CHAPTER : I

INTRODUCTION

GENERAL :

Baroda city, a major industrial centre of Gujarat state, was in the past [some 50-60 years ago], a small university town with little industrialization and a relatively small population. The period from 1960 onwards saw an exponential increase in both industrialization and urbanization, making great inroads into natural resources like land and water. The situation presently, is very critical, as the volume of natural resources has remained constant, but the demand has increased exponentially, the problem made more acute by the pollution of surface and sub-surface water pollution.

Improper land-use, without taking into consideration the capability of the land, has led to the formation of transitional and barren land, wherein agriculture is possible, and in which any sort of agricultural practise is impossible respectively.

Large scale industrialization and urbanization has altered the climate of the city, making it more hotter and having a lesser annual rainfall. The covering of land by roads and buildings have drastically decreased the land area, which in turn has decreased the infiltration and increased run-off.

All the above criterion have combined to degrade the geo-environment of Baroda and its neighbourhood.

LOCATION :

Baroda city is strategically located on the main broad-guage railway line connecting Bombay with Ahmedabad and Delhi. The national highway number 8 connecting Bombay and Ahmedabad also passes through this city.

The study area encompasses an area of 714 sq.km and lies between 73° 5' - 73° 20'E longitude and 22° 10' - 22° 28' latitude, including the Baroda Municipal Corporation area, 103 villages of Baroda, Waghodia and Padra talukas of Baroda district [Fig. 1, Table : 1, Plate : 1].

PHYSICAL FEATURES :

The study area lies in Baroda district forming a part of the great Gujarat plain. The eastern portion of the district comprising the Chhota-udepur, Jabugam and Naswadi talukas is hilly, while the rest of the district is a gently undulating plain.

Located between Mahi and Narmada, the chief rivers of the district, the study area is well-known for black soil which is suitable for the production of cotton. This midland between the Mahi and Narmada covers the Baroda plain which is drained by tributaries of the Mahi, Narmada and Dhadhar. The river Vishwamitri is a dividing line between black soils and red loams. Besides these rivers, the Jambuva and the Surya flow through the district and meet the Arabian sea in the Gulf of Cambay.

The Mahi river rises from the Vindhya hills of Madhya Pradesh and flows through Rajasthan and Gujarat. It has 5 tributaries and sub-tributaries in this district. It forms a major source of drinking water for Baroda city.

The Mini river, a tributary of the river Mahi, after a course of 50 km merges in the river Mahi near Sindhrot village of Baroda taluka. It carries effluents released from the industrial complexes located in the study area

FIG:- 1. LOCATION MAP

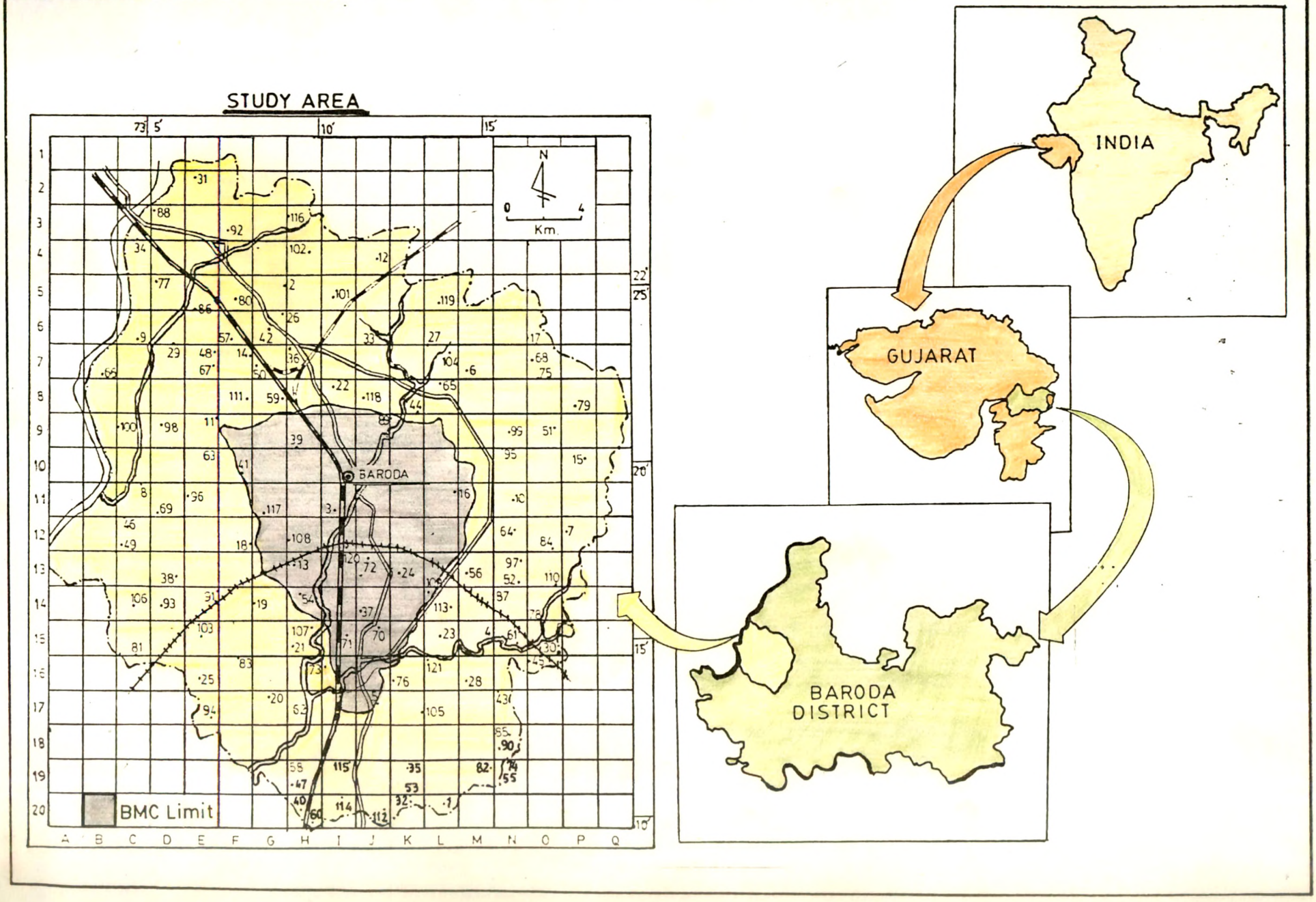

TABLE : 1

LOCALITY INDEX

NO.	NAME OF VILLAGE/ TOWN/ LOCATION	REF. NO. [as per Fig. 1]	NO.	NAME OF VILLAGE/ TOWN/	REF. NO. [as per Fig. 1]
1	Ajitpura	L/20	29	Dhanora	D/6
2	Ajod	G/5	30	Diwalipura	O/15
3	Akota	I/11	31	Dodka	E/2
4	Aladpura	M/15	32	Dolatpura	K/20
5	Alamgir	J/17	33	Dumad	J/6
6	Amaliyara	M/7	34	Fajalpur	C/4
7	Amodar	P/12	35	Fatepura	K/19
8	Ampad	C/11	36	F'nagar	H/7
9	Angadh	C/6	37	G.I.D.C.	J/14
10	Ankhol	N/11	38	Gokalpura	D/13
11	Ankodiya	E/9	39	Gorwa	H/9
12	Asoj	J/4	40	Gosindra	H/20
13	Atladara	H/13	41	Gotri	F/10
14	Bajwa	F/7	42	G.S.F.C.	G/6
15	Bakrol	P/10	43	Hansajipur	N/17
16	Bapod	L/11	44	Harni	K/8
17	Bhavpura	O/6	45	Hetampura	O/16
18	Bhayali	F/12	46	Hinglot	C/12
19	Bil	G/14	47	Itola	H/19
20	Chansad	G/17	48	I.P.C.L.	E/7
21	Chapad	H/15	49	Jaspur	C/12
22	Chhani	I/8	50	J'nagar	G/7
23	Chikhodara	L/15	51	J'pura	O/9
24	Danteshwar	K/13	52	Jobantekri	N/13
25	Darapura	E/16	53	Kajapur	K/20
26	Dasharath	G/6	54	Kalali	H/14
27	Dena	L/7	55	Kanadkoi	N/19
28	Dhaniyavi	M/16	56	Kapurai	M/13

Table : 1 [Contd.]

NO.	NAME OF VILLAGE/ TOWN/ LOCATION	REF. NO. [as per Fig. 1]	NO.	NAME OF VILLAGE/ TOWN/	REF. NO. [as per Fig. 1]
57	Karachia	F/6	90	Samastpura	N/18
58	Karali	H/19	91	Samiyala	E/14
59	Karodia	G/8	92	Sankarda	F/3
60	Kashipura	H/20	93	Sangma	D/14
61	Kelanpur	N/15	94	Sareja	E/17
62	Khalipur	H/17	95	Sayajipura	N/10
63	Khanpur	F/10	96	Sevasi	E/11
64	Khatamba	N/12	97	Shankarpura	N/13
65	Kotali	L/8	98	Sherkhi	D/9
66	Kotna	B/7	99	S'pura	N/9
67	Koyali	E/7	100	Sindhrot	C/9
68	Kumetha	O/7	101	Sisva	I/5
69	Mahapura	D/11	102	Sokhda	H/4
70	Makarpura	J/15	103	Sokhdakhurd	E/15
71	Maneja	I/15	104	Sukhilpura	L/7
72	Manjalpur	J/13	105	Sundarpura	K/17
73	Maretha	I/16	106	Tajpur	C/14
74	Mastupura	N/19	107	Talsat	H/15
75	Morlipura	O/7	108	Tandalja	H/12
76	MuzurGamdi	K/16	109	Tarsali	L/14
77	Nandesari	D/5	110	Tatarpura	O/13
78	Navapura	O/15	111	Undera	F/8
79	Nimetha	P/8	112	Untiya	J/20
80	Padmala	F/5	113	Vadadla	L/14
81	Padra	C/15	114	Vadsala	I/20
82	Patarveni	M/19	115	Varnama	I/19
83	Patod	F/16	116	V'kotariya	H/3
84	Pavlepur	O/12	117	V'saiyed	G/11
85	Raghavpura	N/18	118	Vemali	J/8
86	Ranoli	E/5	119	Virod	L/5
87	Ratanpura	M/14	120	Vishwamitri	I/12
88	Rayaka	D/3	121	VoraGamdi	L/16
89	Sama	K/9			

and in itself is a major source of pollution.

The Dhadhar river rises from the hills south of Pavagadh. It has in all, 5 tributaries and sub-tributaries in Baroda district.

The Vishwamitri river, a tributary of the river Dhadhar, originates from the Pavagadh hill and bisects Baroda city into two. It is an effluent carrying seasonal river.

The Surya river, a tributary of the river Vishwamitri originates from the Pavagadh hill ranges. The Ajwa reservoir has been constructed by damming this river.

The Jambuva, another tributary of Vishwamitri, originates near Vesania village in Waghodia taluka of Baroda district.

CLIMATE AND RAINFALL :

The climate of Baroda city is characterised by a hot summer, and general dryness, except during the monsoon season. The year may be divided into four seasons.

Winter is from December to February, January is the coldest month with a mean daily maximum temperature of about 30.1°C, and a mean daily minimum temperature of about 10.6°C. Baroda is sometimes affected by cold waves in association with western disturbances passing across north India when the minimum temperature may near the freezing point of water. Winds blow from the north or north-east during the post-monsoon and early winter months.

The summer season is from March to June. The day temperatures during May are the highest, with an average of about 42.5°C. The heat, particularly in the latter part of the summer season is intense and on individual days, temperatures may go upto about 46°C. During this period,

relative humidity is less than 30% in the afternoons. The summer winds are mostly from directions ranging between south-west and north-west.

The period from June to September is the south-west monsoon season. Winds are generally light with some strengthening in force during the late summer, and early part of the south-west monsoon season. The average annual rainfall in the study area is 900 mm. The rainfall in the district, increases, generally from the west to the east. About 95% of the normal annual rainfall is received during this period, with July being the rainiest month. The variation in the annual rainfall from year to year is large. The monsoon season is associated with westerly or north-westerly movements of depressions movements in the Bay of Bengal towards Gujarat.

On an average, there are 42 rainy days [i.e. days with rainfall of 2.5 mm, ± 10%]. With the onset of the monsoon, in early June, there is an appreciable drop in the day temperatures, but nights are as warm as during the summer. During this season, relative humidity is high, generally exceeding 70%. Skies are generally heavily clouded or overcast during the monsoon [Gazetteer of India, Baroda district 1979].

October and November constitute the post-monsoon season. By the end of September, there is a slight increase in day temperatures and a secondary maximum in day temperatures is reached in October. However, the night temperature decreases after the withdrawal of the monsoon. After mid-November, both day and night temperature decrease rapidly. Cloudiness rapidly decreases in the post-monsoon season. Except in the monsoon, the air is dry throughout the year.

FLORA :

The Baroda district as a whole, is badly deficient in forests. The area of forest in the district was found to be 766.54 sq.km in 1970-71. The Government of India have laid down that forests should form 33% of the total area. However, the total forest area of the district is about 9.4%

of the total area, as against 8.87% area of the State. These forests consist of "Dry Mixed Deciduous Types". The study area has scanty patches of degrading forests. Most of the land is cultivated or has bulit-up areas.

The main floristic elements of the study area are as follows : Sag [Tectona grandis], Limbda [Melia azadirchta], Babul [Acacia arabica], Khakharo [Butea frondosa], Amli [Tamarindus indicus], Garmala [Cassia fistula], Tad [Phoenix sylvestris], Vad [Ficus glomerata], Pipal [Ficus religiosa], Bordi [Zizyphus jujuba] etc.

FAUNA :

With the great increase in human activity and an increase in population, there has been considerable changes in habitats, and most of the larger manmals which were fairly common and familiar, are now either locally extinct or endangered. The important fauna of the study area are as follows : Common langur, fox, rabbit, blackbuck, nilgai or blue bull, dog, donkey, cow, buffalow, cat, bullock and domestic animals.

The study area has a rich and varied avifauna. The important birds are : Grebes, pelican, heron, egret, ibis, duck, eagle, hawk, vulture, quail, partridge, pigeon, dove, parakeet, cuckoo, owl, kingfisher, roller, barbet, bee-eater, crow, myna, bulbul, etc.

Also, the study area has poisonous and non-poisonous snakes and a good variety of fishes.

COMMUNICATION AND TRANSPORT :

Baroda city, the headquarters of Baroda district, is amply connected to all parts of the country by all three major modes of transport viz. rail, road and air. Baroda has no sea-port.

Baroda State was the pioneer among Indian States to initiate railway

construction in its territories in 1869. At present Baroda is served by the following railway lines :

[1] Bombay Central - Surat - Baroda - Mathura - new Delhi line [Broad Gauge].
[2] Baroda - Anand - Ahmedabad - Viramgam line [Broad Gauge].
[3] Jambusar - Vishwamitri - Dabhoi - Chhota-udepur line [Narrow Gauge].
[4] Chandod - Miyagam - Karjan - Malsar line [Narrow Gauge].
[5] Dabhoi - Samlaya - Timba line [Narrow Gauge].

National Highways [NH] are the main highways serving predominantly, as distinct from State purposes, and run through the length and breadth of India, connecting major parts, foreign highways, capitals of States, and strategic routes of importance for the defence of the nation. The Bombay - Delhi National Highway No. 8 [Plate : 1] runs through the district connecting Baroda with Bombay, Surat and Bharuch to its south, and Ahmedabad, Mehsana and New Delhi to its north. Besides this, there is a vast network of State highways which connect Baroda with the rest of the towns and villages of the study area and district.

There is a direct air-link with Bombay and New Delhi. Flights are operated on a nearly daily basis by Indian Airlines.

SCOPE OF WORK :

Developmental activities associated with urbanization and industrialization have played havoc with the geo-environment. Shortages of land and drinking water, degradation of agricultural land into transitional and barren land are some of the related manifestations. The macadamised roads of Baroda are in a sorry plight due to wrong usage of construction material.

Taking all this into consideration, this research was taken up with an aim to make an in-depth study of the following parameters :

* Geology and geomorphology
* Soils of the area, their occurrence, distribution, physico-chemical and geo-technical properties.
* Land-use
* Evolution and development of Baroda through the ages
* Surface and sub-surface water - its qualitative and quantitative assessment
* Climate of the city
* Baroda's roads.
* Appropriate remedial measures have been suggested.