STUDY AREA

Geography of Gujarat and study area

The Gujarat state is situated on the West Coast of India between 20°1' and 24°1' North latitudes and between 38°4' and 74°4' East longitudes. On the West of Gujarat is Arabian sea; on the north-west is the Gulf of Kutch. The northern side of the state is the international boundary between India and Pakistan. It is bounded in the north-west by Rajasthan, east by Madhya Pradesh and south by Maharashtra.

Among all the districts of Gujarat, Kheda is the fifth smallest district having ten talukas. It is between 72°15' and 73°17' east longitude and between 22°7' and 23°18' north latitude.
The district lies between the river Mahi (south-east) and Sabarmati (north-west).

Several rivers flow across the State and meet Arabian sea, Gulf of Cambay and Kutch. The Sabarmati, Mahi, Narmada and Tapi are the largest among the river of Gujarat. The flow of river water except Narmada and Tapi is very limited. The natural drainage of the state is provided by some major rivers with their tributaries. There are rivers in the Kheda district of which the Mahi and the Sabarmati are the major rivers. The river Mahi popularly known as Mahisagar, flows towards the east and south of the district while river Sabarmati on the north-west of the district. The other rivers are the Vatrak, the Shedhy, the Meshwo, the Khari, the Luni, the Varansi and the Mohar. Most of these rivers are very shallow and flows only during monsoon and dries up thereafter.

The present investigation is carried out on four rivers which found to have different mode of pollution, for a period of two years from March, 1991 to January, 1993. The main sources of pollution in these rivers are either domestic or industrial waste or both.
The selected rivers are:

1. River Sabarmati
2. River Khari
3. River Vatrak
4. River Shedhy

The Sabarmati

This river rises in the south-western spurs of Aravalli hills. It traverses through Sabarkantha, Ahmedabad, and Kheda districts. In Kheda it passes through the eastern boundary. It enters the district at Khadiyapura village of Matar taluka and finally discharges into the Gulf of Cambay (Khambhat). At some distance from village Khadiyapura on the southern direction, the Khari river meets Sabarmati, at the north west of village Radhu in Matar taluka. Thereafter at the place where Voutha village lies on the right bank and Palla on the left bank, the river Vatrak carrying water of all other rivers except Mahi meets the river Sabarmati. From there it proceeds in the direction of the Gulf of Cambay.

The riverine flow occurs only for a short rainy season and the flow progressively decreased thereafter. It becomes negligible for most part of the year. However, the riverwater flow increases due to enormous discharge of sewage and industrial
effluents from Ahmedabad and other city areas. The down stream of Sabarmati, when enters Kheda district was taken for the present study. 3 sites were fixed along the river over a stretch of about 10 Kms. The first site was near village Rasikpura, the second was near village Voutha after its confluence with river Khari and the third site little far from Voutha after the confluence of river Vatrak, which carries the water of other six rivers. (Fig. 3a, 5a, 5b, 5c)

The Khari

The Khari rising in a cluster of hills about 16 Kms to the north east of Himatnagar in Sabarkantha district passes through the extreme wast of the Kheda district, and falls into river Sabarmati at the north west of village Radhu in Matar taluka. From the point of its origin to Vatva, near Ahmedabad, the riverine flow is only for a short rainy season. But from Vatva onward a continues flow occurs throughout the year, because of the discharge of large quantities of industrial effluents from the Vatva industrial estate. This industrial area is situated about 8 kms from Ahmedabad city in the south eastern direction. It is spread over an area of about 205 hectares. There are about 33 dyes and chemical industries, 14 pharmaceuticals, 3 pesticides and 4 paper industries (Shaji, 1990). The sampling site was fixed near village Rahdu, before it discharges into Sabarmati. (Fig. 3a, k-1)
Plate-I

A - Partial view of river Sabarmati (site-I).
B - Partial view of river Khari.

Note: Arrow indicates sampling sites.
Plate I
Plate-II

A - Partial view of river Shedhy.

B - Partial view of river Vatrak.

Note: Arrow indicates sampling sites.
The Vatrak

The river Vatrak with which the waters of river Shedhy unite at Kheda, rises from the hills of Dungarpur in Rajasthan. It runs parallel to Mahi and enters the district in Kapadvanj taluka. The river flows through, Kapadvanj, Mahemadabad and Matar talukas of the district. The total length of river is 125 kms of which 105 kms are covered by it in this district. Two sampling stations were fixed near Kheda town, one at Kheda before it mixes with river Shedhi and the other near Kheda town after its confluence with river Shedhi. (Fig. 3.2 V₁, V₂)

The Shedhy

This river originates from the Dhanod and Vardhari hills of Panchmahals district. The river traverse through six talukas of the district viz. Balasinor, Thasara, Anand, Nadiad, Matar and Mahemadbod. The total length of the river in the district is 113 km. It merges in the river Vatrak at Kheda town. The sampling site was fixed near Kheda before it merges with Vatrak. (Fig. 3.2 S.)

A map of Gujarat state and the different sampling sites at the Kheda region are given in Figs. 3.1 and 3.2.