Monitoring the Impact of Industrialization on Environment Using Geospatial Technology: A case study of Bhilwara District (Rajasthan)

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Abstract : It is well known that cotton mills produce large amounts of water which is used in various processes such as sizing, desizing, scouring, bleaching, mercerization, dyeing, printing, finishing and eventually washing. Contaminated air, soil and water from industrial effluents are associated with heavy disease burdens (WHO, 2002) and this may be one of the reasons for the current shorter life expectancy in the world (WHO, 2003) relative to developed nations. Some of the heavy metals in these effluents (either in free form in effluents or in suspended solids) from the industry have been found to be carcinogenic (Tamburlini et al., 2002) while other chemicals similarly present are toxic depending on the dosage and length of exposure (Kupchella and Hyland, 1989). These chemicals are not only harmful to humans but also found to be toxic to marine life (WHO, 2002) and may result in food pollution (Novick, 1999). Sulfide and metal contaminants such as fluoride, arsenic, molybdenum, etc. cause many harmful effects on life directly indirectly.

The Bhilwara district of Rajasthan and the surrounding areas are well known for the textile industry. It produces about 75% of the country's textile products. There are about 500 synthetic textile units on the outskirts of Bhilwara on the Chittorgarh, Gangapur and Mandal road involved in dyeing, weaving and spinning, but there is also a dark side. The industry's weak effluent management system has long contaminated areas affecting air, surface, water, agricultural land

and human health. Poisoned Water(2004), a report by the Department of Public Health Engineering, found that most of the open wells in the villages near the Banas River, which lie beside the industrial belt, had chromium, lead, iron, zinc and sodium above the levels set by the Bureau of Indian Standards (Srinivasan,2007). Lead is particularly detrimental to children's brain and nervous systems. These chemicals were identical to those present in the textile waste unit. Experts worry that it will soon reach the city center and begin to make ground water toxic, which is used for domestic purposes. This study therefore analyzes the textile contaminants and their environmental strength of Bhilwara Tehsil in terms of their socio-economic and demographic context. The primary survey included field visits and questionnaires for the analysis. We reviewed a variety of different governmental reports, literature, academic textbooks, and newspapers to learn more about the subject. As stated earlier, steps have been placed in place to reduce the effects of the pollution in the water bodies. There is still a lot of work yet to be completed, although policy formulation and execution remains somewhat on the conservative side.

Key Words: Discharges, for treatment, Waste, sulfate, Agriculture, Textile Industry. Environmental Loss.

Introduction-

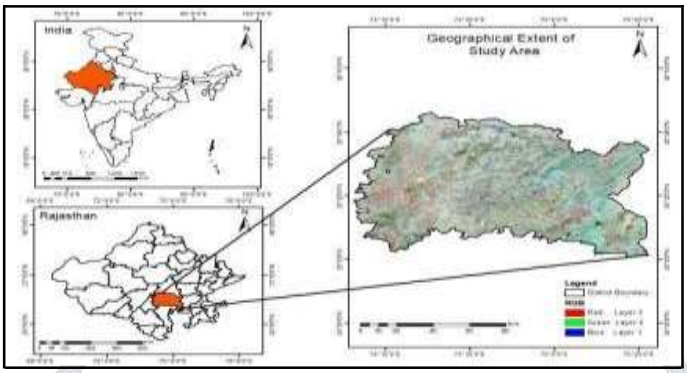
The deterioration of the ecosystem due to the discharge of polluting wastewater from factory sources is a very real issue, albeit in many countries. Even though India is a developed nation, poorer countries like this one will still greatly benefit from better and more affordable care for this disease. Despite the many measures taken to keep the quality of the soil and groundwater clean and secure and despite the many attempts put forward by the municipalities to establish an alternative approach to waste management, the volumes of wastewater continues to increase and municipalities are faced with an urgent need to develop a safe and viable alternative to current practices.

The Textile industry is a major water user as well as water producer because it produces textiles. Increased demand for textile goods, leads to increase in the generation of textile wastewater, which makes the textile industry as a main sources of severe pollution problems worldwide. The method of coloration in printing is called dyeing. The dye is in a liquid solution that is slowly released in water. During the rinsing, that has a large volume of water. Using a special dye to make things pink, will require various chemicals. There are a large number of chemicals used to dye fabrics and there are millions of commercially available dyes that can do the dyeing. For every day that you run your textile factory, you produce 1,000 to 4,000 cubic meters of waste water from your nano-fiber manufacturing sector. There are many harmful poisons that are swirl in the waste water and not adequately handled. If these contaminants aren't properly processed, they can cause a large-scale threat to the environment and health, if left untreated. Wastewater produced during different production steps in a textile mill has a high pH, temperature, detergents, oil, suspended and dissolved solids, dispersants, leveling agents, colour, alkalinity, and toxic and non-biodegradable matter. There are major concerns for toxics and contaminants in textile effluent. It primarily includes recalcitrant organics, colors, toxins and surfactants, and chlorinated compounds . (AOX). While textile wastewater has high chemical oxygen demand (COD), high biological oxygen demand (BOD), low pH and even color, its other parameters are extremely erratic and difficult to regulate.

The study area

The area known as the Bhilwara district is in the south-eastern part of the state of Rajasthan. In the district of 250 00' 00" 38.87 to 250 57' 53.70 North latitude and 740 00' 31.67 to 750 27' 46.25 East longitude are the coordinates of the district. The district's total geographic location is around 10,455 square kilometers. The district of Bhilwara has a population of 2,408,523 according to the 2011 census, of which 1,220,736 and 1,187,787 were male and female, respectively. It is situated in a part of India which is north, west and south-west by the district of Ajmer in the north-west, west and south-west by the district of Rajsamand and also south and

south-east by the district of Chittaurgarh which is east and north-east by the district of Bundi and is a thing of Tonk. From ancient times, the textile industry was known as the Bhilwara industry because most of the people living in Bhilwara worked in this industry. For much of the twentieth century, it has been the TEXTILE DISTRICT of TEXTILE.



Study Area

Over the course of the last decade, the district has grown into a leading position in the textile industry in the region. Bhilwara is a center for the textile industry in the state; it is also known as the "Textile City" In 1978, when the First District Industrial Centre (DIC) was set up, only 1059 small scale industries had registered with it. The number of patients seeking support has increased to 1,373 patients. The city of Bhilwara accounts for approximately 47% of the net agriculture value gained from textiles in Rajasthan. There is presently 22 plants processing tobacco and 8 plants manufacturing dyes in Bhilwara. Besides textiles, building bricks, manufacturing bricks, electrical conductors, tractors, compressors & motors, china clay, 'Hozari' goods, fertilizers, & 'Niwar' industries are other main industries in Bhilwara. This industry takes a lot of water and generates about fifty percent more than six million litres of effluent per day.

Industrialization undergone a tremendous boom in Bhilwara district.

- Industrial growth of Chambal district started in the time periods of 1946, 1951 and 1957.
- At the turn of the first century . (before 1914)

- Industrialization between the First World War and the Second World War (1914 - 1945)
- The era between WWII and the "Plan" saw an economic development (1945 - 1951)
- The proposed industrial growth was during the plan (since 1951).

Status of the Textile industry in Bhilwara

In Bhilwara district, about 300 small and large textile factories of about 7000 power looms in which 22 crores meters of synthetic fabric, 18,342 metric tonnes of certified cotton yarn, 38,778 metric tonnes of chemical, man-made and synthetic yarn as well as carpet yarn are being produced. Synthetic fabrics have been the fastest growing industry in the world, particularly in India (1.90 crore metre of cloth per month). These two small mills in the area are very cooperative as they manufacture cotton thread for quality show purposes. The largest group in the field of synthetic textiles is L. N. J. (Lakshmi Niwas Jhunjhunu Wala) in which 5 industries are located namely B.S.L., Bhilwara spinners, Bhilwara Spinners & Weaving Mills Mandpam Bhilwara Processors, Rajasthan Spinning & Weaving Mills and Khari Gram (Mayur).

Table 3: Volume Transferred versus Expected Return for Different Sectors in Textile Industries.

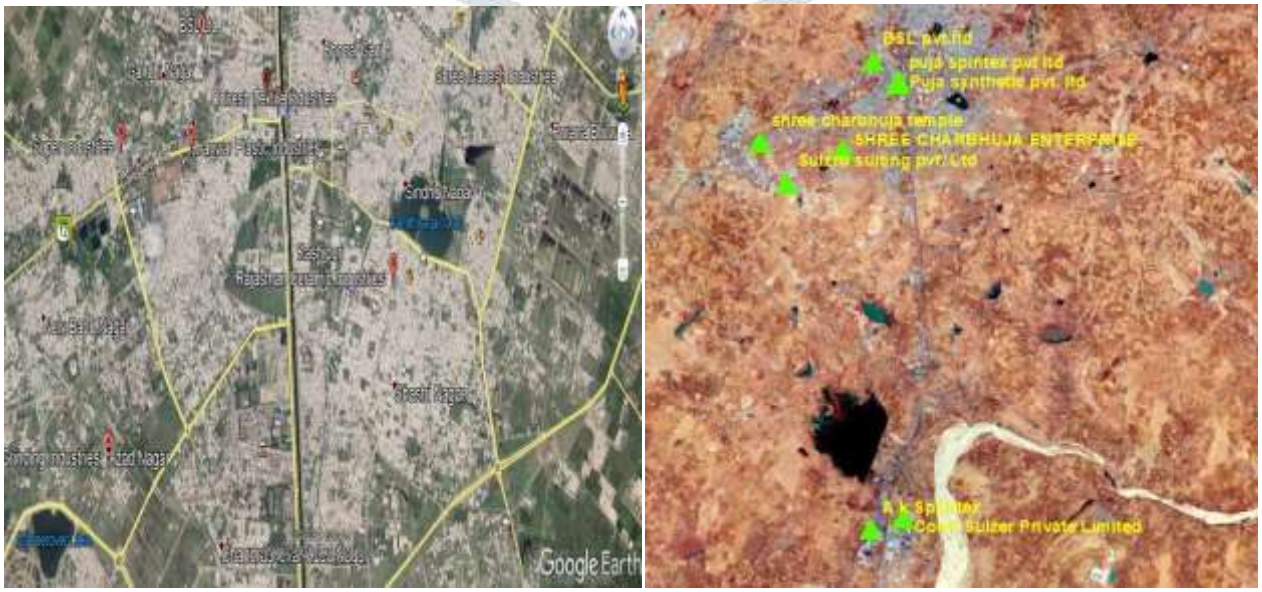
S. No.	Item	No. of Industries	Invested Amount (In Crores)	Planned Amount (In Crores)
1	Cotton Thread	35	62	5300
2	Synthetic Yarn Construction	03	298	8393
3	Wool Worsted Yarn	04	71	980
4	Synthetic Thread	05	124	1467
5	Synthetic Cloths Weaving	32	58	1800
6	Processes House	18	68	4200
7	Total	97	681	22140

Source: MSME, Bhilwara

Stages of Thread Construction

- To begin, staple rays are prepared in order to warp strands of yarn into threads.
- The fibers were moderately inhaled.
- Allowing the yarn to take up more or less space.
- Bending and linking together, long fibers are made of silver.
- Weaving several times through the silver to make a fabric.
- Wound the full ball of yarn on a bobbin.

Industries in Bhilwara-



Environmental impacts

Any industrial activity produces emissions in some form or another. The cotton textile and manufacturing industry is similar. On the environmental & health issues, one has to understand what effect the e-cigarette industry has on the environment, the surrounding areas, and the human body. While theoretically the processes used in processing textile city Bhilwara is 40 years old, it is slowing down our progress in cleaning the air. The goods being manufactured by these factories are not collected and disposed of at the designated locations. Areas of land in the center of forests have now become barren due to the contamination of the water from factories. Groundwater is also being slowly contaminated in combination with leaching into the ground. In our primary survey it was discovered that the water in the well had become salty and simple instead of being clean and pure.

Pollution

A primary process in cotton and wool processing produces gaseous emissions. Ultrafine particles that are inhaled have been described as the second greatest pollution concern (after air quality) for the textile industry. There have been some speculations about the quantities of air pollution released into the atmosphere from textile factories. However, though in poor quality, emission data for textile factories is not readily available. Air pollution can be most challenging to sample, test, and quantify, which makes it the biggest challenge to study. There are boilers at Textile mills that contain nitrogen and sulphur oxides. There are plenty of other pollutants in textile activities, including resin finishing and drying (production processes like dip-dyeing), but what we concentrate on here has to do with wastewater treatment plants.

Land Pollution

The land which has had its soil tainted by this chemical and which is irrigated with water from this polluted water transforms into barren land. This shows that toxic chemicals, used by the industry, is dangerous for the environment, and must be controlled before you release it

directly. Even, these contaminants dissolved into the ground water and are now polluting the ground water and wells. The crops that would flourish in the soil have been lost due to the use of this water in irrigation. The situation is even worse in the adjoining village around Kothari near Bhilwara, where these contaminants are affecting human health by entering in the food chain. It has been recognized that land productivity has been significantly eroded from the pollutants that have leached into it.

Water Pollution

The water coming out of the terrible method houses has poor particles and should be "drawn" off. With the polluted water along with the muddy water flowing through the river Banas, the states project essential Bisalpur water project is affected. In method, there are around 75 S tenter machines engaged in 18 processing units that uses approximately 2 million of liters of water per day. There is a drinking water shortage in this town because the rate of heavy use of this water is much higher than the rate of depletion of its aquifer. As a result of this, ground water is dwindling rapidly.

Granting the fact that both the major rivers of this region, the Banas and the Kothari are in the grip of serious problem of this water pollution. Although the water department in the village chose not to implement the new water scheme, Harni Mahadev did not think he could not go and implement it, hence he could not. When big factories pollute the river they are destroying the ecosystem because millions of gallons of contaminated water are being polluting these rivers every day.

Physical and chemical parameters of Textile Waste Water

S. No.	Parameters	Textile waste water	Standards(ISI 2490-1981)
1	Colour	Brownish-Black	
2	Odour	unpleasant	
3	Ph	8.3	5.5 to 9.0
4	BOD mg/L	350	100
5	COD mg/L	770	
6	TDS mg/L	2352	2100
7	TSS mg/L	270	200
8	Oil & grease	60	10
9	Iron mg/L	0.37	
10	Manganese mg/ L	0.07	
11	Sodium mg/L	520	5(ISI 2490)
12	Potassium mg/L	24	60(ISI 2296)
13	Calcium as Ca mg/L	62.4	75
14	Magnesium as Mg mg/L	61.5	50
15	Total Hardness	408	
16	CaCO3 mg/L	378	600
17	16 Chloride mg/L	348	1000

Measures to Control Pollution

Factories that emit toxins may be set up in an isolated region to help reduce the impact of emissions on the atmosphere. Either the climber has not mounted the plant, or they have not used the plant to help avoid cabin fever. Besides these plans, the government is prioritizing steps to further regulate emissions from the textile industry.He process chemicals to boost flow and process dependent control so that the other by treating chemicals before discharging by biological treatment.

Conclusions

In this new competitive world, the factories are maximizing their profits rather than concentrating on the environmental issues and this can be seen in the Bhilwara District too. This industry plays an important role as a major producer of the textile sector here. Not only it is a single producer, but also discharges untreated waste water containing heavy materials like arsenic, cadmium, Sulphur and nitrogen peroxides. This emission continues to deplete the ozone even though our country has set guidelines for the units. With a changing world climate, the situation will get worse in the future which will impact the biotic population and the environment as a whole.

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