WATER POLLUTION AND ITS IMPACT ON HUMAN HEALTH: A STUDY OF RISK AND VULNERABILITY ASSESSMENT WITH SPECIAL REFERENCE TO SIPCOT TUTICORIN

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Abstract

In India, Tamil nadu is one of the most preferred states for industrialists. Because it has enormous count of natural resources. But due to environmental pollution, natural resources. Such as air, water, and land are vehemently affected. Compared to the other components water is severely affected by industrial pollution. In this context the present study is try to find out the losses of human health and natural resources like water. This study is based on both primary and secondary data. Details report has been made with regards to effluents discharged from industries in and around Thoothukudi region.

Keywords : *Environment, Poverty, Health,*

Introduction

The Economy of India is the seventh largest in the world by nominal GDP and the third largest by purchasing power parity with approximately 7 per cent average growth rate for the last two decades. India needs the path of high economic growth quickly, which is essential because it will generate huge revenue for the government which can be utilized for social welfare and infrastructure program. But rapid growth is not enough; it must be of the environmental friendly nature. Many countries across the world have not taken into account the consequences of some environmental issues such as air and water pollution, climate change, energy use and natural resource depletion. In a recent global assessment approximately 60 per cent of the world's ecosystem services were found to be degraded or used unsustainably.

Environmental problems in India

In developing countries, forests, lakes, rivers and oceans provide a significant share of households' diets, fuel and incomes and represent a precious safety net in times of crisis particularly for 78 per cent of the world's extreme poor who live in rural areas.The integrity and functionality of these vital natural assets, however, are increasingly compromised. 60 to 70 per cent of the world's ecosystems are degrading faster than they can recover. There are many environmental issues in India. Air pollution, water pollution, garbage, and pollution of the natural environment are all challenges for India. The situation was worse between 1947 through 1995. According to data collection and environment assessment studies of World Bank experts, between 1995 through 2010, India has made one of the fastest progresses in the world in addressing its environmental issues and improving its environmental quality. Still, India has a long way to go to reach environmental quality similar to those enjoyed in developed economies. Pollution remains a major challenge and opportunity for India. Environmental issues are one of the primary causes of disease, health issues and long term livelihood impact for India. (Rajive Chopra, 2016)

India is facing an alarming rate of environmental degradation. India is the sixth largest and second fastest country in producing the Green house gases. Three largest cities in India are considered as the most polluted cities in the world.The recent World Bank report estimates that environmental degradation is costing India around 5.7per cent of its GDP every year. The report, "Diagnostic Assessment of Select Environmental Challenges in India" is the bank's first national economic assessment of environment-related degradation in India. It analysed the losses of environmental health and natural resources, and provided a valuation of biodiversity and ecosystem services in India, among other valuations.

Environmental Problems in Study region

In India, Tamil Nadu is one of the most preferred states for the industrialists, because it has enormous natural resources. But due to environmental pollution, natural resources such as air, water, and land are severely affected. Compared to the other components, water is severely affected by industrial pollution. It is found that one third of water pollution comes in the form of effluent discharges, solid waste and other hazardous waste. (Seema Sharma, 2003) Industrial sector is the secondary sector in India which provides a lot of employment opportunity to the entire society. But the recent industrialization has negatively affected the Domestic and Agriculture sectors because of pollution.

Tuticorin is one of the important districts which have a large number of red category industries. It has 49 large scale, 17 medium scale and 193 small scale red industries. (CPCB, 2010) Due to the extreme growth of the industrialisation, the city of Tuticorin is worst affected by air and water pollution. Along with the growth of industry, environmental problems also have grown in the city and this creates several healths hazards. Industries have offered considerable employment opportunities but the waste discharges from these industries threaten the environment, both aquatic and surface. The Central Pollution Control Board (CPCB) report on National Ambient Air Quality Status 2008 reveals that the two air pollution monitoring stations in Tuticorin — Fisheries College and AVM Jewellery Building — were ranked fourth and fifth in the country's top ten locations with respect to SO2 in residential areas, whereas it was in the sixth and seven position in 2007. Except the three stations of Tuticorin, all the stations in the State were categorised as “low polluting” with respect to SO2 by the TNPCB. (TNPCB, 2010)

Pollution of groundwater resources has become a major problem today. The pollution of air, water, and land has an effect on the pollution and contamination of groundwater. The solid, liquid, and the gaseous waste that is generated, if not treated properly, result in pollution of the environment; this affects groundwater too due to the hydraulic connectivity in the hydrological cycle.

There are two Industrial Estates in Tuticorin district, one at Kovilpatti with 11 units and the other at Tuticorin with 20 units. The former is managed by SIDCO and the latter by SIPCOT. Small Scale Industries such as match industries, food-based and metal-based industries are generally concentrated in Kovilpatti and Tuticorin taluks.

Tuticorin ground water perspectives report pointed out there are a large number of industries in Tuticorin, but most of them dump their waste into the sea. Thus there is no big ground water pollution in this region. But NEERI report 1998, 2003 and Community Environmental Monitoring 2010 pointed out a series of ground water pollution in the SIPCOT region of Tuticorin district.

Surface Water pollution in Meelavitan Village

Kalangarai streams flows in Meelavittan village, only in the raining season water flow in the streams. The regional people told that, during the period of raining Sterlite industry dump their effluent in this stream. In early period they used this stream water for agriculture,but now days they are not able to use it because of water pollution. Earlier people of this village rearing their cattle’s in this region, but at present most of the cattle’s were died due to drunk the chemical contaminated stream water.

Water taken from the Kalangaraiodai on the Eastern Side of the Sterlite Unit, between the Factory and Meelavitan Village

S.No	Parameter	Results (mg/l)	Standards (Comparision with the permissible limits as per IS 10500, 1991R. 1993 Ist Rev.)	Number of times the results are above the limits
1	Turbidity	1240	10	124
2	Electrical conductivity @25C (Micromhos/cm)	7500	3 Micromhos/cm	2500
3	PH	7.46	6.5-8.5	
4	TDS	5100	2000	2.55
5	Total Hardness	2337	600	3.895
6	Calcium Hardness	1815	NA	---
7	Magnesium Hardness	522	NA	---
8	Magnesium	127	100	1.27
9	Calcium	726	200	3.63
10	Alkalinity	253	600(Unpleasant taste when above 200)	Unpleasant taste
11	Chloride	1003	1000	1.003
12	Sulphate	2200	400	5.5
13	Fluride	4.76	1.5	3.17
14	Iron	2.43	1	2.43

Source: Community Environmental Monitoring, 2010

It clearly noted that the stream is severely polluted by the industrial effluent. It shows that the level of TDS, EC, Turbidity, Calcium, Iron, Fluoride etc… exceeds the IS standards.

Effects on human health

There is a greater association between pollution and health problem. Industrial pollution is a major factor causing the degradation of the environment. Industries release many toxic effluents into water bodies. An ecological study was conducted to generate data for possible correlation between industrial effluent in river water and health problem among river-side inhabitants. The following table shows number of people died caused by various reasons in Melavitan village.

S.No	Causes for death	No. of People in Meelavitan Village
1	Heart problem	6
2	Cancer	1
3	T.B	3
4	B.P	1
5	Accident	2
6	Unknown reason (Health problem unknown)	2
7	Old age	10
8	Sucide	0

Source: Ankanwadi Census 2007-2011

The above table clearly indicated during 2007-2011 six people died due to heart problem. Heart problem is closely associated with air pollution. In addition to that three people died T.B, one person died due to Cancer and large number of people affected by these kinds of disease.

Incidence of Death Age Wise Distribution

Environmental degradation and pollution is estimated to cause up to 234 times as many premature deaths as occur in conflicts annually, highlighting the importance of a healthy environment to achieving the 2030 Agenda for Sustainable Development, according to a new report released at the second United Nations Environment Assembly.

Health status of Meelavitan Village

Year/ Age group	20-30	30-40	40-50	50-60	60 & above
2007		1		1	2
2008	1		1	1	1
2009			1	1	7
2010	1	1	1	1	1
2011 May		1	1	1	

Source: Ankanwadi Census

The World Health Organization (WHO) defines life expectancy as; "the average number of years a person is expected to live on the basis of the current mortality rates and prevalence distribution of health states in a population". In India Life expectancy age is 68. But in this village during 2007-2011 fifty six percentage of people were passed away below the average life expectancy age of our country. The main reason for this problem is industrial pollution.

Conclusion

For analyzing the above information's it founded that regional people surrounding the Tuticorin area has faced several problems due to the industries. There are number of industries providing employment to people but the externalities from the industry adversely affect the people. Sterlite is a large scale industry located in the SIPCOT area. More than 60per cent of the SIPCOT region is occupy by this industries alone. The industrialist pointed out they provided lot of employment opportunity, free training courses, free medical facilities, gifts, donation etc… and we earn more foreign exchange we actually developed the region. But one of theserious problems of this industry is the disposal of large quantities of waste generated from the industrial processing. Improper disposal of the effluents and toxic air emissions and sludge waste affects environment. Toxicity and environmental effects of industrial wastes particularly for their effect on soil properties and ground water it intern affects agricultural production, ecology, employment, human health etc. Could we say is it the development? Is it economic progress on social progress? Whether the fruits of the development enjoyed by the regional people? The answer for the question is 'No'. This industry provided employment opportunity, but it provided only blue scholar job, most of the white scholar job belongs to other states. We couldn't justify the pollution is the cost for development.

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