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Water Pollution In The Area Of Rihand Reservoir

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Abstract: *The water and environment has become an emotive issue for the people and policy makers. River valley projects are projects that serve several purposes like water for agriculture and industries, generate hydropower, drinking water, flood control, navigation and tourism. The chief causes for the pollution of water and environment are anthropogenic activities of human beings. Water is the one of the essential source of life on the earth planet. It also performs unique and indispensable activities in earth ecosystem, biosphere and biogeochemical cycles. Thus, high quality water is always a need for living organisms. The whole industrial belt in Singrauli region lies practically in the close vicinity of Rihand dam, regularly discharging their effluents into the reservoir. Coal fly ash and ash slurry released from thermal power plants and coal mines serious threat to aquatic ecosystem due to presence of various pollutants. The environmental restoration catchment and command area in Rihand dam is bad condition. Thus, the environmental health of Rihand dam is facing very serious conditions due to improper environmental restoration.*

Key Words: Emotive, anthropogenic, indispensable, ecosystem, biosphere, biogeochemical and pollutants.

Introduction- Pollution is the introduction of a contamination into the environment. Industrial and commercial waster, agricultural practices, everyday human activities and most notably, models of transportation create it. The three main types of pollution are: Land Pollution, Air Pollution and Water Pollution. The objective of this paper is to find out the situation of water pollution in the Rihand reservoir. District Sonbhadra is called as Energy Capital of India because there are so many power plants. Sonbhadra district is an industrial zone and it has lots of minerals like bauxite, limestone, coal, gold etc. Industry has been ruthless in the indiscriminate exploitation of the region. No heed has been paid to the social and environmental cost of relentless development. The story of Sonbhadra's rise on the power map of India began in 1962 with the construction of the Rihand dam and the subsequent extraction of its massive one billion ton of coal reserve and limestone hummock.

The ready availability of power lured Hindalco into setting up its aluminum plant in the same year at Renukoot at the northern end of the reservoir. Kanoria Chemicals followed suit two years later, to supply caustic soda to Hindalco. Further north, the UPState Cement Corporation set up a plant in 1967 at Dalla, near Obra, marking the first few steps in the industrialization of the region. Over the years, big plus like NTPC as well as private players like Lanco, Jaypee Group, Aditya Birla Group et al made inroads as well, accompanied by many ancillary industries, stone-crushing units and limestone quarries. At present, nearly two-and-a-half lakh tons of coal is burnt every day in Sonbhadra. Stacks over 200 meters high spew pollutants like sulphur and nitrogen oxides, fluoride and trace metals like mercury into the air, which travel almost 30-40 km, or are dumped as effluents in fly ash ponds. The contaminated water, inevitably but surreptitiously, streams into the Rihand reservoir, the lifeline of the residents of this region. Due to excessive fluoride and mercury in the water of the dam, it has also become highly harmful for the life of aquatic animals as well as for human life. In one of the largest reservoirs in Asia, the fish of Rihand river and reservoir has also become poisonous. Consumption of these fishes, which have direct penetrations from the districts of Purvanchal and border states to Kolkata (West Bengal), have become dangerous for human life.

Statement of the Problem- Due to industrial development in Sonbhadra district many physical, chemical and bio-chemical substances get dissolved in water, it causes severe threat to ecological stability and a matter of great concern for human health. Hence it is obvious for a rational person to point out these issues as matter of



primary requirement.

Objective of the Study- The broad objective of this paper is to trace out status of water pollution in Rihand dam. The consequential impact of these pollution on socio-economic status of the living population in study area.

Sub objectives are

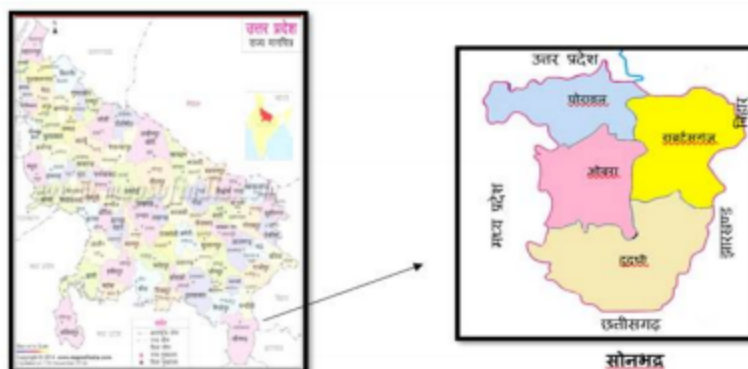
- * Quality of the water of incoming river
- * Quality of water in the reservoir at dam site
- * Increase in aggressiveness of water which may affect the concrete structures
- * Quality of water in the immediate vicinity of the confluence of effluents from CHI with the reservoir water
- * Quality of the chemical effluent water

Research Methodology- This paper focus on water pollution in Rihand Dam. The study is based on secondary data; it is descriptive and analytical study. Data are drawn and classified from the Published Books, Censes Reports, Various Research papers, thesis, articles, websites and Newspapers.

Study Area- "RIHAND DAM"- Sonbhadra is the 2nd largest district of Uttar Pradesh, India. The study area located between 23°-55' to 24°-41' North latitude and 82°-30' to 83°-3' East longitude. Sonbhadra is the only district in India which borders four states, It lies in the extreme southeast of the state, and is bounded by Mirzapur District to the northwest, Chandauli District to the north, Kaimur and Rohtas districts of Bihar state to the northeast, Garhwa district of Jharkhand state to the east, Koriya and Surguja districts of Chhattisgarh state to the south, and Singrauli district of Madhya Pradesh state to the west. The district has an area of 6788 square kilometres and a population of 1,862,559 (2011 census), with a population density of 270 persons per sq. km. The district has historic, cultural, and ecological affinities with the Bundelkhand region and it is the only district of UP which share boundary with four states (Bihar, Jharkhand, Chhatisgarh, and M.P.). Geographically the district is located between 82°72' to 83°33' East longitude and 23°52' to 25°32' North latitude. In survey of India toposheets 63L/14, 63L/15, 63L/16, 63P/3,63P/4 this area has been published. The northern third of the district lies on a plateau north of the Kaimur Range, and is drained by tributaries of the Ganges including the Belan and Karmanasha rivers. South of the steep escarpment of the Kaimur Range is the valley of the Son River, which flows through the district from west to east. The southern portion of the district is hilly, interspersed with fertile stream valleys. The Rihand River, which rises to the south in the highlands of Surguja district of Chhattisgarh, flows north to join the Son in the centre of the district. The Govind Ballabh Pant Sagar, a reservoir on the Rihand, lies partly in the district and partly in Madhya Pradesh. East of the Rihand, the Kanhar River, which originates in Chhatisgarh, flows north to join the Son. The district has an area of 6788 km² and a population of 1,862,559 (2011 census), with a population density of 270 persons per km². The district headquarters is in the town of Robertsganj.

Fig.1- Map of Uttar Pradesh and Sonbhadra

Source: https://wikimedia.org/India_Uttar_Pradesh_districts_2012_Sonbhadra





Sonbhadra district is an industrial zone and it has lots of minerals like bauxite, limestone, coal, gold etc. Rihand dam is a concrete gravity dam with a length of 3,066 ft. & the maximum height of the dam is 300 ft. was constructed during period 1954-62. The dam consists of 61 independent blocks and ground joints. Total catchment area of reservoir is approximately 13,333.26 km². The capacity of the reservoir is 10.6 billion cubic meters water of Rihand Dam is used for irrigation, drinking, fish culture, bathing, generation of power 300 M.W. (6 units of 50 MW each) electricity and industrial purpose. The Intake Structure is situated between blocks no. 28 and 33. Its reservoir area is on the border of Madhya Pradesh and Uttar Pradesh. It is located on the Rihand River, a tributary of the Son River. The catchment area of this dam extends over Uttar Pradesh, Madhya Pradesh & Chhattisgarh where as it supplies irrigation water in Bihar located downstream of the river. During Seventies, huge quantity of good quality coal was found at very shallow depths around and close to Rihand reservoir. The whole industrial belt in Singrauli region lies practically in the close vicinity of Rihand dam, regularly discharging their effluents into the reservoir. Coal fly ash and ash slurry released from thermal power plants and coal mines serious threat to aquatic ecosystem due to presence of various pollutants.

ANALYSIS- In the area of Sonanchal, the industrial units along the various reservoirs are located, in which the situation of pollution has emerged in the aqueous area. The sources of surface water include Rihand, Son, Kannahar, Bijul etc. rivers and the vast Govind Ballabh Pant Sagar. In which the thermal power plants, Hindalco, Hi-tech carbon, the chemicals of Kanodia, Obra thermal power plant and Anpara thermal power plants are dissolved by polluted water exclusion. Many super thermal power stations are located in the catchment area of the dam. These are Singrauli, Vindychal, Rihand, Anpara & Sasan super thermal power stations and Renukoot thermal station. The high alkalinity run off water from the ash dumps (some are located in the reservoir area) of these coal-fired power stations ultimately collects in this reservoir enhancing its water alkalinity and pH range. Using high alkalinity water for irrigation converts the agriculture fields in to fallow Alkali soils.



Location of Thermal Power Stations along the Rihand Reservoir

The water of these surface areas is polluted. In this superficial water pollutants such as lead, mercury, zinc etc. dissolve. Due to which the water of these areas is being polluted. Underground water pollution is a cursed form of water pollution, which provides toxicity to aquatic reserves. The establishment of thermal power stations and chemical and cement factories has also resulted in large scale gaseous air pollution, particularly of SO₂ and HF pollution due to particulate matter through fly ash and cement dust and that due to liquid effluents. Surface coal mining has caused extensive damage to the natural ecosystems with growing dumps of overburden. The water polluted by the industrial areas and the urban sources reaches underground water reservoirs, resulting in ground water becoming polluted. Source of water pollution arises from various activities, among which are:

- * Industrial waste dumped into rivers and reservoir
- * Flood during the rainy season which carries waste deposits into water.
- * Combustion
- * Toxic waste disposal at reservoir



- * Mineral processing plant (coal production)
- * Deforestation
- * Household chemicals
- * Animal wastes

Conclusion- The environment in and around Rihand reservoir, considered to be the largest manmade reservoir in the country, is getting damaged with high concentration of mercury, high pH, violations in fly ash disposal, ground water pollution with high fluoride concentration and so on. Silicosis, fluorosis and excess mercury are affecting the health of the residents around Rihand in Singrauli area in both Madhya Pradesh and Uttar Pradesh. More than 3,000 acres along the Rihand reservoir has been occupied for disposal of flyash by thermal power plants of NTPC, Uttar Pradesh Rajya Vidyut Utpadan Nigam Ltd (UPRVUNL), Lanco Power and Hindalco Industries Ltd in the Singrauli region. Most of the ash ponds have attained their maximum height and reached their saturation and therefore have no further augmentation capacity for disposal of ash slurry.

Polluted water with ash emanated from the factories is immersed in the Rihand Dam, which has filled the silt and ashid silt at the bottom of the Rihand Dam, more than 15 feet, which is highly dangerous for the dam. The situation will be worse in the next some years. The disposal of ash in the ash ponds along the Rihand reservoir leads to silting of the reservoir in case of non-compliance of ash pond overflow discharge limit or any breach in ash dyke. The treated water from reverse osmosis (RO) plants installed in Bajrang Nagar, Dibulganj and Parsavar- raja was found to be exceeding the permissible limits for aluminum, iron, mercury, cadmium and nickel, which shows that RO plants installed are not capable of removing the trace metals from water. The excessive amount of fluorosis has been done for more than a decade of the life of 22 villages of 4 blocks of Sonbhadra, which has been adversely affected by the adverse effects of tribal areas in the coastal areas of Rihand, still there is problem of the development of disabled children Due to excessive fluoride and mercury in the water of the dam, it has also become highly harmful for the life of aquatic animals as well as for human life. The environmental health of Rihand dam is facing very serious conditions due to improper environmental restoration. The quality of environmental health of Rihand dam with its surrounding is continuously degrading very fast.

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