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RESEARCH ARTICLE

STUDENTS ATTITUDE AND AWARENESS IN RIVER POLLUTION IN SECONDARY LEVEL AND ENVIRONMENTAL EDUCATION IN TRIBENI NEARER, HOOGHLY DISTRICT

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ABSTRACT

The river has been polluted by dumping of raw sewage, industrial waste and municipal waste into the river. Besides this, illegal activities like washing vessels, animals and oily drums, discharge of unauthorized hazardous waste are also carried out along the course of this river. Cattle sheds in some areas contribute animal waste. Barrel cleaners, scrap dealers and others dump sludge oil, effluent and garbage in the river. The organic waste, sludge and garbage dumping has reduced the carrying capacity of the river. The water with mixture of sewage and industrial waste is a threat to marine life. The river bed is full of sludge, garbage and vegetation growth like water hyacinth in many parts. The present study was designed to investigate the environmental awareness in river pollution of secondary school student in Tribeni, Hooghly District. Sample of the study considered of 800 secondary school students from different secondary schools of Hooghly District. Then their respective awareness was measured. The data are treated with the help of statistics. Validity and reliability are also calculated before data treatment. The result of Analysis shows that, there exists difference in river pollution awareness among secondary students coming from urban, rural, semi-urban and semi-rural students. Male students have greater awareness in river pollution than female students.

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INTRODUCTION

Most of the Indian rivers and their tributaries viz., Ganges, Yamuna, Godavari, Krishna, Sone, Cauvery Damodar and Brahmaputra are reported to be grossly polluted due to discharge of untreated sewage disposal and industrial effluents directly into the rivers. These wastes usually contain a wide variety of organic and inorganic pollutants including solvents, oils, grease, plastics, plasticizers, phenols, heavy metals, pesticides and suspended solids. The indiscriminate dumping and release of wastes containing the above mentioned hazardous substances into rivers might lead to environmental disturbance which could be considered as a potential source of stress to biotic community. As for example, River Ganges alone receives sewage of 29 class I cities situated on its banks and the industrial effluents of about 300 small, medium, and big industrial units throughout its whole course of approximately 2525 kms. Identically Yamuna is another major river, has also been threatened with pollution in Delhi and Ghaziabad area. Approximately 5, 15,000 kilolitres of sewage waste water is reported to be discharged in the river Yamuna daily. In addition, there are about 1,500 medium and small industrial units which also contribute huge amounts of untreated or partially treated effluent to the river Yamuna every day. Similarly many other rivers were surveyed during past two decades with respect to their pollutional status. In addition to domestic and industrial discharge into the rivers, there were continued surface run off of agricultural areas, mines and even from cremation on the river banks. According to a report, over 32 thousand dead bodies were cremated at the major burning Ghats per year in Varanasi alone in the year 1984. The rapid pace of growth of population in India is primarily responsible for the significant increase in the level of pollution of rivers. With the increasing rate of growth of population, the human activities around the bank of rivers also increased, which results in contamination of water. An intimate relationship is found between human number (population) and environment. The impact of population on environment, in general and on rivers, in particular, is harsh. We can understand the effect of population growth on rivers by a simple formula.

The story of remaining rivers of India like the Ganges, the Yamuna, the Godavari and the Gomti is, more or less, same and all have been suffering due to inflow of industrial effluents and sewage for many years. It is submitted that the Small Scale Industries (hereinafter referred as S.S.I.) forms an important sector in Indian economy in terms of contribution to

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production, GDP, exports and employment. The sector accounts for 40% of the industrial production, 35% of the total exports and employs about 167 lakhs persons in about 33.2 lakhs SSI units in the country. The SSI sector manufactures about 7500 types of products. This sector also supplies the lower income groups with inexpensive consumer goods and services as well as machines and the sophisticated requirements of technology based industries in India and abroad. However, due to uncontrolled and haphazard growth, SSI sector is also a significant contributor to environmental pollution in general and river pollution in particular. Therefore, it is necessary to estimate the pollution load from SSI sector, to prioritize the pollution control strategies, to identify the low cost clean technologies and to bring out issues that need to be taken up for effective pollution control policy for SSI sector in India. The level of pollution caused by S.S.I. sector per unit of output is higher than their counterparts in developed countries.

The reasons are:

- Continued usage of outdated and inefficient technologies that gives large amount of wastes
- Large and unplanned industrial conglomeration
- Lack of resources for enforcement and implementation of pollution control performance
- Productivity and environmental performance given a back seat.
- However, SSI units have different reasons for non-implementation of env-standards.
- They operate in very small area (in 100 sq ft area)
- No space for setting up of pollution control systems
- No funds for setting up of pollution control systems
- No guidance available from pollution control Boards/Committees
- Cost effective technologies for pollution control are not available

Some important rivers in India

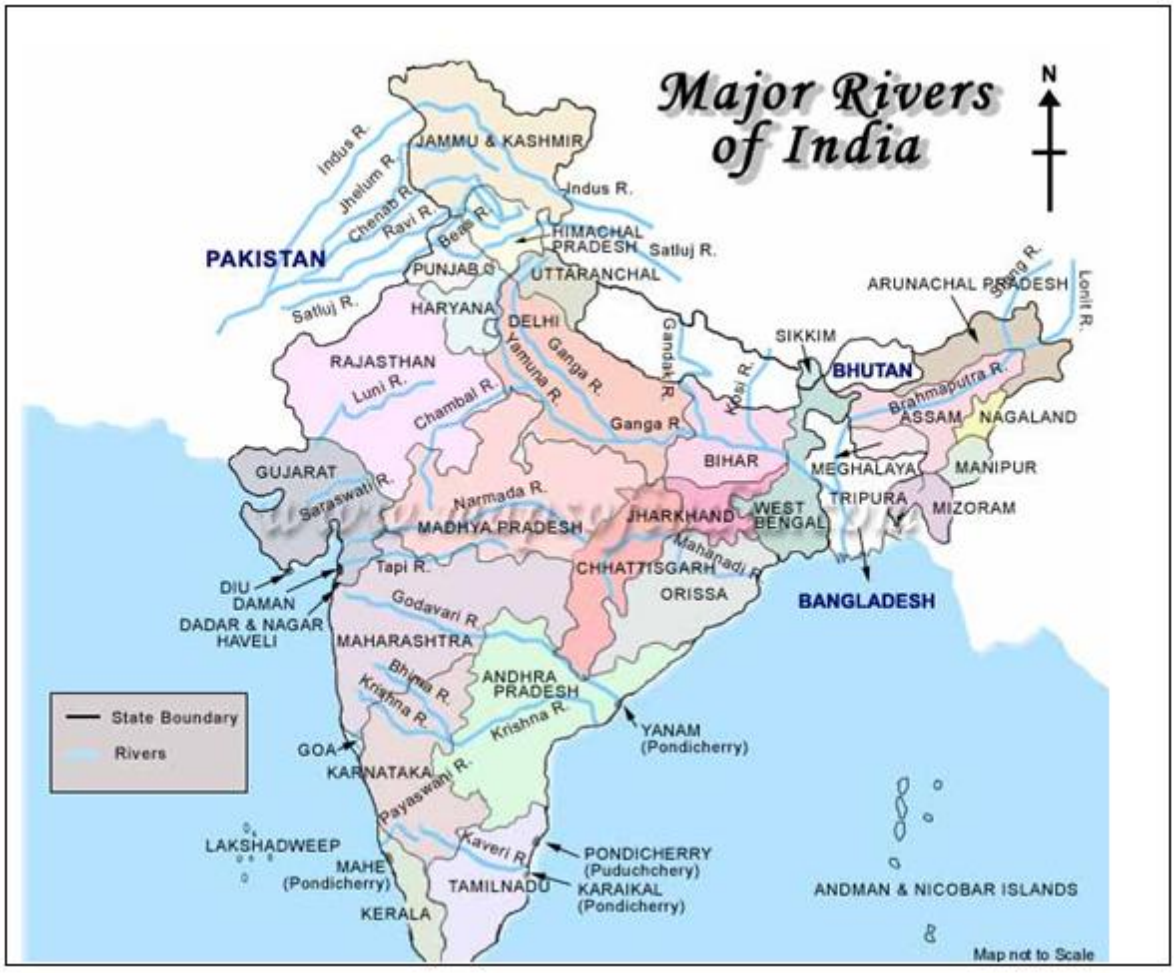
River	Brief Descriptiption
Ganga	The Ganga (Ganges) rises from the Gangotri Glacier in the Garhwal Himalayas at an elevation of some 4100 metres above the sea level under the name of Bhagirathi. This main stream of the river flows through the Himalayas till another two streams – the Mandakini and the Alaknanda – join it at Dev Prayag, the point of confluence. The combined stream is then known as the Ganga. The main tributaries of the Ganga are Yamuna, Ram Ganga, Gomati, Ghaghara, Son, Damodar and Sapt Kosi. The river after traversing a distance of 2525 kms from its source meets the Bay of Bengal at Ganga Sagar in West Bengal.
Brahmaputra	The Brahmaputra originates in the Mansarovar lake, also the source of the Indus and the Satluj. It is slightly longer than the Indus, but most of its course lies outside India. It flows eastward, parallel to the Himalayas. Reaching Namcha Barwa (7757 m), it takes a U-turn around it and enters India in Arunachal Pradesh and known as dihang. The undercutting done by this river is of the order of 5500 metres. In India, it flows through Arunachal Pradesh and Assam, and is joined by several tributaries.
Yamuna	The River Yamuna originates from the Yamunotri glacier, 6387m above mean sea level (msl), at the Banderpoonch peak in the Uttarkashi district of Uttarakhand. The catchment of the river extends to states of Uttar Pradesh, Himachal Pradesh, Haryana, Rajasthan and Madhya Pradesh and the entire union territory of Delhi. The river flows 1367 km from here to its confluence with the River Ganga at Allahabad. The main tributaries joining the river include the Hindon, Chambal, Sind, Betwa and Ken. The annual flow of the river is about 10,000 cumecs. The annual usage is 4400 cumecs, irrigation accounting for 96% of this.
Tapti	The Tapi is a river of central India. It is one of the major rivers of peninsular India with the length of around 724 km; it runs from east to west. It rises in the eastern Satpura Range of southern Madhya Pradesh state, and flows westward, draining Madhya Pradesh's historic Nimar region, Maharashtra's historic Khandesh and east Vidarbha regions in the northwest corner of the Deccan Plateau and South Gujarat before emptying into the Gulf of Cambay of the Arabian Sea, in the State of Gujarat. The Western Ghats or Sahyadri range starts south of the Tapti River near the border of Gujarat and Maharashtra. The Tapi River Basin lies mostly in northern and eastern districts Maharashtra state viz, Amravati, Akola, Buldhana, Washim, Jalgaon, Dhule, Nandurbar, Malegaon, Nashik districts but also covers Betul, Burhanpur districts of Madhya Pradesh and Surat district in Gujarat as well. The principal tributaries of Tapi River are Purna River, Girna River, Panzara River, Waghur River, Bori River and Aner River.
Mahanadi	The Mahanadi River system is the third largest in the peninsula of India and the largest river of Orissa state. The basin (80º30'–86º50' E and 19º20'–23º35' N) extends over an area approximately 141,600 km^2, has a total length of 851 km and an annual runoff of 50X109 m^3 with a peak discharge of 44740 $m^3 s^{-1}$.The basin is characterised by a tropical climate with average annual rainfall of 142 cm (NWDA, 1981) with 90% occurring during the SW-monsoon. The river begins in the Baster hills of Madhya Pradesh flows over different geological formations of Eastern Ghats and adjacent areas and joins the Bay of Bengal after divided into different branches in the deltaic area. The main branches of River Mahanadi meet Bay of Bengal at Paradip and Nuagarh (Devi estuary). The tidal estuarine part of the river covers a length of 40 km and has a basin area of 9 km^2.
Godavari	The river with second longest course within India, Godavari is often referred to as the Vriddh (Old) Ganga or the Dakshin (South) Ganga. The name may be apt in more ways than one, as the river follows the course of Ganga's tragedy. The river is about 1,450 km (900 miles) long. It rises at Trimbakeshwar, near Nasik and Mumbai (formerly Bombay) in Maharashtra around 380 km distance from the Arabian Sea, but flows southeast across south-central India through the states of Madhya Pradesh, Karnataka, Orissa and Andhra Pradesh, and empties into the Bay of Bengal. At Rajahmundry, 80 km from the coast, the river splits into two streams thus forming a very fertile delta. Some of its tributaries include Indravati River, Manjira, Bindusara and Sabari. Some important urban centers on its banks include Nasik, Bhadrachalam, Rajahmundry and Narsapur. The Asia's largest rail-cum-road bridge on the river Godavari linking Kovvur and Rajahmundry is considered to be an engineering feat.
Krishna	The Krishna is one of the longest rivers of India (about 1300 km in length). It originates at Mahabaleswar in Maharashtra, passes through Sangli and meets the sea in the Bay of Bengal at Hamasaladeevi in Andhra Pradesh. The Krishna River flows through the states of Maharashtra, Karnataka and Andhra Pradesh. The traditional source of the river is a spout from the mouth of a statue of a cow in the ancient temple of Mahadev in Mahabaleshwar. Its most important tributary is the Tungabhadra River, which itself is formed by the Tunga and Bhadra rivers that originate in the Western Ghats. Other tributaries include the Koyna, Bhima, Mallaprabha, Ghataprabha, Yerla, Warna, Dindi, Musi and Dudhganga rivers.
Kaveri	The Kaveri is one of the great rivers of India and is considered sacred by the Hindus. This river is also called Dakshin Ganga. The headwaters are in the Western Ghats range of Karnataka state, and flows from Karnataka through Tamil Nadu. It empties into the Bay of Bengal. Its waters have supported irrigated agriculture for centuries, and the Kaveri has been the lifeblood of the ancient kingdoms and modern cities of South India. The source of the river is Talakaveri located in the Western Ghats about 5,000 feet (1,500 m) above sea level. It flows generally south and east for around 765 km, emptying into the Bay of Bengal through two principal mouths. Its basin is estimated to be 27,700 square miles (71,700 km^2), and it has many tributaries including Shimsha, Hemavati, Arkavathy, Kapila, Honnuhole, Lakshmana Tirtha, Kabini, Lokapavani, Bhavani, Noyyal and Famous Amravati.

Environmental education is a learning process that leads to an informed and involved citizenry having the creative problem-solving skills, scientific and social literacy, ethical awareness and sensitivity for the relationship between humans and the environment, and commitment to engage in responsible individual and cooperative actions. By these actions, environmentally literate citizens will help ensure an ecologically and economically sustainable environment. Environmental education is an integral part of a young person's schooling. By requiring instruction in the conservation of natural resources at both the elementary and secondary levels as well as in the teacher preparation programs, the groundwork was laid for an environmentally conscious and responsible citizenry. Because environmental education is interdisciplinary, previous efforts to define discipline centered content standards have not fully captured its essence. Content and performance standards for each of the disciplines have environmental content, yet there is no umbrella document that describes the integration of these disciplinary standards to create curricula that will produce environmentally literate citizens. References have been made throughout this document to the content and performance standards for other disciplines in order to assist with the interdisciplinary approach to environmental education.

- Religious events
- Dams
- Tourism
- Growing Population
- Poverty
- Urbanization
- Industrialization
- Agricultural run-off and Improper Agricultural Practices
- Religious and Social Practices

Consequences of pollution of Ganges River

- More than 420 million people depend on the Ganges River and they will be affected very badly due to the pollution.
- People utilizing the water, no matter if it is consuming the water or just using the water to bathe, wash clothes, they might suffer from water-borne disease such as diarrhea and cholera
- Marine animals living inside the Ganges River will die as a result of poisoning from the pollutants.
- The government has to spend a lot of money to clean up the pollution in the Ganges River, affecting the economy
- Fishing will also be affected as the fish population will decrease due to poisoning from the toxic waste



Causes of river pollution

- Human waste
- Industrial waste

Prevention

- Proper Management and Treatment of Wastewater
- Conserve Water and Use It Effectively

- Promote Wastewater Treatment & Technologies
- Drainage Water Management and Treatment
- Recycling and Reuse of Wastewater
- Financing Wastewater Management Schemes
- Improving the Sewerage System
- Upgrading of Sewage Treatment Plant
- Proper Disposal of Sewage
- Agricultural Practices Improvement
- Environmental Management
- Solid Waste Management
- Formation of Public Toilets
- Formation of Electric Crematorium and Create Awareness
- Formation of Holy Bathing Ponds
- Afforestation
- Canal Formation
- Legislation and Fines
- Awareness among the People

Study Area

Tribeni is located at 22.99°N 88.40°E. Tribeni is a small town in Hooghly in the state of West Bengal, India. It was an old holy place for the Hindus. The sanctity of the place has been recognized for many centuries and has been mentioned in Pavana-Dutam, a Sanskrit piece of the last quarter of the 12th century. The Muslims took it over during early phases of their conquest of Bengal. Tribeni is believed to get its name from the divergence of three rivers, Yamuna, Ganga and Saraswati. The probable earlier names were "Muktaveni", which distinguished it from Prayag, Allahabad, known as Yuktaveni; "Terbonee" was spelled in James Rennell's map of Bengal in 1781. The River Saraswati surfaces from besides the famous Hindu cremate area, commonly known as 'Shashan ghat', towards south west into Saptagram. This leaves the river Ganges, variedly known as Hooghly or Bhagirathi to descend to the sea, along with another holy River, Yamuna engrossed in it.

Objectives

- To measure the environmental awareness level among secondary school students.
- To study the general environmental awareness in river pollution and environmental practices among the school students.
- To know the level of attitude towards environmental awareness on river pollution of secondary students.
- To know the level of knowledge and compare environmental awareness in river pollution among secondary students of rural and urban area in Hooghly district.

Assumptions

1. Secondary students completed class VII.
2. Secondary students are now in class VIII.
3. All the students are age of 13-14years.

Hypothesis

1. There is no significant mean difference in awareness on river pollution among boys and girls students in secondary level.
2. There is no significant mean difference in awareness on river pollution among boys and girls students coming from rural and urban area in secondary level.

Methodology

The following steps and procedure adopted in conducting the study.

Instrument

A questionnaire adapted by self was used to collect data. The 50 item questionnaire focuses on the awareness in river pollution concerns. Each participant completed this questionnaire. The questionnaire addresses four dimensions: Environment, awareness, river pollution and environmental education. Each item contains 1 mark. The validity of the questionnaire was established by a review of three experts in educational technology. Selected items were revised based upon their comments and recommendations. Data were collected from students score.

Data Analysis

The questionnaire was used to assess secondary school student's environmental awareness in river pollution. A paired t-test was used to compare means score of male and female students. A one-way ANOVA was used to compare means among grades. The test was used to identify the source of significant differences at 0.05 level of confidence.

Selection of sample: 10 schools in Hooghly District are selected for data collection.

Type	Male student	Female student	Total
Urban	100	100	200
Rural	100	100	200
Semi-urban	100	100	200
Semi-rural	100	100	200
Total	400	400	800

Variables

- Boys and girls
- Rural area, urban area, semi-rural area and semi-urban area
- Environmental awareness
- River pollution
- Reduction of river pollution

Reliability and Validity of the Tool:

For reliability of the tool, we used Test-retest method. Retest was taken after 20 days and the correlation is 0.911 (r=0.911). At the initial stage we choose 55 items for the questionnaire. After content validation 50 items are drafted.

RESULTS

Table 1. Mean, standard deviation, standard error and t-value for awareness on river pollution of Rural and Urban students (boys and girls) in secondary level of Hooghly District

Group	Sum	Mean	SD	SE	t	p	Remark
Urban-girls	1356	27.12	4.12	0.583	1.387	0.168	At the 0.05 level two means are
Urban-boys	1422	28.44	5.31	0.751			significantly different
Rural- girls	1534	30.68	6.04	0.854	4.352	3.309E-5	At the 0.05 level two means are
Rural- boys	1830	36.6	7.48	1.057			not significantly different

Table 2. Mean, Variance and Percentage of awareness on river pollution of Rural, Urban, Semi-rural and Semi-urban students (boys and girls) in secondary level of Hooghly District

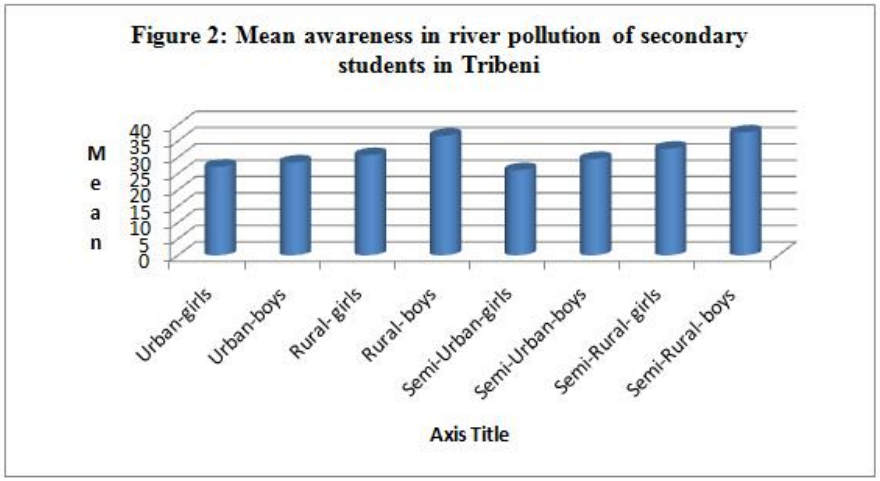
Group	N	Degree of freedom	Mean	Variance	Percentage of awareness
Urban-girls	50	49	27.12	17.005	54.24%
Urban-boys	50	49	28.44	28.251	56.50%
Rural- girls	50	49	30.68	36.548	61.36%
Rural- boys	50	49	36.6	55.959	73.2%

Table 3. Mean, standard deviation, standard error and t-value for awareness on river pollution of Semi-Rural and Semi-Urban students (boys and girls) in secondary level of Hooghly District

Group	Sum	Mean	SD	SE	t	p	Remark
Semi-Urban-girls	1303	26.06	4.96	0.701	3.226	0.0077	At the 0.05 level two means are significantly different
Semi-Urban-boys	1474	29.48	5.61	0.794			
Semi-Rural- girls	1632	32.64	5.66	0.800	3.629	4.54E-4	At the 0.05 level two means are not significantly different
Semi-Rural- boys	1881	37.62	7.87	1.114			

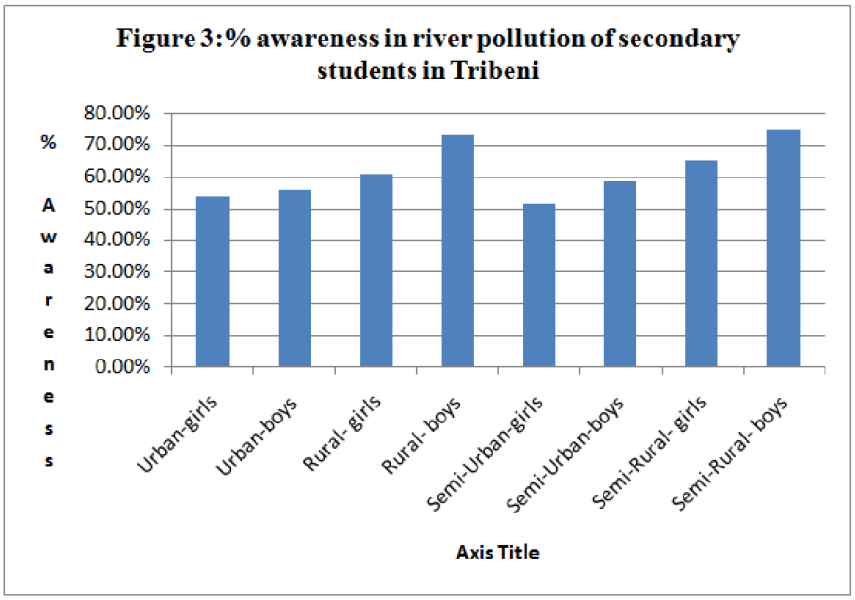
Table 4. Mean, Variance and Percentage of awareness on river pollution of Semi-rural and Semi-urban students (boys and girls) in secondary level of Hooghly District

Group	N	Degree of freedom	Mean	Variance	Percentage of awareness
Semi-Urban-girls	50	49	26.06	24.628	52.12%
Semi-Urban-boys	50	49	29.48	31.56	58.96%
Semi-Rural- girls	50	49	32.64	32.071	65.28%
Semi-Rural- boys	50	49	37.62	62.077	75.24%



Findings from tables and diagram

- Semi-rural-boys have greatest awareness in river pollution awareness.
- Semi-urban girls have lowest awareness in river pollution awareness.
- Rural boys have greater awareness than rural girls in river pollution awareness.
- Urban boys have greater awareness than urban girls in river pollution awareness.
- Semi urban boys have greater awareness than semi urban girls in river pollution awareness.
- Semi rural boys have greater awareness than semi rural girls in river pollution awareness.
- All the secondary students have average awareness in river pollution awareness.



Conclusion

The pollutants include oils, greases, plastics, plasticizers, metallic wastes, suspended solids, phenols, toxins, acids, salts, dyes, cyanides, pesticides etc. Many of these pollutants are not easily susceptible to degradation and thus cause serious pollution problems. Contamination of ground water and fish-kill episodes are the major effects of the toxic discharges from industries. Discharge of untreated sewage and industrial effluents leads to number of conspicuous effects on the river environment. The impact involves gross changes in water quality viz. reduction in dissolved oxygen and reduction in light penetration that's tends loss in self purification capability of river water. Apart from ensuring proper operationalisation of assets created under different schemes, it is need to strengthen mechanism and the capacity of institutions for effective control of water pollution and waste from point source by emphasizing socio-economic measures at the same time as using law enforcement measures.

This study examines the environmental awareness in river pollution of secondary school students in Hooghly District, West Bengal in the basis of intelligence. The study finds that there exist significant differences between awareness in river pollution among secondary student coming from rural, urban, semi-rural and semi-urban area. They have average percentage of awareness in river pollution. Male students have greater awareness in river pollution than female students. Environmental education is essential need for school curriculum to increase the environmental awareness in river pollution.

Limitation of the study

- The study was limited to a few schools.
- The sample of the study was restricted to 800 students only.
- The research was limited only to Tribeni, Hooghly district of West Bengal due to shortage of the time.
- The reliability of the awareness of river pollution scale was determined only by test-retest method due to shortage of time
- Only the content validity of the scale was determined.
- The difference in the mean score of river pollution awareness was found out only by t-test.

Suggestions for future study

- The scale of awareness in river pollution can be standardized on the basis of large samples.
- A similar study can be conducted by including larger samples from various schools of West Bengal or other state of India.
- This work will be applicable on different college and university students.
- Other independent variable like age, cast and religion etc. will be considered for future study.
- The study can be conducted upon common people not only the pupils.

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