Water Resource Management Is aBoon Agriculture Development In Bilaspur District

(Chhattisgarh)

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Abstract

It is necessary for the government and the private sector to work together in order for agricultural production in the Bilaspur District to grow and be maintained. This is necessary in order to keep up with the rapidly shifting conditions of both the global environment and the national socio-political and economic climate. In order to meet the problems posed by feeding a growing population, there is a pressing need for an all-encompassing agricultural development strategy. It is also very important to give price support for producers while simultaneously keeping the cost of basic items within the range of what people with low incomes can afford to pay. The manufacture of a select few essential goods will need, as a first step, an approach that makes the most efficient use of the available land, water, and human resources. Even if future endeavours will involve commercial agriculture and the addition of value to goods, the current, relatively small scale has to be expanded before such things can be attempted. The availability of water for agricultural production is one of the most essential variables that contribute to food security. Irrigated agriculture is responsible for the production of forty percent of the world's food supply and takes up twenty percent of all arable land. Because of the higher productivity of irrigated agriculture, the potential for increasing both output and crop diversity in irrigated agriculture may be at least twice as big as in rainfed agriculture. In order to prepare for potential challenges in the future, it is necessary to reevaluate water management in the agricultural sector in the context of overall water resources management and water security. In more rural areas of the world, you may often find a variety of irrigation and drainage systems, of varying sizes and scopes. As a result of this, they are an effective method for dispersing job advertisements over a variety of communities.

Keywords: *Bilaspur, Chhattisgarh, Panchayats,Water Resource, Archaean Crystallines*

Introduction

About 90% of a town's land is irrigated by that of the Mahanadi River, with the other 10% irrigated by other rivers. It's the Ganges Water, certainly (Plate-I). Seonath, Maghdhara, as well as the Brahmaputra are some of Mahanadi's major tributaries. Sukhad, Jaswa, Sagar, Chhotinarmada, Gongha, Arpa, Teswa, Agar, Maniari,Khurung, and Arpa are only a few of the names that appear in this list.The Son River is the Ganges' most significant tributary. In this instance, the Tipan, as well as Alan nalas, are the Streams that flow into the Son River. Dendritic structures landscape in the northern part of the area. In the northwest, we have a pattern, and in the south, a trellis (sub-parallel drainage pattern). As a consequence of the drainage In the plains, the density of population drops dramatically, suggesting that the underlying shale, limestone, and dolomite) than that of the strata in the northern half of the local government. Forests account for around 38.18% of th land mass. A section of a municipality. Chhattisgarh plains is yet another name for this region. The soil is rich as well as productive. It is mostly used for agricultural purposes, but there are limited surface irrigation systems. The persons of the north A major agricultural area of the region is situated on steep, strongly undulating terrain. Constricted to a small area. In 2011, over 360195 acres were sown net. Paddy is grown on 88% of the land, the world's most valuable crop. Out of 125 yes votes, there are composed of three distinct branches ones. There are a lot of smaller irrigation projects in the area. A substantial irrigation project has still not been planned for the area. All 3 of the medium-sized irrigation projects are as follows: Khum, Ghongha, as well as Maniyari. These blocks are classified as Lormi, Mungeli, Masturi, as well as Bilaspur. Major people who might benefit from these endeavors.

Objectives of Paper

1. **Discuss Bilaspur Primarily an Agricultural**
2. **Discuss Strategy for Controlling Groundwater**
3. **Discuss Questions And Problems Concerning Ground Water**
4. **Discuss the role of water resource Management inAgricultural in reference of Bilaspur District**

Review of Literature

- Optimizing water allocation in the Rio Grande Basin was indeed the primary focus of the construction of an integrated body of water nonlinear programming system that Ward et al. (2006) undertook in 2006.The purpose of their study was to carry out an integrated economic-hydrologic-institutional examination of policy responses to reduce the harmful impact of drought.Their integrated framework was designed in the form of a mathematical optimization problem, with the objective being to maximise the number of advantages accrued from river basin diversions for an off uses and advantages gained from in-stream usage recreation.The leisure advantages of reservoirs were assumed to be a complex quantity of storage, and total water-related benefits were estimated as a quadratic equation of consumptive usage. usage.
- Economic optimization of connectives usage in a state water system was presented by Pulido-Velazquez et al. (2006) in a modeling approach that provides the following functions distributed parameter aquifer simulation and dynamic river interaction. In Spain, the Adra Rivers system. To be minimized, they set the objective function as that of the product of Losses in GDP due to drought in the consumption industry + the variable, including pumping costs, in order to maximize overall total financial benefit of water use in the systems
- Ringler and Cai (2006) introduced the role of wetlands and fisheries in the economic hydrologic management of Mekong River Basin. They described valuation techniques for wetlands and fisheries in a basin context and estimated the economic benefits associated with aquaculture production by a production function approach, where the value of the fisheries is related to in- stream flows. River's hydrologic water balance was used to estimate the water supply, while water demand is estimated endogenously based on functional relationships between water and productive uses in different sectors (e.g. irrigated agriculture, domestic-industrial areas, wetlands, fisheries, and hydropower). Optimization was based on maximizing economic benefits of water use while keeping the balance between water supply and demand

Bilaspur Primarily an Agricultural

The agricultural industry is the most important in Bilaspur's economy, since it provides the main source of income for the vast majority of the city's residents (75%). Most often grown cereal crops are wheat and maize. Greenhouse cultivation of a wide variety of cash crops, including tomato, ginger, carnation, and capsicum, is the region's main economic driver. The average American farm is less than one hectare in size, and 84.4% of all farmland is owned by

small and marginal farmers (0.92 ha). In addition to the 66 commercial banks and 8 regional rural banks in the area, the Kangra Area Central Cooperative Bank has a network of 28 branches across the district. In all, there are now 28 locations of the Central Cooperative Bank in the Kangra district. Certificates of deposit (CDs) account for just 25.36 percent of its total assets, which is much lower than the norm for financial institutions. The Priority Lending Program (PLP) for 2016-2017 was created in response to the release of the new RBI regulations for Priority Sector Lending. The Crop Production industry is responsible for 30%, or 19334.90 Lakh, of the expected total credit flow of 6526 Lakh. Twenty percent of the total is allocated to agricultural term loans, with 138.98 million rupees (roughly $200,000) allocated to support agricultural infrastructure. Repayment terms for agricultural term loans typically range from one to five years. Micro, small, and medium-sized enterprises (MSME) are expected to have a potential of 18998.00 lakh (or 29.79%), while other sectors (which may include exports, education, housing, and so on) are expected to have a potential of 13839.35 lakh. It is anticipated that the MSME industry would contribute 29.79% to the overall sum. Annexure I provides this future analysis, which is broken down into both steps and building blocks for ease of reading. Both the PLP and the ACP for 2015-16 were 23% more than the 12,185,000 lakh that is projected for 2016-17. This result was achieved. This year's Annual Comprehensive Plan (ACP) aim is based on forecasts made by the PLP, and those projections have been recognised and approved by the DCC.

Sector-wise Comments On Major Sectors

1. **Crop Production, Maintenance and Marketing**

Due to the area's favourable climatic conditions, valuable crops may be grown here, and instruments designed for use in the hills, such as power tillers, mini tractors, maize shellers, and post-harvest tools that are neutral in terms of gender, can be put to good use. Financial institutions may provide educational materials for Rupay KC and similar crop insurance programmes to farmers.

2. **Water Resourcesand Land Development**

While the monsoon remains unpredictable, water resource management must be a top priority. Farmers should be incentivized to alter their crop rotation in order to consume less water. The stability of soil moisture is essential for maximising yield from each irrigation drop. To save water, many people nowadays choose for a Rainwater Harvesting Structure. The hydrological,

hydraulic, and structural design of the structure can only guarantee its long-term survival if the watershed approach is taken into careful account.

3. Mechanization of Farming

Increased investment in farm mechanisation is necessary if the area is to realise its potential for agricultural and horticultural goods. Local banks may need to use a JLG financing approach to help small and medium-sized farms (SF/MF) acquire necessary agricultural equipment due to the low earnings of many farmers in the area. Due to a lack of accessible workers, the agricultural sector in the area is struggling. It's vital to provide farmers with more money for investing in agricultural gear. Financial institutions' use of JLG finance to help SF/MF buy vital agricultural machinery and equipment may be on the increase.

4. Plantation and Horticulture

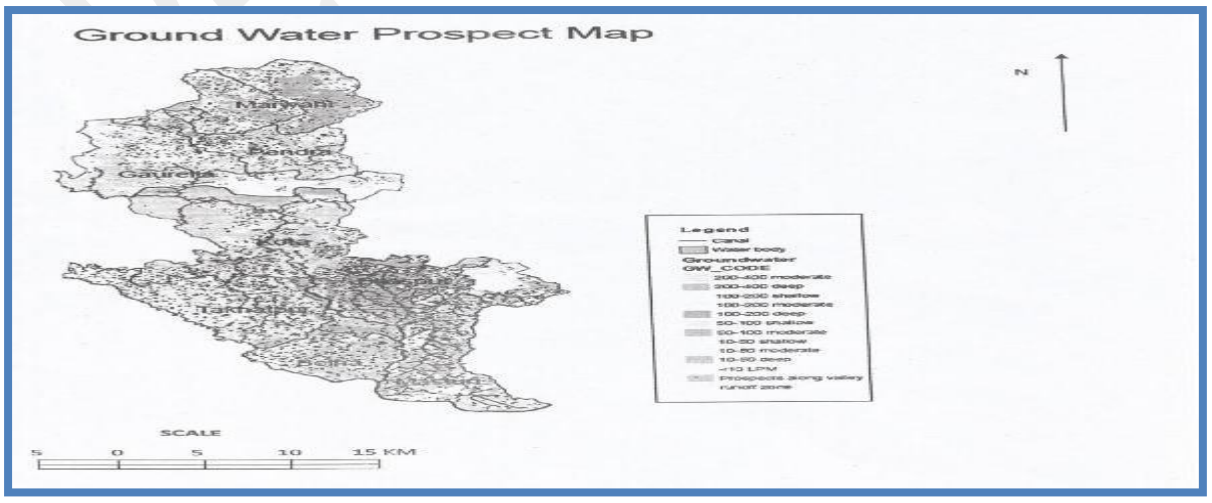
The plantation and horticulture sectors may benefit from increased access to financing. Considering the possible financial benefits from growing high-value cash crops like medicinal plants. The HP administration has shown initiative, particularly in the agricultural sector. Farmers may be persuaded by bankers to invest in subsidised horticultural crop programmes. Farmers in this region might benefit from growing horticulture crops as a means of diversifying away from their current farming pattern. The employment of innovative methods like greenhouses and temperature control, together with bank finance, may lead to a rise in vegetable and floricultural output. The Department of Agriculture and the Department of Horticulture may work together to encourage the growth of suitable horticultural crops on marginal soils and salty/basic areas.

Bilaspur District

The old Bilaspur District was divided into Bilaspur, JanjgirChampa, and Korba in May of 1998. Free open-source nos. 64E/16, F/6,7,10 to 16, G/9,13, I/4, J/1 to 4,7,8, K/1,5,6 from the Census of India cover the area that composes the Bilaspur district inside the northwest region of the state of Chhattisgarh. The correlating East and North longitudes seem to be 81°29'02" and 82°27'44" as well as 21°42'40" and 23°06'58," respectively. It has a total size of 8,569 square kilometresThe districts of Durg and Raipur it is to the south, Kawardha&Mandla are to the west, Koriya is from the north, and Korba as well as Janjgir-Champa it is to the east (Plate-I). With such a distance of 120 kilometres to Raipur, the state capital, Bilaspur acts as the

district capital. It has good transport links to the capital building. The settlement is on National Highway 200. It lies on the major line between Mumbai as well as Howrah. All-weather roads provide convenient access across the area. The district is divided into 8 tehsils, 10 CDBs, and 858-gramme panchayats just for convenience in administration. The region has 16 major cities. There is a Municipal Corporation in the responsibility of Bilaspur, a Municipal in charge of Mungeli, as well as 14 Nagar Panchayats accountable for the remaining cities (Towns of Bodri, , Gaurela, Kota, Lingiyadih, Lormi, Mahmand, Ratanpur,Deori, Ghutku, Sirgiti,Baitalpur, Belha, Pendra, and Takhatpur are included in this list.). The urban population accounted for 25.50% of the district's total, having 4,54,000 people who live in Bilaspur town alone. Just one significant industry exists inside the Belha block. The Hirri region is mined primarily for dolomite. Useful for building, laterites, as well as limestones, are extracted from scattered locations.The distribution of water and also how it is used as a commodity by agriculture are both contingent on the unique aspects that water has. The use of water for agriculture for irrigation is dependent, in itself, on the availability of land. The following provides a summary of the economic characteristics of water as well as the implications of those traits. The case for a more fair water delivery within the agricultural sector and a more equal distribution of water to the agriculture industry is then stated.. A reevaluation of the sectoral allocation of water is unavoidable in the present climate, which is characterized by a growing shortage of water as well as an increase in the amount for non-agricultural uses of water (such as household and commercial), correspondingly. Irrigated agriculture is a key factor in the development of developing nations since it helps alleviate poverty and assure the safety of the nation's food supply.

Ground Water Prospect

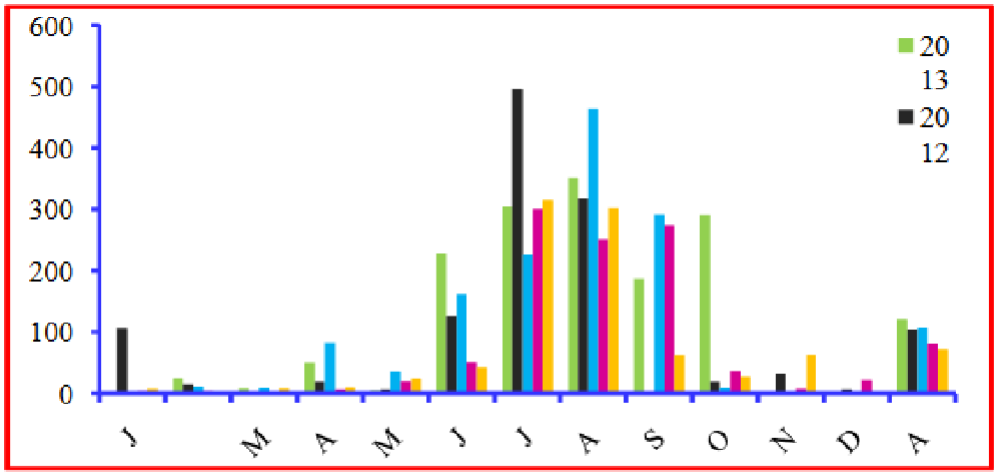


The most pressing problem facing the Chhattisgarh government is the exponential growth in population in Bilaspur's urban and rural districts, as well as the steadily decreasing groundwater level. Because of this, shortly the government will write a law to prevent the excessive and unwarranted use of groundwater. If you live in a town or hamlet, you can't dig a bore well and a dug well without first obtaining permission from the Underground Water Authority. Not only this, but corporate will be liable and responsible to respond, how much water is being supplied against the population. To conserve the subsurface water by water harvesting, watersheds or water-recharge, authorities would strive to implement water draught bill. To comply with the provisions of this law, not only individuals but also parties will be required to disclose if they supply freshwater for residential or commercial use. Groundwater depletion is becoming an urgent issue throughout the nation, not only in Chhattisgarh or elsewhere. The groundwater table in Bilaspur city has fallen by an average of 30 feet due to the fast rise of industry and urbanisation. People working for businesses in several parts of the city are required during the summertime to shut off pump-motors owing to the low groundwater table. Inside the previous year, certain locations like Hemunagar and Chuchuhiapara, water level went down to 30 feet and Bhartinagar, Nehrunagar, JunaBilaspur, Sarkanda exhibited 10-15 feet further down of water level. This pattern has indeed been recorded as persisting year after year. The inhabitants of Bilaspur known that before when the Arpariver was not there in route, even though the water table was accessible at 20-30 feet quite readily. But right now, you can't get drinkable water anywhere, not even by excavating Fifty feet into a riverbank.

Bilaspur District Rainfall (mm) For Last Five Years :
Arithmetic Average of Rainfall

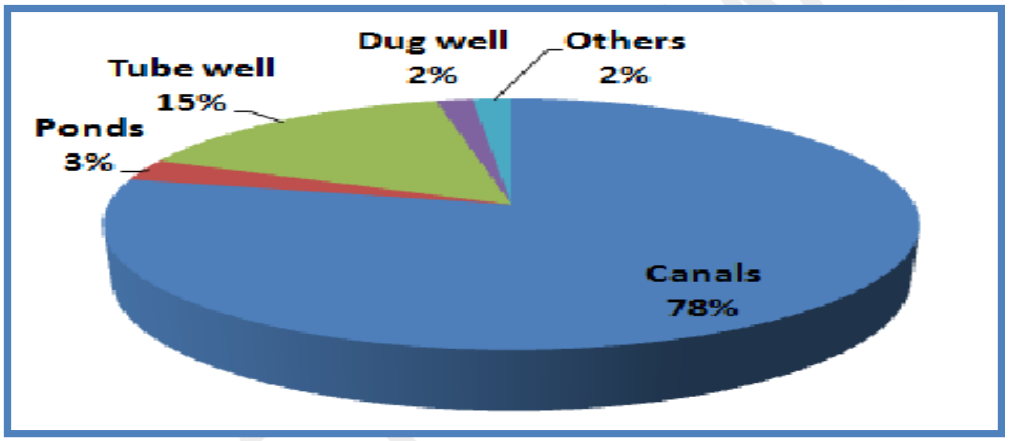
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg.
1.2	24.4	8.0	50.9	4.4	229	304.3	350.7	186.3	290.3	0.0	0.0	120.8
106.3	14.8	0.0	19.1	6.4	126.3	495.9	318.6	20.4.8	19.3	32.0	6.6	104.1
0.1	11.4	8.9	82.3	35.6	161.9	226.1	463.9	290.9	9.0	0.0	0.0	107.5
3.3	3.5	0.0	6.3	19.6	51.5	300.3	250.5	273.7	36.4	7.3	21.4	306.4
7.8	0.0	8.0	9.7	23.5	43.1	314.8	301.9	62.6	28.0	63.4	0.0	71.9

Bilaspur District Rainfall (mm) For Last Five Years :
Arithmetic Average of Rainfall



BILASPUR DISTRICT GEOHYDROLOGICAL MAP

Detail of AeraIrragated



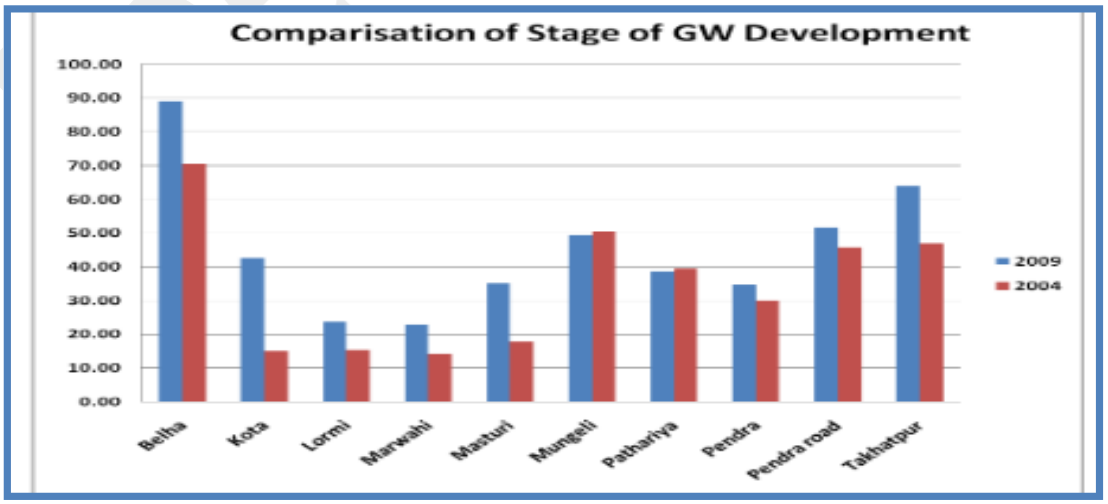
The overall sum of irrigated land is equivalent to around 40% of the net planted area. About 72% of the net irrigated area is watered by canals; this includes parts of a Bilaspur, Masturi, Mungeli, as well as Lormi blocks. Kharif crops benefit greatly from surface irrigation water (98.6 percent). About seventeen percent of a net irrigated land inside the district is irrigated using groundwater. This amounts to about 246.95 square kilometers. There is a breakdown of an irrigated area by irrigation method shown in Fig. Exploratory drilling, geological research, geochemical research, groundwater table surveillance, methodical hydrogeological study, and reappraisals hydrogeological studies are a few of the surveys and investigations that the Central Groundwater Board conducts throughout the neighborhood as portion of its hydrogeological studies. The Hydrogeological Survey of Systematic Procedures. **(Pullaiah 2007)**

Two separate hydrogeological reappraisal investigations, one in 1976–1977 and another in 1995–1996, were conducted in same area. The area's developmental potential as well as

groundwater levels supplies both were studied in 2000 as well as 2006. Studying the hydrogeology of the region around the Bilaspur Municipal Corporation started in 2002–2003. Groundwater in the district was evaluated on a block-by-block basis by the Chhattisgarh Groundwater Board (CGWB) and the Ministry of Chhattisgarh's Water Resource Department in 2004, 2009, and 2011. 68 DTH borewells was drilled as part of an exploration effort. There were 92 vertical electrical resistivity soundings (VES) taken in the region around Bilaspur town to map the Arpa river alluvium and find the best drilling spots. Forty-three dug wells (DW) and seventeen piezometers (Pz) are checked 4 times yearly to track changes in water quantity and availability over the long term. **(E-Library 2009)**

Resources for Groundwater

All we've succeeded to replenish 52353.99 ham of ground water. With a net outflow of -2617.17 ham due to natural causes, the total available resources now are 49736.28 ham. The current gross groundwater levels draw is 23229.37 ham; of this quantity, 18419.52 ham will be used for irrigation and 6392.43 ham will be used for household as well as industrial water supply. To far, 46.71 % of the district's water table has been developed. The Belha block (89.19%) is the most advanced in terms of its groundwater, following by the Takhatpur (64.18%) as well as Pendra Road (51.66%) blocks. While the Belha block is categorized as semi-critical, the other blocks are all found to be appropriate for future groundwater development. Plate-4 displays the resources available in a block-by-block format. Evaluation of Groundwater Levels Development Between 2009 but instead 2004 **(Chandana, R and Sidhu, M. J. 1980)**



Ground water resource of Bilaspur district as on March 2009								
Assessment Unit / Block	Total Annual Recharge in Ham	Net Ground Water Availability in Ham	Existing Gross Ground Water Draft for Irrigation in Ham	Existing Gross Ground Water Draft for Domestic & Industrial Water Supply in Ham	Existing Gross Ground Water Draft for All Uses in Ham	Allocation For Domestic & Industrial Water Supply in Ham	Net Ground Water Availability for Future Irrigation Development in Ham	Stage of Ground Water Development in %
Belha	6673.51	6339.84	4110.18	1544.26	5654.44	2140.44	89.22	89.19
Kota	3850.33	3657.81	1110.57	450.2	1560.77	587.96	1959.28	42.67
Lormi	6620.51	6289.48	1011.9	487.43	1499.33	636.58	4641	23.84
Marwahi	6006.29	5705.98	1041.66	277.35	1319.01	362.24	4302.08	23.12
Masturi	4778.78	4539.84	1103.23	491.65	1594.88	642.1	2794.51	35.13
Mungeli	7318.04	6952.13	3046.1	389.75	3435.85	509.01	3397.02	49.42
Pathariya	5079.62	4825.64	1589.29	276.62	1865.91	361.26	2875.09	38.67
Pendra	2752.28	2614.67	695.26	210.89	906.15	275.42	1643.99	34.66
Pendra road	2198.24	2088.32	929.26	149.47	1078.73	194.99	964.07	51.66
Takhatpur	7076.39	6722.57	3782.07	532.23	4314.3	682.43	2258.07	64.18
District	52353.99	49736.28	18419.52	4809.85	23229.37	6392.43	24924.33	46.71

Strategy for Controlling Groundwater

Excluding the Belha block, every one of the blocks are considered safe from the perspective of groundwater levels development. The post-monsoon season has a decreasing water level trend over almost 73.91 % of a district. As a percent of the overall land surface, 1.40 % shows a declining trend rate of more than 0.4 m/yr, with a maximum of.53 m/yr, while 10.80 % falls in the region of 0.2 to.4 m/yr. Plate 5 presents a map of groundwater management areas based on water level drop trends, groundwater stage, as well as depth to sea levels more than 3 meters below ground level. All future development in the area, though, cannot detract from the fact that all these specific areas require urgent action to restore or maintain sufficient water levels. One promising strategy that may be used in these areas to help accomplish this goal is artificial recharge to the groundwater. Groundwater management, as well as development, is suggested in the Plate VI area.(Rao 1993)

Questions And Problems Concerning Ground Water

The southern half of the district, which is really underlain by the Chhattisgarh Rock group of rock, serves as the potential groundwater, however, drilling in certain sections of these places needs extreme caution.DTH drilling is recommended in areas with hard rock. Drilling will proceed to the necessary depth after the weathered portion was cased to avoid formation collapse. Naked is the part of the borehole whereby the hard rock has been bored. Drilling time is an illusion to the formation's intricacy and the rig's productivity. Casing the collapsible

layers in the Pandaria Formation is always necessary before continuing drilling due to the regular likelihood of the cavernous limestone collapsing. The combination rig is optimal in formation between alternate among hard rock and softer rock. **(Ahmad 2003)**

Here, the sandy overburden is drilled to use the mud rotary technique and either slotted pipe or blank pipe the will be used for casing, depending on the production of the aquifers. DTH drilling is utilized to attain the optimal depth in hard rock. Combo rig wells, such as those drilled at Mungeli, Rohra, Lori, as well as Chilfi, are only reaching deep fracture zones. The Mungeli perforated pipe is the only one of a kind, since it successfully taps both deep granular zones as well as deeper fracture zones. Rotating drilling rigs work best in the Gondwana sedimentary rocks that are only partially cemented. The following pilot borehole drill to the appropriate depth, seismic logging is performed to map out the probable granular zones. After berating the pilot borehole, well assembly is dropped into the hole since it was deemed to be necessary based on the findings. Gravel is used to fill the void between both the assembly pipe and the bore hole. Up till the water from of the borehole is clean of suspended material and mud cake, the well is expanded using an air compressor. Wells with large diameter shaft that are drilled into the weathered rock are particularly common. The water level is low around these wells. Filter points are widely used in alluvial areas. Wells like this are called combi bore wells, and they are usually drilled to a depth of between 5 as well as 9 mbgl in a sandy or clayey formation. Due to their closeness to pollution sources and the fact that they had been built on river alluvium at the outskirts of Bilaspur's urban core, the groundwater in such areas is unfit for consumption. Gypsum veins inside the overlaying Maniarisale contribute to elevated levels of sulfur dioxide (SO4) in the water table in the Takhatpur, Patharia, and Mungeli blocks. The older metamorphics and granites that make up the north part of the district are not favorable to abundant groundwater, but the area could still be put to be used with the help of powerful drilled wells. **(Joshi 1988)**

Water resource Management in Agricultural in Reference of Bilaspur District

The frighteningly high rate of groundwater variations that are creating an ever-increasing rate of groundwater depletion may be quantified by utilising the groundwater stage development [%] measure. The National Critical Catchment Regions and Critical Groundwater Basins have given the Takhatpur block of District Bilaspur a designation of "semi-critical" from the year 2015. This classification was given to the area in order to prioritise water conservation efforts (NCCR, CGWB). Inadequate conditions for the process of recharge, an abundance of

productive wells, and extensive use of the water resource to irrigate crops and provide water to houses and businesses are the primary contributors to the problem. The water table in the area of Neora, Ganiyari, has been under the watchful eye of the NCCR CGWB from the month of May 2018 to the month of January 2020. It is a section of the pheratic aquifer that extends to a depth of between 5 and 15 metres below ground level. The water table in that area is between 6.65 and 8.68 metres deep, hence this section of the aquifer extends to a depth of between these two values. At this point, practically all of the water has evaporated from the once-significant Arpa River, which passes through Bilaspur. During the winter, before summer, and after summer, the length, average breadth, and average depth of the water have been 147 kilometres, 400 metres, and 1 to 1.5 metres, respectively. According to what can be seen, everything gets started in the dry and dusty Khondari-Khongsara neighbourhood of Pendra, which is covered with trash from residential neighbourhoods. This neighbourhood is also known as the dumping ground for residential garbage. The river's flow is greatly slowed down between Belgahana and Masturi as a consequence of a number of check dams, anicuts, a barrage, and a number of bridges. This is because the river has to go over a lot of different structures. It is possible to get to the Shivnath River, which is no longer flowing, by going to Thakur deva, which is situated close to Bartoi. The natural river system that formerly existed has been further decimated as a result of the mining of sand, which has required the excavation of the river bed in a number of different locations.

Conclusion

The great majority of locals in the Bilaspur District depend heavily on agriculture as a source of income, hence its significance should never be understated. Despite the fact that agriculture today contributes less than 20% of the country's GDP and that other sectors' contributions have increased more quickly, agricultural productivity has increased. As a consequence, we are no longer dependent on others for our food supply, and as a result of gaining our independence, we are now a nation that is a net exporter of agricultural and allied goods. The quantity and quality of water resources are impacted by economic activities including farming, energy production, industry, and mining, which in turn influences how much water is available. It will become increasingly difficult for an increasing number of nations to divide up limited water supplies among conflicting economic sectors and environmental concerns. Economic growth will be hindered in the absence of efficient resource allocation systems, which will heighten economic disparity and exacerbate environmental stress. Because they are aware of the

financial and time commitment required to thrive in the industry, those with advanced degrees, particularly those in their 20s and 30s, are more likely to launch agricultural businesses. Over the course of the next ten years, the impact of developing technology will fundamentally transform agriculture's destiny.

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