

Climate Change Anthropogenic pressure on river Jhelum through Sopore urban centre (Jammu & Kashmir): a case study

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ABSTRACT

The present investigation was undertaken on river Jhelum through Sopore urban centre of Jammu and Kashmir State. The study revealed that the river is facing great anthropogenic pressure from the dense unorganised human settlements located on its both banks throughout the sopore town. Domestic wastes and municipal sewage are continuously being discharged directly into the river without any proper treatment. The gradual decrease in CO₂ increase in chlorides, alkalinity and nitrates indicate high degree of organic pollution of the river. The anthropogenic pressure on the river is likely to increase if left unattended which could have prolonged disastrous effects on the river water quality and in turn a massive environmental pollution particularly in the valley of Kashmir.

Key words: Anthropogenic pressure, Domestic wastes, Jhelum, Organic pollution, Alkalinity, Kashmir.

Abbreviation: CO₂- Carbon dioxide

1. INTRODUCTION

Water is an invaluable resource on the earth supporting almost every kind of life forms. Human beings use water for drinking, bathing, transportation, recreational and for agriculture and industrial purposes. Besides this, water is the home of the larger part of the biodiversity on the mother earth. It is because of its vital significance that man has been continuously indulging with the water bodies around him to suffice his needs. Many ancient civilizations have developed in the river valleys and even today, immense human settlements are seen on the banks of rivers and stream. Since the turn of the century, there have been phenomenal explosions both in the industrial and population growth. Indiscriminate discharge of human wastes, excrements and sewage, unplanned urbanisation, industrialization, extensive agriculture and deforestation have contributed to the deterioration of physical chemical and biological characteristics of water, which have profound and detrious effects on human

health by way of disease transmission and on the environment as a whole. Since, there has not been much industrial development in the Kashmir valley, the main contributors towards the degradation of these water bodies are land-use changes, unplanned urbanization, increased soil erosion and reckless use of pesticides for agro-horticultural practices in the catchment areas (Badar and Romshoo 2007).

1.1. River Jhelum

The River Jhelum is one of the main tributaries of the Indus River and is the longest River of Kashmir valley originating from Pir Panjal range of mountains. The water of River Jhelum is used for irrigation, drinking, bathing and also provides food and sport fishing.

1.2. Pollution of Water Bodies

The pollution of a particular water body can always be linked to an industry, sewage or agricultural runoff (Subramanyam, 2006 and Sathware et al., 2007). Water quality assessment has become a big issue today because of the potential hazards associated with the use of contaminated water supplies. (Ali et al., 2007). Water bodies all over the world have been giant sewers for urban and industrial wastes and river Jhelum is no exception of it to assess the magnitude of such pollution, various studies on river Jhelum have been carried out by Vassel et al (1997), Raina et al (1982) Pandit et al (2002) and many others. The present study has been carried out to focus the anthropogenic pressure on river Jhelum in Sopore urban centre of Jammu and Kashmir.

2. SCOPE OF THE STUDY

The Present investigation was carried out to highlight the pollution of water bodies particularly river Jhelum through the unrestricted and unattended anthropogenic pressure in the Sopore urban cluster of Jammu and Kashmir. The study provides a bird eye view of the contamination of river Jhelum by various means and their possible remedial measures.

2.1. Materials

The urban centre of Sopore is located at 34°17' N Latitude and 74°31' east longitude (Figure1). It is situated 40 kilometres north west of Srinagar city at an altitude of 1575 amsl. Sopore, known as 'Apple town' in the whole is located on either banks of river Jhelum. River Jhelum popularly known as the '*life line of Kashmir valley*' besides being an important source of water for domestic and agricultural purposes provides the main line of drainage to the town. The runoff of the town finds its way ultimately into the river. In addition to this, the runoff from agricultural fields also finds its way into the river. The Sopore urban centre thus exerts a tremendous anthropogenic pressure on the river Jhelum.

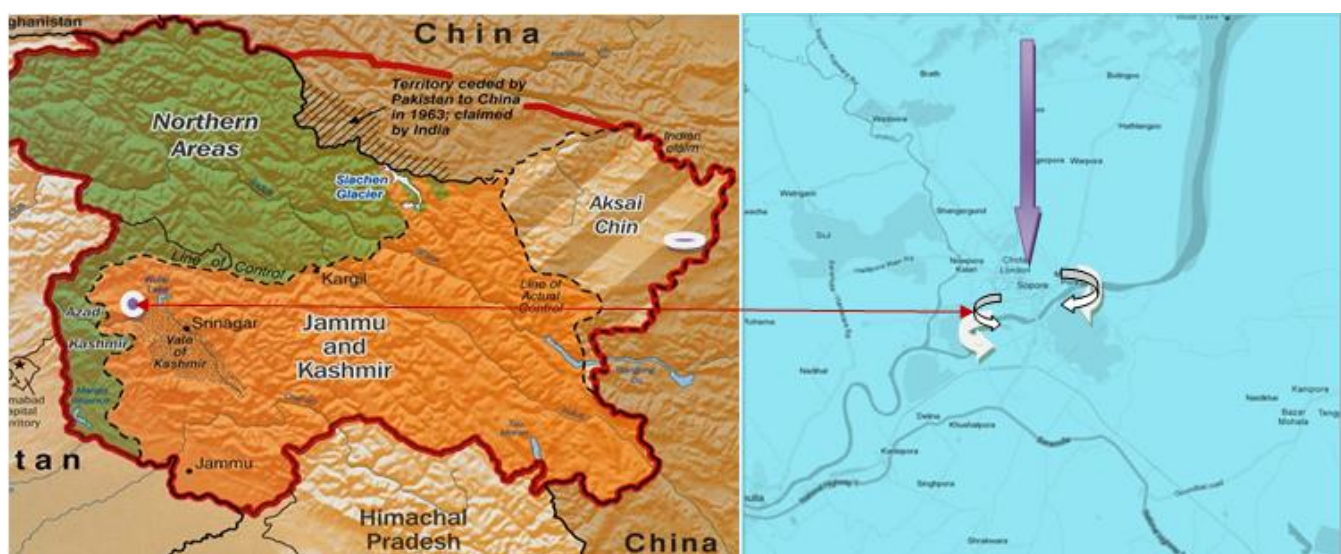


Figure 1

Map of Jammu and Kashmir showing the study area (Sopore Urban Cluster and the River Route through it)

2.2. Methodology

The data presented in the present study is primary as well as secondary in nature. The data regarding the municipal wards falling in the Jehlum bank, number of houses and population of wards falling on the Jehlum bank were obtained from the Municipal Council Office, Sopore. The details regarding the study area were also obtained by making ground observations.

3. RESULTS

Urban Sopore has been divided into 21 municipal wards, out of which 10 wards lie on the immediate bank of river Jehlum as detailed in Table 1. These 10 wards under the investigation revealed 2910 households with a population of 20103 heads and average of 7 persons per house. The present population figure is about 50% of the total urban population of Sopore which is 40059 persons. Furthermore, the open field visits carried out in the study area reveal that almost every day-to-day activity of the studied habitations are connected to the contamination and deterioration of river Jehlum. In Sopore town, domestic wastes and municipal sewage are being indiscriminately discharged into the river Jehlum without any treatment. Sewage and domestic wastes include all types of refuges such as kitchen refuse, bathroom washings, detergents, night soils etc.

Table 1 List of Municipal wards of Sopore town lying on the bank of river Jehlum

S. No.	Ward No.	Name of Habitation/Mohalla	No. of Houses	Population
01	02	Babaraza/ Naseembagh/ Doglitang/ Khushal colony	266	1051
02	03	Chankhan/ Sofi Hamam/ Untoo Hamam	259	1517
03	04	Khankah Mohalla/ Now hamam/ Jamia Qadeem/ Hatishah	252	1570
04	05	Nigli/ Sheer Colony	418	2604
05	06	Ashpeer/ Upper ashpeer/ Usman Abad/ Towheed bagh/ Mumkak	296	1997
06	08	Sangrampora/ Badshah Masjid/ Shah Abad/ Khushaal matoo	221	1953
07	15	Baba Yousf/ Muslimpeer/ Kreltamg	316	2179
08	16	Teliyan/ Hajama	238	2097
09	17	Mehrajpura/Takyabal	388	2209
10	18	Chinkipora/ Sheikh Sahib	256	2226
		Total	2910	20103

4. DISCUSSION

These wastes are quite harmful and affect the quality of water and bring about water pollution of the river. The town pours about 20 MLD of waste water in to the Jehlum as reported by Kundangar, 1999. Besides the solid waste generation of the town is 25 to 40 cubic meters per day (Kundangar, 1999), out of which about 85% finds its way into the river by way of illegal dumping along the river banks. One more critical fact of this water body contamination is the large number of open lavatories (about 150 in number in the studied area only) have been constructed on the banks and adjacent open areas. Apart from this the open lavatories open into the municipal drains and find their way in to the Jehlum River. The Jehlum River after leaving the town faces the contaminated fertilizer and pesticide residue rich water coming out of agriculture fields. All this leads to the gradual increases in to the nutrient level of the water. The gradual decrease in the dissolved oxygen, increase in alkalinity, chlorides and nitrates of the river along its flow through the town clearly indicates the nutrient enrichment and hence promotes higher degree of pollution of the river Jehlum in the town. Human induced hydrological changes, physical disturbances (habitat alteration and urban land use) and point and nonpoint sources of pollution (chemical contamination, surface runoff and intensive agriculture) are examples of processes responsible for a broad-scale deterioration of lotic ecosystems (Chatzinikolaou et al., 2006). Besides the presence of Macrozoobenthic Community pollution indicator species such as *Tubifex sp.*, *Limnodrilus sp.* among Annelida, *Chironomous sp.* and *Gammarus pulex* among Arthropoda, *Lymnea sp.* and *Corbicula sp.* among Mollusca directly points to the shifting status of the river from non-polluted to polluted as reported by Abida et al., (2012).

5. CONCLUSION

The present investigation highlights the anthropogenic pressure on the river Jehlum in particular and its forthcoming off beats in the context of environmental pollution. An urgent and dire need lies to address the problem by providing efficient management facility of the urban wastes and improving the quality of the life of the people living in the vicinity of the water bodies. It is therefore imperative to undertake remedial measures for prevention of pollution of river Jhelum by formulating schemes for environmental infrastructure works to intercept divert and treat the domestic and industrial wastewater. The programme must also addresses the problems of siltation, bank erosion and agricultural run-off containing pesticides and fertilisers with the help and close interaction with the concerned nodal ministries. The Bio-diversity of the river must be studied and monitored to restore its ecological status.

SUMMARY OF RESEARCH

1. The present study has revealed the anthropogenic pressure on the water bodies (river Jehlum) and its possible causes along with the implications on the environmental degradation and water contamination.
2. Paper has availed scientists and policymakers the opportunity to further study the various means of water pollution and to formulate the policies and programmes to overcome the environmental hazards.

FUTURE ISSUES

The findings from the study revealed that water in the river bodies near habitations/ human settlements off and on get contaminated due to the garbage dumping, drainage and inefficient management of municipal wastes. The study emphasizes on the management of water resources to overcome the environmental pollution and health hazards associated with it.

Disclosure Statement

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Ethical approval

Not applicable.

Informed consent

Not applicable.

Conflicts of interests

The authors declare that there are no conflicts of interests.

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Data and materials availability

All data associated with this study are present in the paper.

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