYLLITE	10	
SAJJANGARH	0	5	TOP SOIL	5	GWD
SAJJANGARH	5	13	DESATURATED WEATHER PHYLLITE	8	GWD
SAJJANGARH	13	30	SATURATED WEATHERED PHYLLITE	17	GWD
SAJJANGARH	30	42	COMPACT PHYLLITE WITH ISOLATED FRACTURE	12	GWD
SAJJANGARH	42	70	COMPACT PHYLLITE	28	
NAGDA BARI	0	5	TOP SOIL	5	CGWB

NAGDA BARI	5	15	DESATURATED WEATHER BASALT	10	
NAGDA BARI	15	30	SATURATED WEATHERED BASALT	15	CGWB
NAGDA BARI	30	60	COMPACT GNEIESS WITH ISOLATED FRACTURE	30	
NAGDA BARI	60	120	COMPACT GNEISSES	60	CGWB
KUSHALGARH	0	5	TOP SOIL	5	CGWB
KUSHALGARH	5	12	DESATURATED WEATHER BASALT	7	
KUSHALGARH	12	30	SATURATED WEATHERED BASALT	18	CGWB
KUSHALGARH	30	40	COMPACT GNEIESS WITH ISOLATED FRACTURE	10	CGWB
KUSHALGARH	40	51	COMPACT GNEISSES	11	CGWB
SARWA BARI	0	5	TOP SOIL	5	
SARWA BARI	5	11	DESATURATED WEATHER BASALT	6	CGWB
SARWA BARI	11	20	SATURATED WEATHERED BASALT	9	
SARWA BARI	20	30	COMPACT GNEIESS WITH ISOLATED FRACTURE	10	
SARWA BARI	30	40	COMPACT GNEISSES	10	CGWB
SARWACHOTTI	0	8	TOP SOIL	8	
SARWACHOTTI	8	18	DESATURATED WEATHER BASALT	10	CGWB
SARWACHOTTI	18	50	SATURATED WEATHERED BASALT	32	
SARWACHOTTI	50	90	COMPACT GNEIESS WITH ISOLATED FRACTURE	40	CGWB
SARWACHOTTI	90	215	COMPACT GNEISSES	125	CGWB
Banswara	0	6	TOP SOIL	6	
Banswara	6	15	DESATURATED WEATHER BASALT	9	
Banswara	15	50	SATURATED WEATHERED BASALT	35	CGWB
Banswara	50	70	COMPACT GNEIESS WITH ISOLATED FRACTURE	20	

Banswara	70	100	COMPACT GNEISSES	30	CGWB
Abapura	0	5	TOP SOIL	5	
Abapura	5	14	DESATURATED WEATHER BASALT	9	CGWB
Abapura	14	45	SATURATED WEATHERED BASALT	31	CGWB
Abapura	45	55	COMPACT GNEIESS WITH ISOLATED FRACTURE	10	
Abapura	55	68.5	COMPACT GNEISSES	13.5	
Surwania	0	8	TOP SOIL	8	CGWB
Surwania	8	13	DESATURATED WEATHER BASALT	5	CGWB
Surwania	13	50	SATURATED WEATHERED BASALT	37	CGWB
Surwania	50	80	COMPACT GNEIESS WITH ISOLATED FRACTURE	30	CGWB
Surwania	80	129	COMPACT GNEISSES	49	CGWB

List of Water Quality Data Used in NAQUIM Study Banswara District **AnnexureVI**

District	Block	Location	Lat.	Long.	EC* µS/cm at 25°C	NO_3*	F*
BANSWARA	ARTHOONA	ARTHUNA	23.4958	74.1000	570	17	0.40
BANSWARA	BAGIDORA	Bagidora	23.4042	74.2667	1350	125	0.92
BANSWARA	CHHOTISARVAN	Bagtalav	23.5503	74.6858	420	2	1.40
BANSWARA	BAGIDORA	Bansla	23.4211	74.2919	940	33	0.72
BANSWARA	BANSWARA	Banswara1	23.5333	74.4500	820	31.0	0.40
BANSWARA	BAGIDORA	Barodiya	23.4167	74.3503	600	13.7	0.35
BANSWARA	GHATOL	Bhimpur	23.7153	74.2628	756	38	1.25
BANSWARA	GHATOL	Bhoongra	23.6686	74.5056	660	34	0.15
BANSWARA	SAJJANGARH	Bhura Kua	23.2250	74.3100	475	13	0.75
BANSWARA	SAJJANGARH	Bilari	23.3269	74.3617	750	38	0.76
BANSWARA	ARTHOONA	Borigoan	23.5750	74.1167	765	38	0.40
BANSWARA	TALWARA	Borwat	23.5092	74.3844	860	17.4	1.38
BANSWARA	GHATOL	ChanduJi Ka Guda	23.6667	74.3300	455	1	0.80
BANSWARA	KUSHALGARH	Charakni	23.3128	74.3797	550	110	0.20
BANSWARA	ANANDPURI	CHHAJA	23.4333	74.0586	700	65	0.26
BANSWARA	SAJJANGARH	Chhinch	23.3000	74.3167	1780	31	0.40
BANSWARA	KUSHALGARH	Chhoti Sarwa	23.2197	74.5833	522	48.0	0.63
BANSWARA	TALWARA	Chiriyawasa	23.5092	74.3775	970	49.2	0.80
BANSWARA	SAJJANGARH	CHOTA	23.1722	74.2903	860	38	0.85

		DUNGRA					
BANSWARA	CHHOTISARVAN	Danpur	23.5167	74.7167	280	1.0	0.20
BANSWARA	GHATOL	DUNGARIA	23.8639	74.4583	592	27.1	0.28
BANSWARA	GHATOL	GANORA	23.7667	74.2528	1780	120	0.40
BANSWARA	GARHI	GARHI PARTAPURA	23.5900	74.1750	503	1	0.56
BANSWARA	CHHOTISARVAN	Katumbi Dw	23.5361	74.6167	803	110	0.38
BANSWARA	ARTHOONA	Kotra1	23.4544	74.0750	759	30	0.40
BANSWARA	KUSHALGARH	Kusalgarh_Pz	23.2000	74.4519	924	60	0.58
BANSWARA	GHATOL	NARWALI	23.8944	74.4431	1120	55	0.78
BANSWARA	BANSWARA	Padla Barora	23.5361	74.5194	1110	22	1.10
BANSWARA	BAGIDORA	RAKHO	23.3683	74.2792	790	75.16	1.50
BANSWARA	GHATOL	Rathor Ki Phadoli	23.8944	74.4431	950	40.5	1.45
BANSWARA	GHATOL	SENWASA	23.6561	74.3897	740	42	0.90
BANSWARA	TALWARA	Sera Pada Sandoh	23.4833	74.3667	738	48	0.65
BANSWARA	BANSWARA	Surwania	23.4417	74.3689	413	1	0.42
BANSWARA	TALWARA	Talwara	23.5667	74.3333	954	52	0.40
BANSWARA	GARHI	Wajwana	23.6167	74.2833	763	4	1.50
BANSWARA	Anandpuri	Chandarwara	23.4459	74.1093	610	61	0.41
BANSWARA	Anandpuri	Mundri	23.3748	74.0834	480	6.25	0.185
BANSWARA	Garhi	Ora	23.7704	74.1920	800	20	1.02

BANSWARA	Garhi	Agarpura	23.6576	74.1504	520	1.27	0.375
BANSWARA	Garhi	Bheempur	23.7117	74.2600	810	12	1.22
BANSWARA	Garhi	Chibra Talai	23.5723	74.2513	740	27	0.5
BANSWARA	Garhi	Garhi	23.5908	74.1674	750	15	0.5
BANSWARA	Garhi	Nawa Gaon	23.6205	74.1954	850	1.15	1.37
BANSWARA	Arthoona	Govindpura	23.4688	74.1608	710	9	0.575
BANSWARA	Arthoona	Anjana	23.5319	74.0813	780	18	1.04
BANSWARA	Bagidora	Wansla	23.4248	74.2914	710	38	1.06
BANSWARA	Bagidora	Chheench	23.4677	74.3145	2490	36	1.03
BANSWARA	Gangartalai	Sallo Pat	23.1793	74.1626	1020	60	0.395
BANSWARA	Sajjangarh	Himmatgarh	23.1194	74.3497	1340	20	1.41
BANSWARA	Kushalgarh	Bijori Khurd	23.2400	74.5319	1025	28	0.835
BANSWARA	Kushalgarh	Galwani	23.1278	74.4545	1050	10	1.62
BANSWARA	Kushalgarh	Khajoora	23.2800	74.4915	530	5.16	0.352
BANSWARA	Kushalgarh	Patan	23.2395	74.6596	630	20	0.79
BANSWARA	Kushalgarh	Sarwachhoti	23.2186	74.5795	680	3.4	0.59
BANSWARA	Ghatol	Jagpura	23.8665	74.3473	850	7.05	1.78
BANSWARA	Ghatol	Jamboi	23.6902	74.4570	630	37	0.885
BANSWARA	Ghatol	Narwali	23.8961	74.4417	770	18	0.405
BANSWARA	Ghatol	Baman Para	23.7695	74.3375	760	19	0.875
BANSWARA	Ghatol	Khamera	23.7886	74.4620	4330	52	1.58
BANSWARA	Ghatol	Ghatol	23.7550	74.4044	520	2.91	0.065
BANSWARA	Ghatol	Jetpura	23.8465	74.5082	570	4.2	1.75

BANSWARA	Talwara	Shivpura	23.5589	74.3701	790	8.2	1.63
BANSWARA	Chhotisarwan	Bari	23.5464	74.5849	850	25	0.5
BANSWARA	Chhotisarwan	Phepher	23.4926	74.6518	700	18	0.975
BANSWARA	Chhotisarwan	Kundal	23.6053	74.7056	650	20	1.02
BANSWARA	Banswara	Cheeb	23.6108	74.5022	460	32	0.016
BANSWARA	Banswara	Kesarpura	23.4932	74.5096	1150	53	0.014
BANSWARA	Banswara	Veerpur	23.4191	74.5276	560	21	0.645

District	**Block**	**Location**	**Aqui-fer**	**Lat.**	**Long.**	Cu	Mn	Ni	Pb	Zn	Fe
						mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
BANSWARA	Anandpuri	Anandpuri	H.P.	23.3864	74.0238	BDL	0.000	0.000	0.000	0.000	0.000
Banswara	Garhi	Ora	T.W.	23.7704	74.1920	0.000	0.000	0.000	0.000	0.000	0.000
Banswara	Garhi	Garhi	H.P.	23.5908	74.1674	0.000	0.038	0.000	0.010	0.000	0.595
BANSWARA	Garhi	Kotra1	H.P.	23.4544	74.075	0.000	0.011	0.000	0.024	0.389	1.260
BANSWARA	Garhi	Wajwana	H.P.	23.6167	74.2833	0.000	0.000	0.000	0.000	0.000	0.000
Banswara	Garhi	Nawa Gaon	T.W.	23.6205	74.1954	0.016	0.215	0.000	0.010	0.735	4.972
Banswara	Arthoona	Anjana	H.P.	23.5319	74.0813	0.016	0.021	0.000	0.010	0.641	0.332
Banswara	Arthoona	Arthoona	T.W	23.5004	74.0961	0.000	0.000	0.000	0.017	0.000	0.462
Banswara	Gangartalai	Ram Ka Munna	H.P.	23.2449	74.1491	0.000	0.013	0.000	0.017	0.221	1.400
Banswara	Gangartalai	Gangar Talai	H.P.	23.2573	74.1698	0.000	0.000	0.000	0.010	0.000	0.000
Banswara	Sajjangarh	Bhura Kuan (Bhoora Kua)	T.W.	23.2250	74.3027	0.000	0.000	0.000	0.000	0.000	0.000
Banswara	Sajjangarh	Doongra Chhota	H.P.	23.1630	74.3253	0.000	0.000	0.000	0.010	0.000	0.662

Banswara	Sajjangarh	Himmatgarh	H.P.	23.1194	74.3497	0.000	0.000	0.000	0.017	0.000	0.477
Banswara	Sajjangarh	Thunthi	T.W.	23.1353	74.1305	0.000	0.000	0.000	0.017	0.164	0.232
Banswara	Sajjangarh	Sajjangarh	H.P.	23.2571	74.2876	0.028	0.090	0.010	0.049	1.388	12.780
Banswara	Kushalgarh	Bijori Khurd	T.W.	23.2400	74.5319	0.000	0.000	0.010	0.000	0.510	0.375
Banswara	Kushalgarh	Charakni	H.P.	23.3158	74.3869	0.000	0.000	0.010	0.000	0.587	1.050
Banswara	Kushalgarh	Galwani	T.W.	23.1278	74.4545	0.015	0.010	0.010	0.016	0.886	0.000
Banswara	Kushalgarh	Khajoora	H.P.	23.2800	74.4915	0.000	0.000	0.010	0.000	0.895	1.175
Banswara	Kushalgarh	Kushalgarh	H.P.	23.1908	74.4497	0.018	0.058	0.010	0.036	1.932	5.516
Banswara	Ghatol	Jagpura	H.P.	23.8665	74.3473	0.015	0.000	0.010	0.000	0.000	0.000
Banswara	Ghatol	Jamboi	T.W.	23.6902	74.4570	0.000	0.000	0.010	0.000	0.389	0.465
Banswara	Ghatol	Narwali	H.P.	23.8961	74.4417	0.000	0.026	0.010	0.000	0.000	0.122
Banswara	Ghatol	Bhoongra	T.W.	23.6897	74.5165	0.000	0.000	0.010	0.000	0.000	0.000
Banswara	Ghatol	Baman Para	H.P.	23.7695	74.3375	0.000	0.000	0.010	0.000	0.000	0.410
Banswara	Ghatol	Khamera	T.W.	23.7886	74.4620	0.000	0.015	0.010	0.023	0.000	0.000
Banswara	Ghatol	Ghatol	H.P.	23.7550	74.4044	0.000	0.019	0.010	0.000	0.000	0.000
Banswara	Ghatol	Jetpura	H.P.	23.8465	74.5082	0.000	0.000	0.010	0.000	0.189	0.000
BANSWARA	Ghatol	SENWASA	H.P.	23.6561	74.3897	0.000	0.000	0.010	0.000	0.000	0.187
Banswara	Talwara	TALWARA	H.P.	23.6088	74.4263	0.000	0.000	0.000	0.000	0.000	0.000
Banswara	Talwara	Shivpura	H.P.	23.5589	74.3701	0.000	0.000	0.000	0.000	0.000	0.000
Banswara	Chhotisarwan	Chhoti Sarwan	T.W.	23.5270	74.6408	0.000	0.516	0.000	0.010	0.000	0.000
Banswara	Chhotisarwan	Danpur	H.P.	23.5128	74.7179	0.000	0.000	0.000	0.000	0.000	0.000
Banswara	Chhotisarwan	Bari	H.P.	23.5464	74.5849	0.000	0.000	0.000	0.000	0.000	0.000
Banswara	Chhotisarwan	Katumbi	T.W.	23.5368	74.6187	0.000	0.000	0.000	0.000	0.000	0.147

Banswara	Chhotisarwan	Phepher	H.P.	23.4926	74.6518	0.000	0.039	0.000	0.010	0.000	0.000
Banswara	Chhotisarwan	Kundal	H.P.	23.6053	74.7056	0.000	0.000	0.000	0.000	0.000	0.000
Banswara	Banswara	Cheeb	T.W.	23.6108	74.5022	0.049	0.000	0.000	0.000	0.253	0.205
Banswara	Banswara	Kesarpura	H.P.	23.4932	74.5096	0.000	0.000	0.000	0.024	0.142	0.120
Banswara	Banswara	Banswara	T.W.	23.5480	74.4616	0.000	0.000	0.000	0.017	0.151	0.000