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A Comparative Analysis of Water Samples at Vatva and Odhav Industrial Areas, Ahmedabad

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Abstract: ***Water is the most essential and basic necessity for the living world. Vatva and Odhav are the industrial areas located in the Southern and South –East outskirts of the Ahmedabad city respectively. Vatva and Odhav industrial units supply drugs, chemicals and Engineering parts to various cities of India. Vatva has been divided into different phases. The development of Vatva and Odhav industrial areas doesn't have proper management for disposal of water effluents. The effluents are thrown into the open, thus polluting the water and soil. The water samples were collected in March, June and August, 2011 respectively. The physical parameters like pH and Electrical Conductance were carried out and results were analyzed. The chemical parameters like Total Hardness, Chlorinity and Calcium hardness were also carried out and results were also analyzed. The water samples showed high level of TDS and salinity pointing towards the poor condition of water. The water bodies like ponds, lakes and rivers are polluted in due course causing water pollution. The polluted water also degrades the agricultural land. Many rivers receive heavy flux of sewage, industrial effluents, domestic and agricultural wastes from simple to highly toxic hazardous chemicals. Further analysis and study is required for sustainable development of future projects.***

Keywords: Pollution, TDS, toxic

I. INTRODUCTION

The planning for the mushrooming industry was/is not proper. It created a number of problems. This intensified the situation leading to horrendous mishaps like acid rains and plundering leakages of lethal gases from industrial units.

Growing industrial establishments without proper attention on Pollution control have resulted adverse impact on the local Environment in the city like Kathmandu[1].

As water is one of the most important compounds of the ecosystem, but due to increased human population, industrialization, use of fertilizers in the agriculture and man-made activity, the natural aquatic resources are causing heavy and varied pollution in aquatic environment leading to pollute water quality and depletion of aquatic biota.[2]

The problem of environmental pollution on account of essential industrial growth in practical terms is the problem of disposal of industrial water, whether solid, liquid or gaseous[3].

On a daily basis, untapped water led pollutants from factories all over India damage the urban Environments in which millions live.

A pure, unpolluted river is the guarantee of a bumper crop and a healthy nation. It is however paradoxical that this lifeline of human civilization has been brutally assaulted for irrational economic gains. Unplanned industrialization and modernization, disregards of religious outlooks, over-exploitation of natural resources, lack of ecological education and population explosion have all resulted in degradation of aquatic ecosystem all over the world[4]

Rapid industrialization, unplanned urbanization and extensive use of artificial chemicals have led to varied extent of pollution in aquatic environments leading to deterioration of water quality and depletion of aquatic fauna[5]

Maharashtra & Gujarat are the brightest jewels in India's industrial crown. But impressive industrial growth fails to hide the grim realities of environment pollution. The civil society is struggling to draw public attention to the impending damage to environment & public health.

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The effluents from Vatva and Odhav industrial zone directly affect the growth of plants and indirectly affect human beings. People working at Vatva and Odhav industrial zone are prone to various types of diseases, which they are unaware.

II. AIMS AND OBJECTIVES

- To collect water samples from different sites of Odhav area.
- To collect water samples from different sites of Vatva area.
- To study the physical and chemical parameters in collected water samples.
- To analyze and compare the data.

III. METHODOLOGY

- Water samples were collected from different sites from Odhav area.
- Water samples were collected from different sites from Vatva area.
- Physico-chemical parameters were calculated using Argentometric & EDTA methods.

IV. OBSERVATION TABLES

Table-1
Chemical parameters of water samples- Odhav area

Sr. No	Total Hardness (mg/l)	Calcium Hardness (mg/l)	Magnesium hardness (mg/l)	Chorinity (mg/l)
Sample 1	220	288	68	258
Sample 2	204	264	60	283
Sample 3	300	120	188	255
Sample 4	332	256	76	326
Sample 5	40	260	220	141
Sample 6	256	152	104	252
Sample 7	220	60	160	252
MEAN	**225**	**200**	**125**	**252**

Table-2
Physical parameters of water samples- Odhav area

Sr. No	pH	Conductivity (ms)	TDS (ppm)	Salinity (mg/l)
Sample 1	8.3	1.68	1176	466
Sample 2	8.54	1.62	1134	511
Sample 3	8.44	1.53	1071	461
Sample 4	8.0	1.99	1393	560
Sample 5	8.15	0.24	168	255
Sample 6	8.13	1.49	1043	454
Sample 7	8.2	1.63	1141	454
MEAN	**8.25**	**1.45**	**1018**	**452**

Table-3
Chemical parameters of water samples- Vatva area

Sr No	Total Hardness (mg/l)	Calcium Hardness (mg/l)	Magnesium hardness (mg/l)	Chorinity (mg/l)
Sample 1	540	268	272	368
Sample 2	252	200	52	448
Sample 3	100	160	60	419
Sample 4	164	280	116	397
Sample 5	60	600	540	439
Sample 6	500	440	60	510
Sample 7	428	148	280	538
Sample 8	204	372	168	496
MEAN	**281**	**309**	**194**	**452**

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Table-4
Physical parameters of water samples- Vatva area

Sr No	pH	Conductivity (ms)	TDS (ppm)	Salinity (mg/l)
Sample 1	1.4	5	350	666
Sample 2	8.5	2.9	20300	810
Sample 3	1.6	1.83	1281	756
Sample 4	8.8	2.6	1820	716
Sample 5	8.94	1.6	11200	792
Sample 6	6.5	15.7	10990	920
Sample 7	7.62	71	49700	971
Sample 8	8.13	3.7	2590	895
MEAN	**6.43**	**13.04**	**6066**	**816**

Chart of water samples (Chemical Parameters)- Odhav area

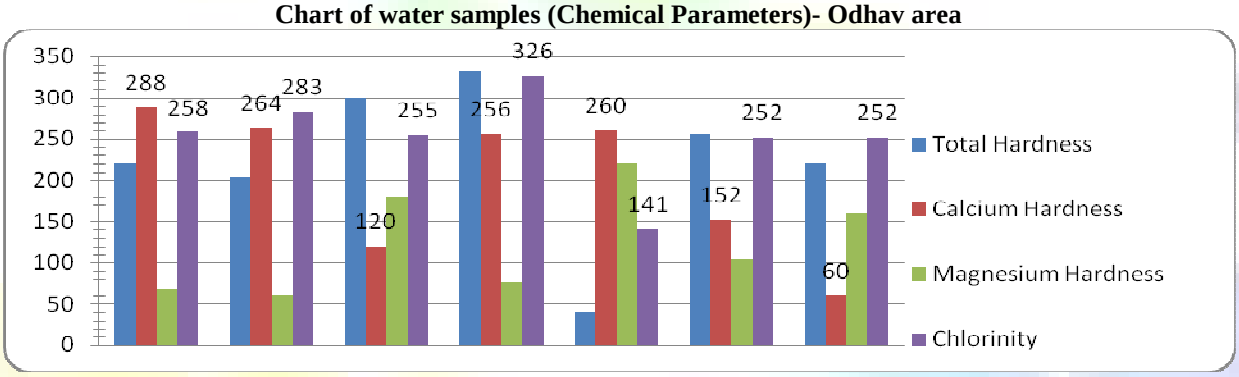

Chart of water samples (Physical Parameters-A)-Odhav area

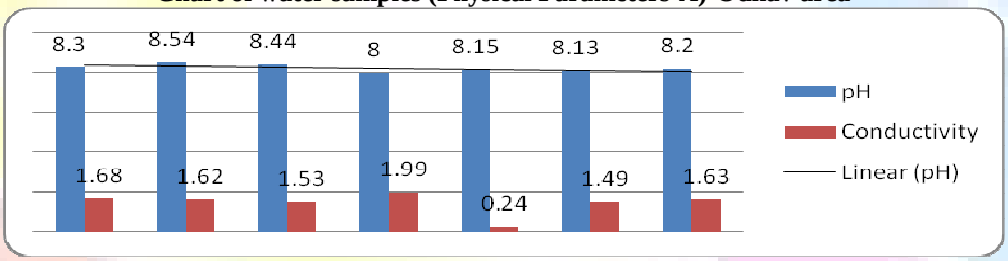

Chart of water samples (Physical Parameters-B)-Odhav area

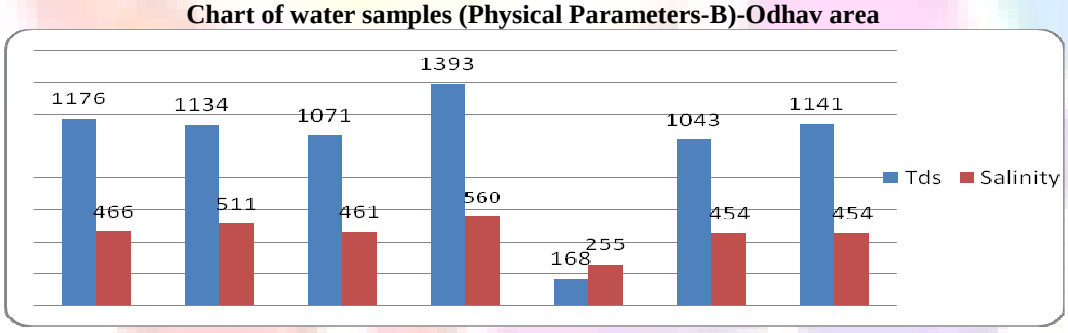

Chart of water samples (Chemical Parameters) - Vatva area

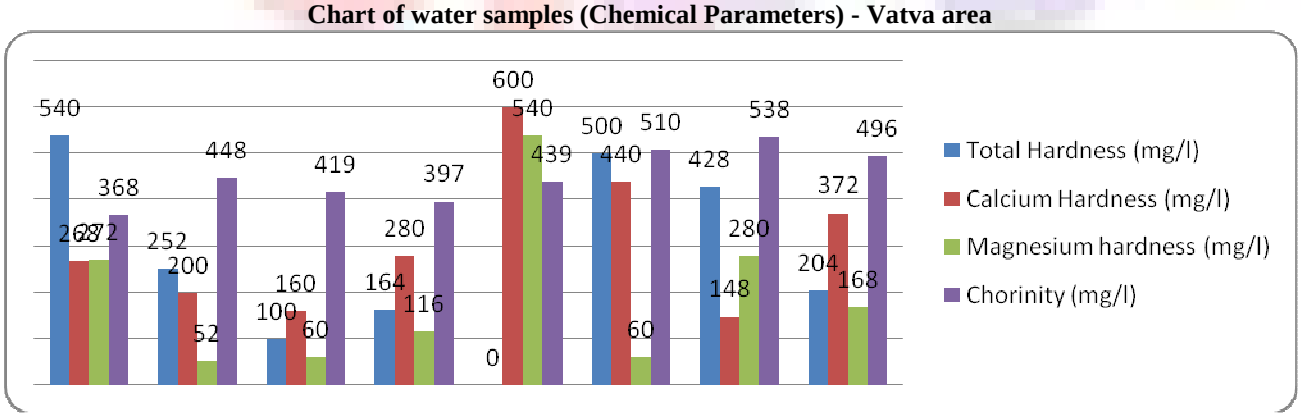

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Chart of water samples (Physical Parameters-A)-Vatva area

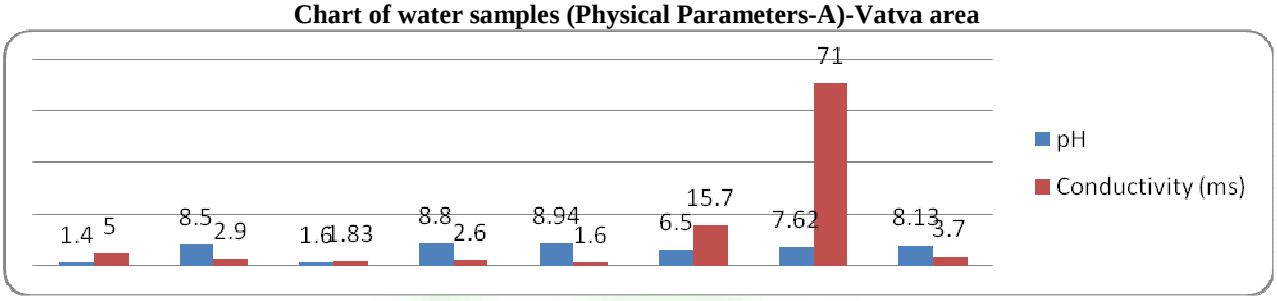
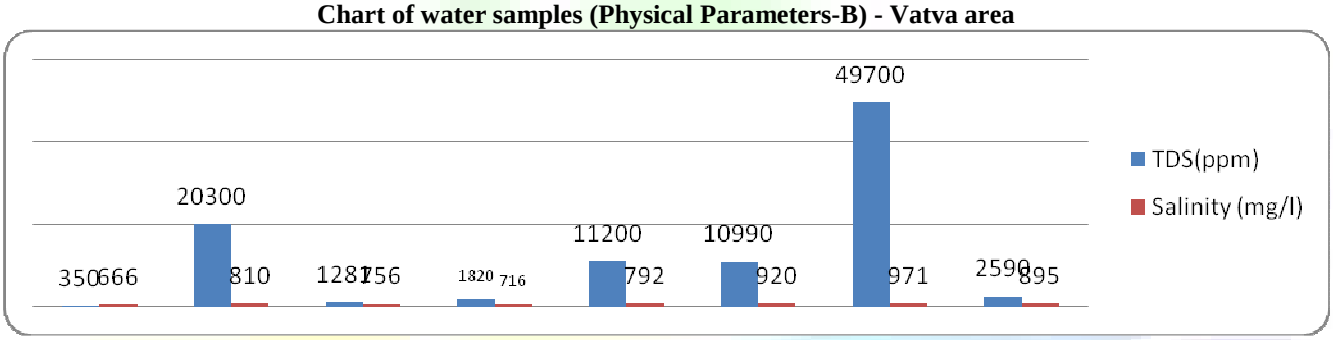


Chart of water samples (Physical Parameters-B) - Vatva area



V. WHO STANDARDS (2012)

Category	Values
Electrical conductance (mS/cm)	< 250
Turbidity (Max)	5
pH value	6.5-9.5
Chloride (mg/l)	1,000
Calcium hardness (mg/l)	200
Magnesium hardness (mg/l)	75
Totalhardness (mg/l)	600

VI. DISCUSSION

1. The chemical parameters of water samples from Odhav and Vatva areas showed high degrees of calcium hardness, magnesium hardness, total hardness and chlorinity.
2. The physical parameters of water samples from Odhav and Vatva areas showed different high values of pH, TDS, conductivity & salinity
3. Vatva industrial units focus on production of dyes and chemicals.
4. The effluents from these units don't have proper disposal system.
5. The ground water is highly saline, leading to salinity in these areas.
6. The parameters were high as compared to WHO standards (2012)

VII. CONCLUSION

Industrial effluents are highly toxic to seed germination and seedling growth. The magnitude of toxicity depends upon the nature and concentration of chemicals present in the effluent[1].

Increase in urbanization, industrialization, agriculture activity and various human activities have increased the pollution of surface water & ground water6. The recycle and reuse of treated wastewater is also one of the main opportunities by which water can be used for irrigation, horticulture and industrial purposes.[7]

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