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Problem of Pure Potable Water in the Rural Areas of District Jaunpur of Uttar Pradesh

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ABSTRACT: Jaunpur district was carved out of Allahabad and lies between 25^{0}22'30" and26^{0}10'00" north latitude and 82^{0}06'00" and 83^{0}00'00" east longitude in survey of India toposheet 63K and 63J. Total geographical area of the district is 4038 sq. km. District head quarter is at Jaunpur having 06 number of tehsils and 21 number of blocks. Agriculture is the main source of economy of the district. Both surface and ground water are used for irrigation. The net irrigated area is 243519 Ha and the net area sown is 278527 Ha, which shows that 87% area is irrigated and the rest area depends on rainfall. Length of canal in the district is 698 Km. and the number of government tube wells is 475.Jaunpur district is drained by Ganga river system of which Gomti and Sai are tributaries. The Gomti enters the district through north western border where as Sai first touches the district in the north western corner takes south east turn near Buxa and ultimately joins Gomti but there is problem for potable water due to increase in population and industrialization exploitation of water occurs.

Keywords: Exploitation; pollution; population; potable; problem and water.

INTRODUCTION: Deaths and diseases are caused worldwide due to pollution of water and approximately 14000 people die every day due to water pollution [1-3]. Pollution of water has become a worldwide problem now a day's ongoing evaluation of water resource policy is needed to counter this problem.

Both developed as well as developing countries are suffering from water pollution problems [4]. Water quality is affected by many factors like precipitation, vegetation, geology, climate, flow conditions, ground water and human activities. Greatest threat to quality of water is posed by point sources of industries and municipalities. Activities like mining, Urban development and quality of water also affected from agriculture. Non-point source pollution also includes n sediments, nutrients and toxic contaminants [5].

According to the census of 2010 the district has population of 1596909 of which 838095 males and 758814 females. Population of Scheduled caste (S.C.) is 196040 and population of scheduled tribe (S.T.) is 60.Rate of literacy of the district is 63.05%.According to Geographic view the area comprises Quaternary alluvium sediments heterogeneous in nature are deposited over the concealed basement of Vindhyan sandstone and shale of varying thickness. The main drainage of the district belongs to the Ganga river system of which river Gomti and Sai are tributaries.

MATERIALS AND METHOD: The climate of district Jaunpur is typical sub humid punctuated by long and intense summer and cold winters. The average annual rainfall in district Jaunpur is 987 mm, about 88% of the annual rainfall is received from south-west monsoon. The month of May is the hottest with temperature shooting up to 46.5^{0}C. With the coming of monsoon by about mid June, temperature starts decreasing. The month of January is usually the coldest in year with the temperature going up to 5.6^{0}C.The relative humidity is maximum during south-west monsoon ranging between 55% to 82% with its minimum around 32% during peak summer months of April and May.

Ground water scenario:

Hydrogeology*: Depth to Water Level:* Depth to water level(DWL) data collected from Ground Water Monitoring Wells in May' 2016 and Nov' 2016 have been utilized to prepare depth to water level contour maps. According to the table and depth to water level contour map for the period May'2016, reveal that water level varies from 2.13 mbgl as seen in Machlisahar in Machlisahar Block to 15.48 mbgl in Chandwak in Dobhi block. Almost all the blocks, covering approximately 50% of the wells show DWL between 05 to 10 mbgl. 25% of the wells show DTWL between 0 to

5mbgl. The data reveal that there no well is showing DWL < 2 mbgl.

A perusal of the table and depth to water level contour map for the period November' 2016 reveals water level has become shallower and varies from 0.60 mbgl in Machlisahar block to 15.10 m in Chandwak in Dobhi block. The data reveal that some areas are prone to water logging. About 50% of the wells show DTWL in 0-3 mbgl.

Table 1: Water Level and Fluctuation (Pre & Post-monsoon) for the year 2016.

Sl. No.	Ground Water monitoring well	Block	Pre-monsoon DWL (May'16) (mbgl)	Post-monsoon DWL (Nov'16) (mbgl)	Fluctuation (m)
1.	Machlisahar	Machlisahar	2.13	0.65	1.48
2.	Shahganj	Shahganj	4.75	0.90	3.85
3.	Mahreon		3.32	2.27	1.05
4.	Maharajganj	Maharajganj	7.90	2.47	5.43
5.	Honipur	Sujanganj	8.69	7.45	1.24
6.	Muftiganj	Muftiganj	12.17	-	-
7.	Rampur	Rampur	9.56	6.93	2.63
8.	Khetasarai	Shahganj	5.17	3.54	1.63
9.	Chandwak	Dobhi	15.48	15.10	0.38

Annual seasonal fluctuation of water level: Annual Seasonal Fluctuation of Water Level has been determined from the Pre-monsoon (May'2016) and Post-monsoon (Nov'2016) water level data of Ground Water monitoring wells. The fluctuation varies from min 0.0 mbgl to max 7.56 mbgl in Dhiuraha and Baraipur in Khutan block.

Post-monsoon trend of water level: Data shows that there is falling trend during Post-monsoon period in all the wells. The range of decline is 0.0069 cm/year at Khetasarai to 2.3278 cm/year at Sikrara in Sikrara block.

Ground water quality: Ground water is generally colourless, odorless and slightly alkaline in nature. The specific conductance of ground water ranges from 425 to 850 µS/cm at 25^{o}C, conductance below 750 µS/cm at 25^{o}C has been observed in about 80% of analyzed samples of water. It is observed that ground water is suitable for drinking and domestic uses in respect of all parameters except Fluoride in Shahganj block where it is (1.8mg/l). The Floride ranges from 0.3 to 1.8 mg/l. The total hardness in the district Jaunpur ranges from 195 to 285.

RESULT AND DISCUSSION:

Pollutants: Different types of pollutants having different properties like Stock pollutants which include non-biodegradable plastics, synthetic chemical and heavy metals have no or very little absorptive capacity. With the passage of time the pollutants accumulate in environment, their damage increases as their quantity increases. Similarly Fund pollutants have some absorptive property in environment, they only cause problem when their quantity increases beyond environment absorbance capacity e.g., Carbon dioxide only causes problem when its amount increases. Fund pollutants can only be diluted to reduce their toxicity or recycled into non harmful substances [6].

Point source pollution: When pollutants or source of water pollution is known that are entering into water are from identifiable source like ditch, pipe industry, storm drain and sewage treatment plants etc. pollution is known as point source pollution [7]. Point source pollution can be distinguished from other pollution sources [8].

Non-point source pollution: When water pollution source is not known or pollution does not come from single discrete source ,pollution is known as non-point source pollution [9]. It is much difficult to control and may come from different sources like pesticides, fertilizers industrial wastes etc. [10].

Ground water pollution: When pollutants which are present on ground enter the water under earth they cause ground water pollution. When faecal water having pathogens reaches under earth it makes it unfit for drinking. Pathogen polluted ground water may contain viruses, protozoa and bacteria and rarely in some cases helminth eggs. Drinking of this water causes diseases like diarrhoea and cholera [11,12]. Similarly nitrates also produces ground water pollution causing disease in children called blue baby syndrome in rural population. It is seen that when nitrates concentration exceeds above 10 mg/L (10 ppm) in ground water chances of blue baby syndrome increases [13,14]. Use of nitrogenous fertilizers can also cause water pollution because very small amount of nitrates is utilized by plants most of it accumulates in soil which later on reaches to ground water by leaching and contaminate ground water [15].

Atmospheric pollutants: Small particles which are present in air when reaches to water bodies through rain, includes carbon dioxide which produced by burning of fossil fuels combines with water molecules forms carbonic acid. Sulphur dioxide produced from volcanoes and industries also combines with water molecules to form sulphuric acid. Similarly Nitrogen dioxide also combines with water to form nitric acid. Particulates also play important role in producing

water pollution these particulates reach to water bodies through rain.

Ground water related issues and problems: The trend analysis of ground water level data indicate fall both in Pre and Post-monsoon period in the major parts of the district Jaunpur. This will impact in:-

(i) further decline of ground water level

(ii) drying up of dug wells/shallow wells

(iii) decrease in yield of Tube wells and increased expenditure and power consumption for drawing water from progressively deeper depths.

CONCLUSION: 1. As level of development in many blocks of the district Jaunpur is high, further development of ground water should be arrested in these areas, especially in Buxa, Karanjia kalan, Kerakat and Sirkoni block which falls in Over Exploited category.

2. Artificial recharge technique should be adopted in the district due to occurrence of deep water condition to arrest the decline of water level. In urban areas, roof top rain water harvesting, with structures such as Recharge pits/shafts/trenches of suitable design, should be made compulsory for all government buildings, schools etc.

3. All blocks district Jaunpur exhibiting declining trends in their ground water level should be regularly monitored of water levels at close intervals through suitably located structures is essential.

4. To minimize the over stress on Phreatic Aquifer , it is advisable to plan heavy duty water supply tube well for future all uses by exploiting the Ground water from the deeper aquifer.

5. Use of extra fertilizers by the farmers should be discouraged particularly in blocks of Jaunpur district showing high nitrate concentration in the past.

6. To treat industrial wastes there should be special industrial waste treatment plants with every industry. Similarly there should also be urban runo pounds to remove pollutants from runo and to prevent floods Toxic pesticides and Herbicides should be replaced with non- toxic ones or Pesticides should be replaced with biological control.

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