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# A Study of Ground Water Contamination In Janjgir Champa District of Chhattisgarh

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***Abstract : Groundwater is one of the important components in development of any area. It is the major potable, agricultural and industrial source of water. In the past, it was thought that groundwater is protected from pollution by layers of rocks and soil that act as filters. The first signs of contamination of groundwater extracted from wells may be detected. The objective of this review is reviews researches of groundwater pollution and contamination as well as pollution types and the effects of groundwater contamination and pollution on public health. Generally, groundwater pollution studies include the scientific understanding of biological, chemical and physical processes which control contaminants fate and movement in the underground environment. High chemical concentration in drinking water can pose a health hazard. Epidemiological studies have shown that the poor quality of drinking water as the main transport route has been responsible for many water-borne diseases. Several of microorganisms and synthetic chemicals have a potential to pollute groundwater. Drinking water containing bacteria and viruses can lead to diseases such as hepatitis or 2 cholera. The serious health effects of lead are known learning difficulties in children; problems in the nerves, kidneys, liver and pregnancy risks. Protection measures are actually simpler and less costly than corrective measures for groundwater contamination. The choice of appropriate therapeutic technique depends on site specific factors and often takes into account clean-up goals based on human health and environmental protection***

***Keyword-Ground Water, Contamination In Water , Treatment Solution***

## 1. INTRODUCTION

The Janjgir-Champa district in Chhattisgarh is bounded by East longitudes of 82°17’ to 83°19’ and by North Latitudes of 21°40’ to 22°15’30” having geographical area of 4467 sq. km. and is surrounded by Raigarh and Raipur district in South, Bilaspur district in west, Korba and Raigarh district in North and East respectively (Figure:- Plate-I). The district falls under Survey of India toposheet no. 64J/8, 64J/12, 64J/16, 64K/5, 64K/6, 64K/9, 64K/10, 64K/13, 64K/14, 640/1, 64O/2, 64O/5 and 64N/4. The district head quarters Janjgir and Champa, the twin towns are well connected with roads as well as rail. National highway No. 200 passes through both the towns. Janjgir is 180 km from Raipur, 75 km from Bilaspur and 94 km from Raigarh. Both Janjgir and Champa are connected with Howrah and Mumbai by SECR Mumbai- Nagpur - Howrah main line. There is a good network of State Highways in the district.


**Figure 1: Map Of Chhattisgarh**

For the convenience of administration, the district is divided into eight tehsils, nine Community Development blocks and 528 no. of gram panchayats. The district has eight townships out of which five are Nagar Panchayats (Akaltara, Baloda, Kharod, Seorinarayan and Baradwar) 3 are Municipalty (Janjgir-Naila, Champa, Sakti). As per 2011 census the total population of the district is 1620632. The male population is 816057 and female population is 804575. The urban population is 11% and the rural population is. 89 % of the population in the district lives in the rural area. The population density calculated from 2001 Census is 342 where as in 2011 it is 421, which is the highest in the state. The literacy rate is around 61.72%.

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**Figure 3.2 GPS View Of NTPC Tendubhata**

## 2. Literature Review

Biswas, et al. (2011) studied the Groundwater chemistry and redox processes: Depth dependent arsenic release mechanism. In this paper they studies about geochemical process responsible for mobilization of As is depth dependent. Concentration of as in groundwater depends on single/ combined release mechanism. and hydroxide reduction, responsible for mobilization of , is microbially mediated.
Biswas et al (2012) studied the Testing tube platform color as a rapid screening tool for arsenic and manganese in drinking water wells. In this study demonstrates that TW platform color can be potentially used as an initial screening tool for identifying TWs with elevated dissolved and , to make further rigorous groundwater testing more intensive and implement mitigation options for safe drinking water supplies.
Choudhury et al (2009) studies the Assessment of Hydrogeological Characteristics of Groundwater in Greater Guwahati City . In this study they work on arsenic and flouride pollution of surface and ground water in parts of the Indian peninsula and Ganga-Brahmaputra Alluvial and Delta Plains. The results of the investigation have been be categorized institutions wise with identification of the principal worker in the research group.
Choudhury et al (2010) studies the Groundwater Arsenic Contamination in the Brahmaputra Floodplain, Assam, India- A Comprehensive Field Investigation. In this paper reports the preliminary assessment of arsenic distribution in the Brahmaputra basin in Assam based upon results from 56,180 public groundwater wells, tested during the rapid assessment programme.
Chatterjee (2010) studies the Assessment of arsenic exposure from groundwater and rice in Bengal Delta Region, West Bengal, India. This study deals with groundwater hydrochemistry vis-à-vis As exposure assessment among rural population in Chakdaha block, West Bengal, India. The water quality survey reveals that 96% of the tubewells exceed WHO guideline value (10 μg/L of As). The groundwaters are generally anoxic (-283 to -22 mV) with circum-neutral pH (6.3 to 7.8). The hydrochemistry is dominated by HCO(3)(-) (208 to 440 mg/L), Ca(2+) (79 to 178 mg/L) and Mg(2+) (17 to 45 mg/L) ions along with high concentrations of As(T) (As total, below detection limit to 0.29 mg/L), Fe(T) (Fe total, 1.2 to 16 mg/L), and Fe(II) (0.74 to 16 mg/L). The result demonstrates that Fe(II)-Fe(III) cycling is the dominant process for the release of As from aquifer sediments to groundwater (and vice versa), which is mainly controlled by the local biogeochemical conditions. The exposure scenario reveals

that the consumption of groundwater and rice are the major pathways of As accumulation in human body, which is explained by the dietary habit of the surveyed population.
Finally, regular awareness campaign is essential as part of the management and prevention of health outcomes Goel, Pooja ( 2009) Study of Older and Newer Alluvium of the Ganga Alluvium Plain in the Ghazipur District, Uttar Pradesh, with special reference to Arsenic contamination in the ground water of Karanda Block. This work dealt with contains a summary of the work done on arsenic and flouride pollution of the surface and groundwater in parts of the Indian peninsula and Ganga-Brahmaputra Alluvial and Delta Plains.
Kumar (2011) studies Chemical weathering of the IndoGangetic Alluvium with special reference to release of fluoride in the ground water, Unnao Distrit, Uttar Pradesh Fe(T) (Fe total, 1.2 to 16 mg/L), and Fe(II) (0.74 to 16 mg/L). The result demonstrates that Fe(II)-Fe(III) cycling is the dominant process for the release of As from aquifer sediments to groundwater (and vice versa), which is mainly controlled by the local biogeochemical conditions. The exposure scenario reveals that the consumption of groundwater and rice are the major pathways of As accumulation in human body, which is explained by the dietary habit of the surveyed population. Finally, regular awareness campaign is essential as part of the management and prevention of health outcomes Goel, Pooja ( 2009) Study of Older and Newer Alluvium of the Ganga Alluvium Plain in the Ghazipur District, Uttar Pradesh, with special reference to Arsenic contamination in the ground water of Karanda Block. This work dealt with contains a summary of the work done on arsenic and flouride pollution of the surface and groundwater in parts of the Indian peninsula and Ganga-Brahmaputra Alluvial and Delta Plains.
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## 3. MATERIAL AND METHODOLOGY

### 3.1 Heavy Metal Concentration In Underground Water Due To Fly Ash At Janghir Champa Region In Chhattisgarh

Groundwater samples were collected from eight different locations (borwells) near Marwa Tharmal Power Station during September to November 2020 which are average 250feet deapt. The water samples were collected in Glass bottles which were pre-cleaned by nitric acid and distilled water in the laboratory. The pre-cleaned Glass bottles were also washed twice by water sample prior to collect the samples and after taking samples we put the bottles in air tight container (thermocol boxes) after taking its temperature because of its we maintain its natural temperature. The water samples were immediately taken to the laboratory and analyzed to minimize the physicochemical and other changes.
The most commonly used adsorbent is activated carbon a substance which is quite similar to common charcoal. Actually, the active carbon is much more efficient because of its high porous character. The high porous character is generated by treating carbon to steam and high temperature (1300 ° ) with or without oxygen in the presence of inorganic salts (physical method). The carbon may be of petroleum coke, bituminous coal, 197 lignite, wood products, and coconut/peanut shells. At high temperature, parts of carbon are oxidized in and steam. The gases are evacuated and micro fractures and pores are generated in the carbon structure. It dramatically increases the carbon surface area, making a useful material for the removal of contaminants. In some cases, the carbonaceous matter may be treated with a chemical activating agent such as phosphoric acid, zinc chlorideand the mixture carbonized at an elevated temperature, followed by the removal of activating agent by water washing

(chemical method). Active carbon uses the physical adsorption process, whereby Vanderwaals attractive forces pull the solute contamination out of the solution and onto its surface. The efficiency of the adsorption depends on the nature of the carbon particle and pore size, surface area, density and hardness as well as the nature of the contaminants (concentration, hydrophobicity, polarity and solubility of the contaminant and contaminant attraction to the carbon surface). There are two different forms of activated carbon in common use, granular activated carbon (GAC) and powdered activated carbon (PAC). Physically, the two differ as their names suggested by particle size and diameter. The 198 reusability of the carbon is done primarily with the GAC as PAC particles are too small to be reactivated.

## 4. CONCLUSIONS

The world is facing turbulent water future, with the growing economy and rising population, the theme of all nations is 'Save water'. Quantity and quality of water should be given equal importance. Awareness related to 'water conservation' and 'safe drinking water' is extremely important, and should be given a good thought to the people. The technological solution depends on raw water characteristics, affordability and acceptability and level of application. Of course, sustainability depends on an awareness of 238 the related issues. Since there are limitations in every individual treatment technologies and, thus, hybrid technologies are always beneficial; however, availability, selection, optimization, etc. are important for the best performances of the system. Lastly, it must be mentioned through the gambling of research that the future of the water treatment technology is highly prosperous and hope one day we will fulfill the demand 'fresh water for everyone'

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