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Assessment on Industrial Area's Land and Groundwater Quality Deteriorating in Tamil Nadu

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Abstract

According to a recent report by the Delhi-based think tank Centre for Science and Environment (CSE), groundwater is growing more polluted in Tamil Nadu's industrial zones, and Vellore is the state's most polluted district in terms of river pollution. Tamil Nadu CEPI results were evaluated by CSE. Following the source, pathway, and receptor approach, the CEPI (Comprehensive Environmental Pollution Index) is a logical number that describes the environmental quality at a specific site. A rise in CEPI score indicates negative consequences on the receiving environment. It was discovered that five industrial clusters in Tamil Nadu had water scores of greater than 50. According to the CEPI water score 2018, three of these Vellore-North Arcot, Manali, and Tiruppur were "critically polluted," while two of them, Cuddalore and Coimbatore, were "severely polluted."

Keywords: *Environmental Impact, Ground Water, Industrial Cluster, Comprehensive Environmental Pollution Index.*

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Introduction:

Groundwater is used as a potential source of drinking water because it is widely acknowledged to be safe for human use. All changes in water quality are primarily caused by agricultural development, urbanization, and industrialization. Evaluation of water quality is crucial before allocating to different purposes in order to meet the growing demand for water. Water quality has only become as important as water quantity in the last three decades of the twentieth century due to the extreme concern for it.

According to the WHO, polluted water is the root cause of nearly 80% of all human diseases. Once contaminated, groundwater cannot be restored to its original condition by removing the pollutants at the source. Therefore, it is crucial to regularly check the standard of groundwater. Due to their poor biodegradability and harmful consequences, heavy metals have received a lot of attention when it comes to polluting groundwater.

The water from the sources, such as streams, falls, lakes, hand pumps, open wells, and bore wells, is tainted with domestic, agricultural, and industrial pollutants and is prone to induce diseases associated with drinking water. Bullard deduced that unhealthy socioeconomic conditions are always the result of surface water pollution.

Review of Literature:

A thorough evaluation of the available literature was conducted by consulting reputable journals, reference works, and conference proceedings. The key research done by various researchers is outlined below. According to the WHO, the parameters pH, sodium, potassium,

carbonate, bicarbonate, and chloride are all within acceptable limits, however the values for calcium, magnesium, and nitrate are beyond the limit. The SAR, RSC, and percentage sodium computed values show that the irrigation water is excellent to good quality.

In Tumkur Talk, Karnataka State, India, C. R. Ramakrishnaiah et al. evaluated the groundwater's water quality index. Sami G. Daraigan and colleagues conducted a linear correlation analysis study of drinking water quality data for Al-Mukalla city, Hadhramout, Yemen, and the results showed that all the physicochemical parameters of drinking water in Mukalla city are somewhat correlated with one another.

Statement of the study:

In now days due to increase in population, industrialization, agricultural activities and urbanization, large quantities of sewage and industrial wastewater are discharged into water bodies has significantly contributed to the pollution of the surface and ground water.

Ground water quality, especially in areas that immediately surround industrial zones are of increasing interest owing to the nearing proximity of residential zones. Vellore, the most polluted district in Tamil Nadu in terms of river pollution, was home to 240 tanneries, 17 red category industries and small-scale chemical industries, according to CSE.

Objective of the study:

The objective of the present study was to assess water quality of various ground water sources in India for drinking and agriculture. For the assessment of water pollution status of the water bodies, the

following water quality parameters were analyzed:

1. To analysis the land degradation level in industrial areas of Tamil Nadu.
2. To assess ground water level in the industrial clusters
3. To see policy and suggestion to improve the levels of land and water sources.

The suggested measures to improve the ground water quality includes total ban on the activities that causes pollution, avoid use of pesticides and prevent entrance of sewage in to ground water.

Methodology of the study:

In this study the secondary published data have been used form Centre for Science and Environment (CSE), from the database the land and ground water parameters are determined to draw a conclusion on the quality of water whether it is good or unfit for drinking purpose. Statistical analysis of (Comprehensive Environmental Pollution Index) parameters of land and water has been reported from the different parts of Tamil Nadu and India.

A CEPI individual score of 60 and above denotes an industrial area to be a ‘critically polluted area’ and a score between 50-60 denotes it to be a ‘severely polluted area’. The CEPI water score of Vellore-North Arcot was 65.25 in 2009. This increased to 75 in 2018. Manali had a CEPI water score of 59 in 2009, which increased to 72.25 in 2018. Tiruppur had a CEPI water score of 50.75 in 2009, which increased to 65 in 2018.

Results and Discussion:

Partially treated industrial effluents, combined with sewage and other wastes were being discharged directly into surface water according to the study, Assessment of groundwater quality in some towns of Vellore district, Tamil Nadu, India. This had caused severe groundwater pollution in the industrial belt. The most serious pollution threat to groundwater was from calcium, chloride and iron that are associated with sewage and pollution from tannery waste.

Table – 1: Water polluted industrial clusters in Tamil Nadu CEPI surface water score

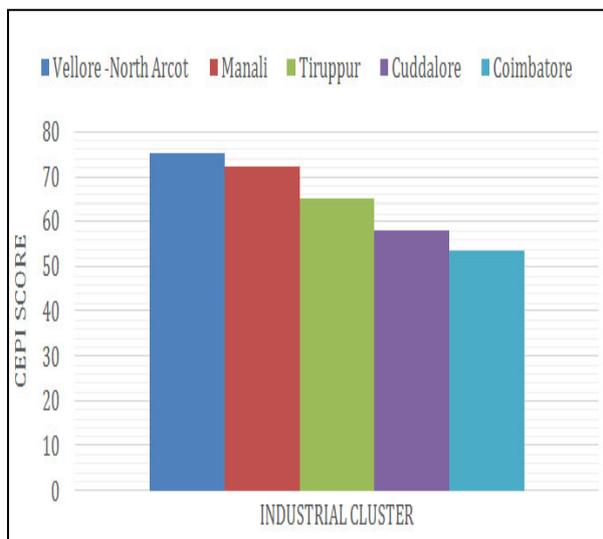
Sl. No.	Name of Polluted Industrial Areas (PIAs)	Water	Category
1	Vellore - North Arcot	75.00	Critically Polluted
2.	Manali	72.25	Critically Polluted
3	Tiruppur	65.00	Critically Polluted
4	Cuddalore	58.25	Severely Polluted
5	Coimbatore	53.75	Severely Polluted

Source: Centre for Science and Environment (CSE)

The above table shows that the results are critically and severely water polluted industrial clusters in Tamil Nadu CEPI

surface water score. The CSE also found that five industrial clusters in Tamil Nadu had a land score of more than 50. For arriving at land score, ground water and soil quality was considered.

Figure – 1: CEPI Surface Water Pollution Score



Source: Centre for Science and Environment (CSE)

Four of the five clusters Manali, Mettur, Tiruppur and Tuticorin fell under the ‘critically polluted’ category and one industrial cluster (Erode) fell under the ‘severely polluted’ category with respect to groundwater and soil pollution. The land score of the Manali industrial cluster was 58 in 2009. This increased to 71.75 in 2018. Tiruppur had a CEPI land score of 53 in 2009, which increased to 64 in 2018. Mettur had a land CEPI score of 46.5 in 2009, which increased to 69.38 in 2018. Erode had a CEPI score 43.5 in 2009, which increased to 52.75 in 2018.

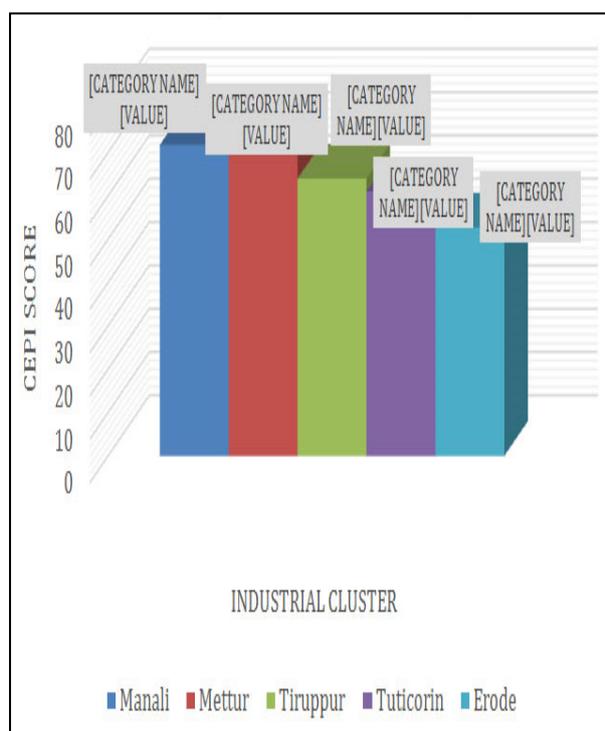
Table – 2: Land polluted industrial clusters in Tamil Nadu CEPI (Groundwater and soil score)

Sl. No	Name of Polluted Industrial Areas (PIAs)	Land Score	Category
1	Manali	71.75	Critically Polluted
2	Mettur	69.38	Critically Polluted
3	Tiruppur	64.00	Critically Polluted
4	Tuticorin	61.00	Critically Polluted
5	Erode	52.75	Severely Polluted

Source: Centre for Science and Environment (CSE)

The above table shows that the results are critically and severely land polluted industrial clusters in Tamil Nadu CEPI. The Manali industrial area was one of the most polluted areas identified by the Central Pollution Control Board (CPCB). About 300 industries had come up in this area, including chemicals, plastics, petrochemicals, refineries and fertilizers. Some well-known industries like Madras Fertilizers Ltd, Madras Petrochemicals Ltd and Madras Refineries Ltd had also flourished in the area during recent years.

Figure – 2: CEPI Land (Ground Water & Soil) Score



Source: Centre for Science and Environment (CSE)

Conclusion:

The study Assessment of heavy metal contamination in soils around Manali industrial area showed heavy metal pollution in the area and found that had resulted in ground water and pollution. Manali was extremely contaminated due to several years of random dumping of hazardous waste and free discharge of effluents on land by industries. The high number of toxic metals in the environment might have also caused an increase in their presence in groundwater as a result of leaching. CEPI was a tool developed by the CPCB in 2009 to identify the problematic industrial areas in the country. In 2009, 88 industrial clusters were notified as polluted industrial areas.

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