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Industrialization in India and drinking Water Quality: A Study

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Introduction

The rapid growth a of human population, rapid industrialization, indiscriminate use of natural resources, our quest for material comforts and new life styles demanding a variety of products and amenities, have led to the environmental pollution, which has become Global phenomenon. But it is neither feasible nor desirable to slow down the pace of development. So, in such condition we should manage our development in such a way that it will not harm our environment. One way in this direction is regular monitoring of environment quality.

Water is the essential constituent of any form of life.

The Water of the earth's surface constitutes the hydrosphere, about 97% of which is tapped in ice glaciers and remaining 1 % is fresh water. Man requires water for variety of purposes including irrigation, industries, livestock management, thermal power generation, fisheries, navigation and recreational activities.

As our communities grow, we notice many visible changes, including housing developments, road networks, expansion of services, and more. These changes impact our precious water resources, with pollution of water resources being one potential impact. Availability of clean and potable water has become a key issue in several developing countries. Growing population and water scarcity is affecting the quality of life significantly; India is no exception to this. Providing water in adequate quantity and quality for domestic water supply, irrigation and industrial requirement in all parts of the country are tremendous challenges. The global water scenario is very much alarming.

The increase in impervious of hard surfaces, (roads, driveways, and parking lots) decreases the amount of water that soaks into the ground. This increases the amount of surface runoff. The impervious surfaces collect and accumulate pollutants, such as those leaked from vehicles, or deposited from the atmosphere through rain or snowmelt. The runoff water carries pollutants directly into water bodies. Because there is less infiltration, peak flows of storm water runoff are larger and arrive earlier, increasing the magnitude of urban floods. Paving may alter the location of recharge, or replenishment, of groundwater supplies, restricting it to the remaining unpaved areas. If infiltration is decreased sufficiently, groundwater levels may decline, affecting stream rows during dry weather periods. Lowered groundwater levels can result in subsequent well failures. While the effects of urbanization on the water cycle can be major, if wise choices are made during the development process, the impacts can be minimized and our future water supply protected (ENVIS, 2005).

Drinking Water Standards

S.No	Parameters	Desirable limits mg/1	Permissible limits mg/1
Essential Characteristics			
1	Colour Hazcn unit	5	25
2	Odour	Unobjectionable	-
3	taste	agreeable	-
4	Turbidity (NTU)	5	10
5	pH	6.5-8.5	No relaxation
6	Total Hardness, CaCOi	300	600
7	Iron (Fe)	0.3	1.0
8	Chloride (Cl)	250	1000
9	Residual Free Chlorine	0.2	-
10	Fluoride (F)	1.0	1.5

Freshwater resources all over the world are threatened not only by over exploitation and poor management but also by ecological degradation. The main source of freshwater pollution can be attributed to discharge of untreated waste, dumping of industrial effluent, and run-off from agricultural fields. Industrial growth, urbanization and the increasing use of synthetic organic

substances have serious and adverse impacts on freshwater bodies. It is a generally accepted fact that the developed countries suffer from problems of chemical discharge into the water sources mainly groundwater, while developing countries face problems of agricultural run-off in water sources. Polluted water like chemicals in drinking water causes problem to health and leads to water-borne diseases which can be prevented by taking measures even at the household level.

Survey of research done in this field - According to the report of Central Pollution Control Board, there were 200C large and medium scale industries in the country which polluted the ground water. Of these only 27% had adequate treatment plants 14% of the industries the treatment units were still under construction. Of the 17% sugar industries, only 6% had effluent treatment plants. The remaining 42% industries were simply disposing the wastes without any sort of prior treatment into the aquatic bodies which were the potential sources of public water supply. They generated enormous problems of water pollution (Trivedy and Goel, 1984).Now 50% of industries simply disposing the waste water without treatment (www. industrial effluents.com). Studies have revealed that some of our major rivers are polluted far beyond the permissible limit prescribed for human use and consumption. The mighty Ganga in the North and Cauvery in the South are also heavily polluted that the once life giving forms have now become a menace to aquatic life and human population. Water pollution is a phenomenon particularly in densely populated industrial cities at India (Babacar et al., 2005). Schueler and Holland (2000) suggested that the effects of urbanization on the water cycle can be major; if wise choices were made during the development process, the impacts could be minimized and our future water supply be protected. Purandara et al (2003) reported that with the rapid growth of population and industrialization in the country, pollution of natural water by municipal and industrial wastes had increased tremendously.

Desirable Characteristic

Dissolved Solids	500	2000
Calcium (Ca)	75	200
Magnesium (Mg)	30	100
Copper (Cu)	0.05	1.5
Manganese (Mn)	0.1	0.3
Sulphate (SO4)	200	400
Nitrate (NO.O	45	100
Phenolic compounds	0.001	0.002
Mercury (Hg)	0.001	No relaxation
Cadmium (C'd)	0.01	No relaxation
Selenium (Se)	0.01	No relaxation
Arsenic (As)	0.05	No relaxation
Cyanide (CN)	0.05	No relaxation
Lead(Pb)	0.05	No relaxation
Zinc (Z11)	5.0	15
Hexavelant Chromium	0.05	No relaxation
Alkalinity	200	600
Aluminum (Al)	0.03	0.2
Boron (B)	1.0	5.0
Pesticides	Absent	0.001

Danilo (1993) reported that the impact on urban areas, with their extensive hardened surfaces and inadequate storm water infrastructure to manage urban runoff, could be significant.

Sheridan et al (1996) reviewed the implications of inadequate provision of water and sanitation on children's health and general development, especially in urban areas. Research into health differentials showed that child mortality and morbidity rate in poor urban settlements was equal or exceed those in rural areas. The chemical composition of ground water

depends upon the soluble products of rock weathering and decomposition and changes with respect to time and space in addition to the external pollution agents (Mariappan et al.. 2000).

Groundwater is a precious natural resource for several vital functions such as for public, industrial and agricultural water supply. It provides drinking water to almost a third of the population and irrigates about 17% of the crop land. Due to the increased demand of water the groundwater is excessively exploited. Now a days ,the increasing effects of pollution on and overexploitation of ground water have become a serious threat.Many workers such as Kaza et al(1991),Ravichandran and Pundarikanthan (1991), Dayal (1992), Ali Akram and Iqbaluddin (1992),Mittal et al (1994),Prasad and Ramesh Chandra (1997), Sambasivarao (1997), Dhembare etal (1998), Tripathi (2003) have been carried exhaustive study on ground water quality.Activities such as indiscriminate disposal of human and agricultural waste, manure spreading over the vicinity of human habitation, housing of livestock, onsite human waste disposal system, septic systems and open defecation etc, are responsible for fecal contamination of ground water in the rural areas of the country.

The American academy of microbiology has showed that the quality of drinking water is declining all over the world mainly because of bacteriological contamination, a significant cause of gastro-intestinal diseases. As a consequence immunity to gastro-intestinal disease following exposure to contaminated water is slowly disappearing. Eric Minz of the US, centre for disease control estimated more than 3 million cases of diarrohea in all over the world per year leading to 10million deaths .

Guidelines for Evaluation of Quality of Irrigation Water

Water class	Sodium (Xa) %	Electrical Conductivity pmhos/cm at 25‘C	Alkalinity hazards	
			SAR	RSC (meq/1)
Excellent	<20	<250	<10	<1.25
Good	20-40	250-750	10-18	1.25-2.0
Medium	40-60	750-2250	18-26	2.0-2.5
Bad	60-S0	2250-4000	>26	2.5-3.0
Very bad	>80	>4000	>26	>3.0

The Central Pollution Control Board (CPCB) identified severely polluted stretches on 18 major rivers in India and a majority of these stretches were found in and around large urban areas. The high incidence of severe contamination near urban areas indicates that the industrial and domestic sectors' contribution to water pollution is much higher than their relative importance implied in the Indian economy. Agricultural activities also contribute in terms of overall impact on water quality. Besides a rapidly depleting groundwater table in different parts, the country faces another major problem on the water front—groundwater contamination—a problem which has affected as many as 19 states, including Delhi. Geogenic contaminants, including salinity, iron, fluoride, and arsenic have affected groundwater in over 200 districts spread across 19 states.

Conclusion - Water as an environmental resource is regenerative in the sense that it could absorb pollution loads up to certain levels without affecting its quality. In fact there could be a problem of water pollution only if the pollution loads exceed the natural regenerative capacity of a water resource. The control of water pollution is therefore to reduce the pollution loads from anthropogenic activities to the natural regenerative capacity of the resource. The benefits of the preservation of water quality are manifold. Not only can abatement of water pollution provide marketable benefits, such as reduced water borne diseases, savings in the cost of supplying water for household, industrial and agricultural uses, control of land degradation, and development of fisheries, it can also generate non-marketable benefits like improved environmental amenities, aquatic life, and biodiversity.

Using available case studies, this survey based research aims to provide an overview of the extent, impacts and control of water pollution in India.

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