

Johari River Water: Pollution And Its Impact On The Human Health

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Abstract: River water pollution has been one of the main environmental issues. Jojari River is one of the important river of Jodhpur districts. This study was conducted to find out the pollution status of Jojari River and the health problem of the surrounding residents in side villages and urban area of Jojari River. The results clearly showed that the water quality of Jojari River is not in conditions to sustain the aquatic life and not suitable for using domestic purpose also. It was indicated by the very low dissolved oxygen (DO) levels and other measured parameters in the river water. The maximum recorded values of pH, colour, turbidity, biological oxygen demand (BOD), hardness, total dissolved solids (TDS), chloride (Cl₂), carbon-di-oxide (CO₂) and chemical oxygen demand (COD) were 7.1 mg/L, 625 ptcu, 97.2, 4.65 mg/L, 1816 mg/L, 676 mg/L, 5 mg/L, 15.5, and 78 mg/L, respectively. The values of turbidity, BOD, hardness, TDS, and COD found in the Jojari River is much higher than the standard permissible limit. The study also provides evidence that local communities are suffering from a variety of health problems including skin, diarrhoea, respiratory illnesses, anaemia and complications in childbirth. Dengue, malaria and other epidemic diseases are also seen in this area. Furthermore, the people are suffering by the odour pollution and respiratory problems.

Keywords- Jojari River, pollution, human health, domestic purpose, urban area

INTRODUCTION

Water is the most vital element among the natural resources, and is critical for the survival of all living organisms including human, food production, and economic development. Today there are many cities worldwide facing an acute shortage of water and nearly 40 percent of the world's food supply is grown under irrigation and a wide variety of industrial processes depends on water. The environment, economic growth, and development are all highly influenced by water, its regional and seasonal availability, and the quality of surface and groundwater. The quality of water is affected by human activities and is declining due to the rise of urbanization, population growth, industrial production, climate change and other factors. According to Brief Industrial Profile of Jodhpur District 2015-16 Report, industrial growth is much more than previous years. The resulting water pollution is a serious threat to well-being of both the Earth and its population. These industries release their effluents in water bodies and on land cause hazardous effects on soil system and fauna inhabiting there (Kumar and Tripathi, 2018). Even with soils, animals, humans and other faunal communities also influenced with these hazardous materials (Kumar and Tripathi, 2019). They are continually magnifying in body and causes a lot of problems (Chen, 2005). The problem of water quality deterioration is mainly due to human activities such as disposal of industrial and sewage wastes and agriculture runoff, which are major cause of ecological damage and pose serious health hazards (Samalet al., 2011). The degree of pollution is generally assessed by studying physical and chemical characteristics of the water bodies.

This river flows near the Jodhpur city, Jodhpur is a part of desert so water is a limiting source here. So, population completes their needs by seasonal rivers and groundwater.

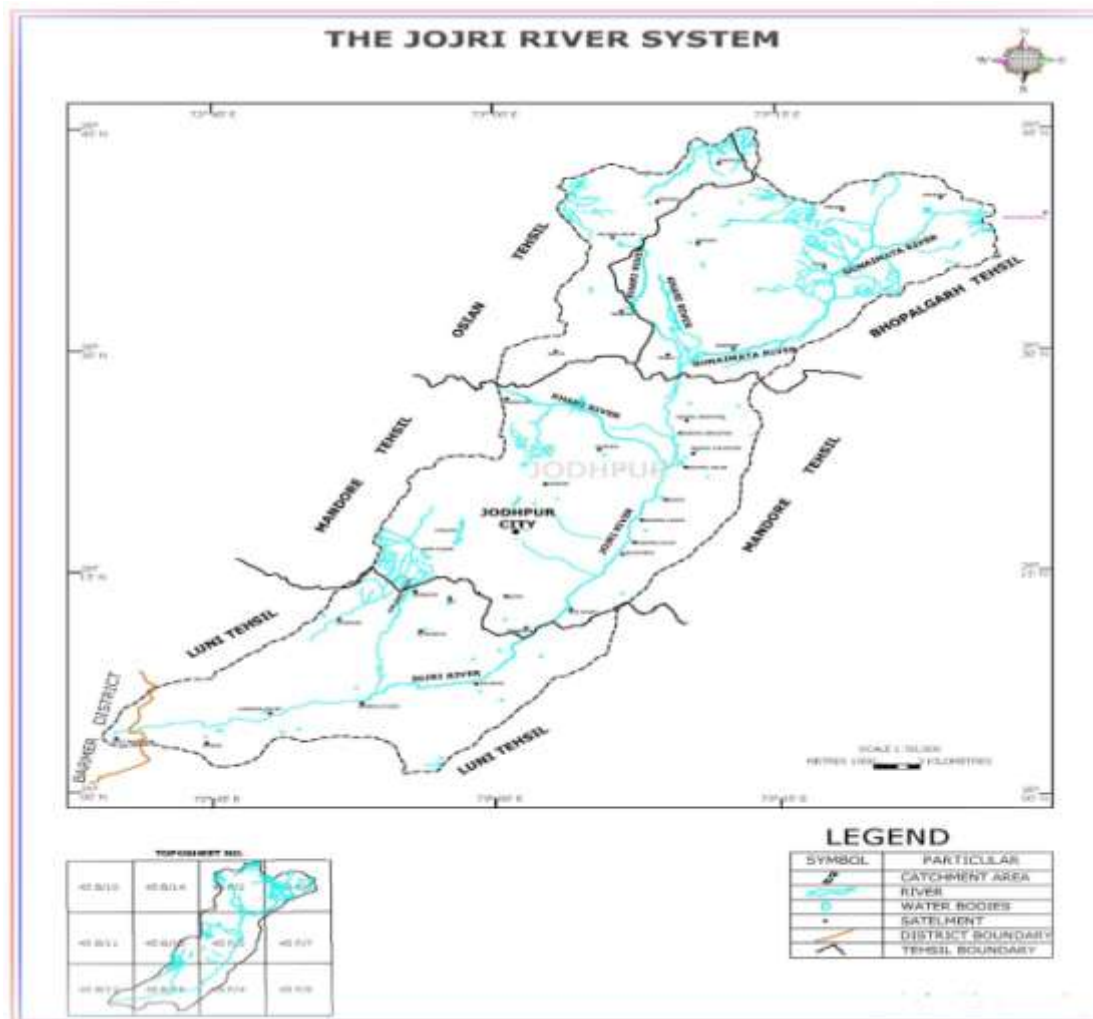


Fig. -1. The Jojri River System

Industrial wastewater reaches groundwater causes pollution (Mohnot and Dugar, 1987). Its origin flows in the name of Jojari after the confluence near the village of Melav of the river Gunaimata and the river Khari from Osian, coming out of Bhopalgarh. The total length of the river flows in about 128 Km. The geographical location of this river is $72^{\circ} 45'$ to $73^{\circ} 15'$ East longitude and $26^{\circ} 02'$ to $26^{\circ} 45'$ North latitude. In this route of flow, many small river streams are added in it, the Jojari River is a fully infested river. It flows in villages like Jajiwai, Banad Nanda kalan, Unchiyada, Jhalamand, Sangriya, Salawas, Lunawas and Dhawa, makes their quay in a pond of village Doli of Pachpadra Tahsil of Barmer. This river starts to be affected by the terrible pollution near Jhalamand and Salawas, which look like this river is like a dirty trunk.

Currently, due to the increase of the city of Jodhpur near this river, due to land acquisition of nearby people and the availability of dirty water coming from chemical factories, this river has become like a dirty drain today, not just for the past few year (Kumar, 2017). With heavy rainfall, the river has taken the area around its main path and also got polluted by pollution. Soil biodiversity and ecosystem services provided by the soil microbes and fauna in many areas are decreasing by pollution effects (Jones *et al*, 2001 and 2003). As a result, the farmers have suffered heavy losses on special occasions. The chemical contaminants are the most hazardous in water. Although they are non-biodegradable and their toxicity is high even at low concentrations causes negative impacts in the bodies of living organisms (Abdel-Raouf. and Abdul-Raheim 2017). Dyes are most common components of textile industries in the dyeing units (Kant (2012); Ashfaq and Khatoon (2014); Trivedi and Verma (2016)). The soluble pollutants get dissolved with water and deposits in river may affect natural phenomena (Panda *et al*, 2006).

MATERIAL AND METHODS

The sources of data were divided into two categories. The data which were collected from the field or study area are called the primary data. Primary data were collected by the interviewing the people of study area

and by making survey on a topic of the study. The secondary data are the data which were collected from published literature, which contain the topics related to the study. The steps that have been adopted to attain the objectives of the study were as follows:

1. Primary data were obtained from field observation and this was needed to know about the existing physical and environmental condition of the study.
2. Secondary data have been collected from pollution control board, Jodhpur and Central Pollution Control Board.
3. Water Samples had been collected and photography was done of different locations of the Jojari River and water samples tested in the Department of ground water, Jodhpur.
4. Water quality and pollution loads analysed to find out the present water quality scenario, trend of water pollution and percent of increase in pollution loading. Besides, reports, theses, journals, and expert opinions were collected from different organizations and websites.
5. Focus group discussion and in-depth interview with community members to identify their perceived current and historical health problems.
6. The second involved the gathering of secondary data and the undertaking of interviews with health workers in the area to determine whether the perceived changes to health expressed by the local population matched the health trends observed by local health professionals. To collect this data, our tool was taking "Interview with the people" of this location.

OBSERVATION

The experiment on a selected segment of the river was carried out for four months duration. The time was chosen as such that both dry season and wet season was there. To assess the water quality, we conducted test on 10 water quality parameters. The lists of those parameters with the standards are listed below:

Physico- chemical parameter		
No.	Parameter	Standard
1.	<i>DO</i>	6 mg/L
2.	<i>pH</i>	6.5-8.5
3.	<i>Color</i>	15 ptcu
4.	<i>Turbidity</i>	10 NTU
5.	<i>BOD</i>	0.2 mg/L
6.	<i>Hardness</i>	200-500 mg/L
7.	<i>TDS</i>	1000 mg/L
8.	<i>CI</i>	0.2 mg/L
9.	<i>CO₂</i>	Present
10.	<i>COD</i>	4 mg/L

From the analysis of data, it was observed that there is a distinct variation in water quality during dry and wet season. As the flow of water is less during dry season and water level goes down the quality of water become poor. As result water remains more polluted during dry season. Again during wet season due to rainfall the flow is more, level of water increases and the water quality becomes relatively better.

There is no sign of river pollution stopped. It is increasing day by day. There are several sources of water pollution, which work together to reduce overall river water quality. Industries discharge their liquid



waste products into river. Our agriculture practice that uses chemical fertilizers and pesticides also contribute to river pollution as rainwater drains these chemicals into the rivers. Domestic wastes that we throw, the size of town-sand cities also grows. With that the amount of domestic wastes that we throw into river increases. In most of the towns and cities, the municipal drains carry our wastes to rivers. There are examples of rivers catching fire because of high pollution levels. This shows how seriously polluted our rivers are. In our everyday life we can easily see symptoms of river pollution. The floating dead animals in our river, any coloured water in the river, or a bad smell from the river point towards river pollution.

Fig. no. 2: Photograph of Polluted River Water near Salawasvillege.

The study provides evidence that local communities are suffering from a variety of health problems that could be a direct or indirect such as skin problems, stomach problems, gastric ulcers, diarrhoea, dysentery, yellow fever, cholera, dengue, malaria and other epidemic disease also observed in this area. The people lives in the area are also suffering by the odour pollution and by the respiratory problems. If you see or feel any of these things in a river be sure that the river is a victim of pollution. River pollution can be due to the causes below:

1. Industrial pollution
2. Urbanizations growth
3. Agriculture pollution
4. Solid waste

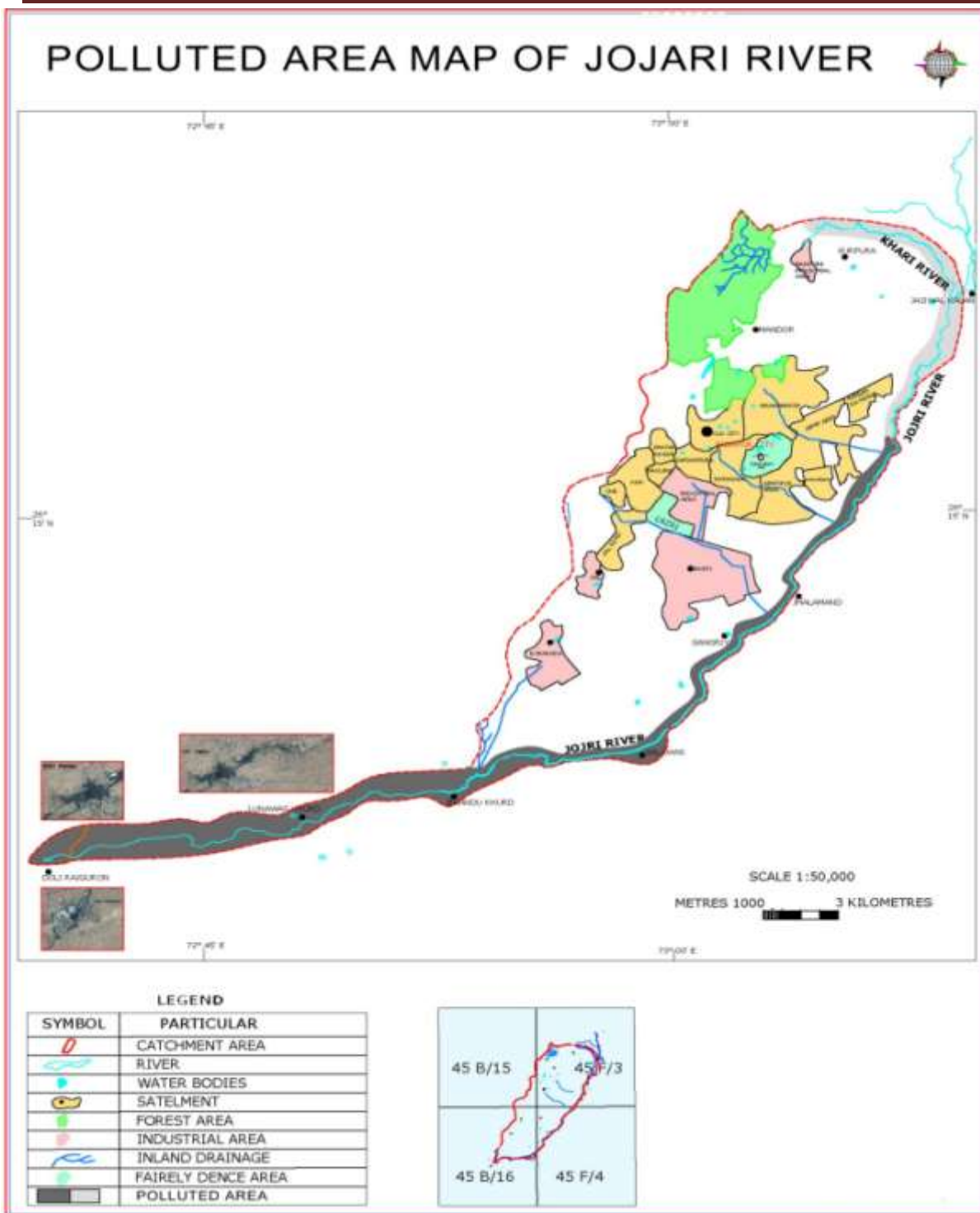


Fig. no. 3: Polluted area map of Jojari River.

RESULTS AND DISCUSSION

It was clearly understood above that during the last 15 years, Jodhpur city and Industrial development have been increasing rapidly. Consequently, industrial wastes and domestic waste through the water bodies are being added to the river Jojari which is increasingly the harmful element's in the river water. This is not good for ecosystem, soil and the health of flora and fauna. Human health is harming by using the unfiltered or direct use of this contaminated water, leading to various diseases.

The result of the sampling program clearly determined that the water of the Jojari River could not be in a state of good quality and is not suitable for domestic purpose, but it maintaining aquatic life surprisingly. The water samples were analysed, which included DO, pH, colours, Malappan, BOD, hardness, TDS, Chloride, CO₂, COD. Disposal of industrial effluents flowing in the river system has given birth to heavy localized pollution and severe threat to the environment. The maximum recorded values of pH, colour, turbidity, biological oxygen

demand (BOD), hardness, total dissolved solids (TDS), chloride (Cl₂), carbon-di-oxide (CO₂) and chemical oxygen demand (COD) were 7.1 mg/L, 625 ptcu, 97.2, 4.65 mg/L, 1816 mg/L, 676 mg/L, 5 mg/L, 15.5, and 78 mg/L, respectively.

The rigidity of maximum concentration, BOD, hardness, TDS and COD were found much higher than standard permissible limit values. The pollution level of the river is increasing rapidly and can cause serious problems in the near future. From this study, the surface water quality of major rivers along the banks of the Jojari River is a major threat to the village and urban areas of Jodhpur. Although some parameters may not be deteriorating, but in the near future, the status of the river is urbanization and all kinds of water pollution can be caused by industrialization.

On the other hand, the study provides evidence that the local communities suffer from various types of health problems. The discharge and flow problems of waste water can have direct or indirect consequences. There may be skin problems that are related to high pH of water, which can definitely result in irritation and lesions in the skin. A large amount of high pH levels is likely to result in the use of caustic soda and soda ash in the dyeing process. This causes problems of stomach causing people in more difficult areas do not drink water from the surface.

However, gastric ulcer and other similar gastric problems can be caused by the effect of pollution on crops related to food and the people living near the Jojari River. It is also probable that ground water is being polluted by infiltration, but it is not equally empirical like industrial flows, research on it. The problem of diarrhoea and dysentery is not likely to be directly caused by industrial wastes, because they are usually the result of microbial contamination.

CONCLUSION

There are a lot of problems and consequences. Like, putting the high level of migration in the area, there may be a lot of pressure on the poor hygiene infrastructure and the risk of communicable and contractual diseases is increasing. Many waterborne diseases spread to humans by using river water for washing and bathing. However, cholera, dengue, malaria and other epidemic diseases are also available in this area. There are also people living in nearby areas that face the problem of smell pollution and respiration. For the polluted condition of the mother river and the nearby riverbank slum areas, the conditions of child health are under danger. On the behalf of all these observations and results we made conclusion that government should have to take an empirical action to clean the river water as well as ban to industries which are not obeying policy of pollution control.

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