Chapter–VII

Conclusion

7.1 CONCLUSION AND FUTURE ASPECTS

In the present work, characteristics of water quality, land use land cover pattern and industrial waste management were analysed. The following conclusions were inferred from the present work.

Spatio-temporal Variability of Hydrochemical and Geochemical Parameters of Surface and Sub-surface Water

- The pH levels of the Surface and Sub-surface water samples indicated that they were alkaline in nature. pH was within the desirable limit in the study area.

- During post-monsoon season, maximum values of Total Dissolved Solids (TDS) of the sample were observed near Nada village (Jambusar Taluka) which indicate the presence of high concentration of dissolved inorganic elements in the water.

- High concentration of TDS and Sodium (Na) in both surface and sub-surface was observed and the highest level was noted near the Jambusar, Vagra, Kadodara, Ankleshwar, Dahej and Olpad industrial estates.

- The high concentration of sodium (Na) during pre-monsoon, 2017, was observed near the Dahej industrial belt. In all the three seasons, sodium (Na) concentration in both surface and sub-surface water was above the permissible limit (200 mg/l).

- The increase in TDS concentrations, might be because of seawater intrusion in coastal aquifers and wastewater leaching.

- In the season of post-monsoon (surface and sub-surface), maximum values of calcium (Ca)were observed in Jambusar and Ankleshwar talukas (Bharuch district).

- In all the sampling stations average fluoride (F) concentrations was below the permissible limit. High concentrations of fluoride were observed in pre-monsoon and monsoon season (2017) in both surface and sub-surface water.

- In this region, most of the hydrochemical and geochemical parameters of surface and sub-surface water showed higher values in pre-monsoon and monsoon seasons indicating spatio-temporal variation.

- Significant role of rainfall was observed in the spatio-temporal variability of the geochemical parameters in both surface as well as sub-surface water.

Water Quality Index

- In the present study, Water Quality Index (WQI) values ranged between 11.11 to 162 in pre-monsoon season, 13.33 to 114.22 in monsoon and 11.90 to 152.22 in post-monsoon season.

- During pre-monsoon season in surface water, "Good Water Quality" was observed in the north-eastern part of Amod taluka and southern parts Choarasi taluka. The water was "Unfit for Drinking" in western part of Jambusar and Vagra talukas (Bharuch district) and in the southern parts of the study area.

- During the rains in surface water, "Poor Water Quality" was noted in 37.76% of samples which were spread over 48.12% of the area. Increase of sodium in the surface water as well as seawater intrusion in coastal aquifers might be the reason for this phenomenon.

- During the post-monsoon season in surface water, "Excellent Water Quality" was observed in the small pockets at Mangrol, Intola, Muler Shamba and Malpore villages which are located in north-eastern part in Bharuch district. It was "Unfit for Drinking" in Hansot and Jambusar talukas.

- In sub-surface water, in pre-monsoon season, Water Quality Index (WQI) values ranged between 5.51 to 255.22, during rains between 6.99 to 224.94 and after the monsoon season it was 6.19 to 245.94.

- During pre-monsoon season in sub-surface water, 44.93% of samples were in the range of >100 representing water quality as "Unfit for Drinking". This WQI range was largely found in the Dahej, Ankleshwar, Pandesara, Katagram, Sachin, Olpad and Jambusar industrial belts. Leaching of ions, water-rock interaction and anthropogenic activities such as excessive pumping, industrial effluents and domestic uses might be the reason for the same.

- In monsoon season of in sub-surface water, WQI range "Excellent" water quality was noted in 11.36% of samples. They were mostly associated with the rivers Vishwamitri, Narmada and Tapi.

- During post-monsoon season in sub-surface water, "Very Poor Water Quality" of WQI range was observed in the northern and north-western part where Dahej industrial belt is located.
- The Overall Water Quality Index (WQI), of sub-surface water showed that approximately 70% of samples had "Poor Quality of Water".

Spatio-temporal Analysis of Land Use/Land Cover

- The landuse/ landcover classes such as agriculture, build-up land, water bodies, saltpan, barren lands and other lands were identified for two years (1997 and 2007) Change Detection Analysis was performed.
- A decrease in agricultural land was identified between 1997 (78.14%) and 2017 (76.07%)
- 4.10% increase in built-upland was noted largely because of rapid population growth and associated activities.
- Water bodies stretched over 4.19% in 1997 but decreased to 4.03% in 2017.
- 0.86% barren lands were lost because of conversion into agricultural lands.
- Subsequently, area under industrial land use rapidly grew in this region specifically Dahej, Sachin, Palej, Olpad and Khatodara GIDC's.

Identification of Landfill Site Selection for Solid Waste Disposal

- 14 highly suitable landfill sites were identified which covered 2.75% of the area and fulfilled the minimum requirements, according to (CPHEEO, 2016). The potential landfill sites were identified in the north, central and southern parts of the study area.

*****************The End*****************