SUMMARY AND CONCLUSION

Baroda, is a major industrial centre of Gujarat, with numerous large, medium and small-scale chemical and engineering units spread out in and around it. The industrial expansion was accompanied by a population explosion. The pollution of air, soil, surface and sub-surface water, along with an increasing demand for land for housing and potable water, has disrupted the geo-environment, with due consequences for the future.

Geologically, the study area of 714 sq.km comprises of a Quaternary sequence of sediments consisting of conglomerates, clays, kankars, sand, gravels and soils belonging to the major groups of inceptisols, vertisols and entisols. Three major geomorphic units have been identified viz. [1] central alluvial peneplain, [ii] flood plains, and [iii] bad-land or ravines.

Soil mapping has revealed the presence of 3 orders in the study area viz. inceptisols, vertisols and entisols. These have been further classified into 3 sub-orders viz. orchrepts, usters and fluvents; 3 great groups viz. ustochrepts, chromusters and ustifluvents; 5 sub-groups viz. fluventicc ustrochrepts, vertic ustochrepts; udic chromusters, typic chromusters and typic ustifluvents, and 8 families and series viz. I_1 - Sandy Clay Loam, I_2 - Sandy Loam, I_3 - Clay, I_4 - Sandy Loam, I_5 - Sandy Clay Loam, V_1 - Clay, V_2 - Clay, and E_1 - Sandy Loam. Physico-chemical and geotechnical investigations have been carried out.

Land-use patterns for the years 1876-78, 1959-60 and 1988 show that indiscriminate usage without taking into consideration the usability has resulted in an overall degradation of the land, resulting in top-soil erosion, gullying, and an overall increase in transitional and waste/barren land

at the expense of agricultural land, with severe micro-climatic ramifications. This problem is compounded by a burgeoning population. Out of a total study area of 714 sq.km. Baroda city occupied 12.70 sq.km in 1876-78, 46.19 sq.km in 1959-60 and 88.79 sq.km in 1988. Agricultural land decreased from 537.57 sq.km in 1876-78 to 197.13 sq.km in 1988. Waste/barren land increased from 60.50 sq.km in 1876-78, to 119.62 sq.km in 1988. Transitional areas, come to occupy 308.52 sq.km in 1988.

The cultural history of Baroda began somewhere in the mid-Pleistocene period, when the early man lived on the banks of the Mahi river. This was followed by the first human settlement on the right bank of the Vishwamitri river on a group of dunes, during 1000 B.C. This developed into a small township [about 3 century A.D.], which came to be known as Ankotakka. Periodical heavy floods forced the inhabitants to move to another elevated land in 600 A.D., located on the present Kothi area, which formed the nucleus of a new township named "Vadapadraka". From then till 1875, the development of Baroda was slow, with the accession of Sayajirao III in 1875, developmental activities increased with the laying of roads, railway lines and residential areas. The formation of the State of Gujarat, saw the inception of chemical industrial revolution with the setting up of large fertilizer, petrochemical, petroleum refining and other small-scale industries in and around Baroda. This was accompanied by a population boom. The pollution of air, soil, surface and sub-surface water was rampant. The situation vis a vis drinking water became critical, with future prospects bleak.

Qualitative and quantitative evaluation of surface and sub-surface water has revealed that there is a deficit supply at the present, with an increasing deficiency in the future. Baroda has two water supplies viz. Ajwa reservoir and the French-wells at Fajalpur in the Mahi river bed. The supply from the former is a fixed quantum, hence increments to satiate the demand have to be made from the French-wells at Fajalpur. This faces a problem, as the tidal ingress in the Mahi river brings back the effluents dumped upstream, right upto Fajalpur, where they infiltrate into the river

bed aquifers, thereby polluting the very source of water from which the French-wells draw water. Discussions with medical practitioners have shown that in Baroda, people residing in areas which are supplied potable water from the Mahi river are more prone to enteric diseases than those people consuming water from the Ajwa reservoir.

There is variation in depth of water table in the study area, with several mounds and troughs with multi-directional flow. The only source of recharge is due to rainfall. Field observations have revealed that out of 500 dug-wells, 166 were polluted; out of 2000 bore-wells, 600 were polluted; and out of 60 tube-wells, 5 were polluted. Out of 68 wells monitored in 1988-89, 34 were found to be unfit, 24 were considered potable in the absence of a better alternate source [ABS], and 10 were found to be fit. The total availability of potable water, in 1988, was 63.9 MCM, whereas the demand was 70.12 MCM, a deficit of 6.2 MCM. If pollution of surface and sub-surface water is not checked, then future demands of potable water would be hard to meet with.

The climate of Baroda city has also undergone a drastic change with, an increasing mean annual temperature and a decreasing mean annual rainfall. The soil moisture balance shows an increasing deficit. The 'water-proofing' of the land by buildings and roads has led to an increased run-off of rain water, with less quantities available for infiltration to recharge the aquifers.

The condition of tar roads of Baroda are another source of irritation and discomfort to the citizens, and this also reflects in the longevity of the vehicles. Critical examination of the quarries at Halol, Panchmahals district, and laboratory investigations of the road building material got from them reveals that, sub-standard material is being used in the building of roads. This is inspite of good quality material available at Halol, in the absence of which, material from Sevalia could also be got.

The geo-environment of Baroda viz. land, surface and sub-surface water

and climate is gradually being degraded. This is in the face of rapid industrialization/urbanization complemented by monetary richness. The future prospects, in the absence of strict preventive measures, are very bleak, with a deficit supply of water, increasing mean annual temperature, decreasing mean annual rainfall, and an increasing deficit soil moisture. All these point towards an increasing arid 'micro-climatic' regime for the study area.