

## **5.0 URBAN ENVIRONMENT**

### **5.1 INTRODUCTION**

Urban Environment includes both natural elements as well as built environment. Natural elements include air, water, land, climate, flora and fauna. The built environment, physical surroundings constructed or modified for human habitation and activity, encompasses buildings, infrastructure and urban open spaces. A city's built environment also gives visible form to important historic or contemporary cultural values. The intersection and overlap of natural environment, built and socioeconomic environment constitute urban environment.

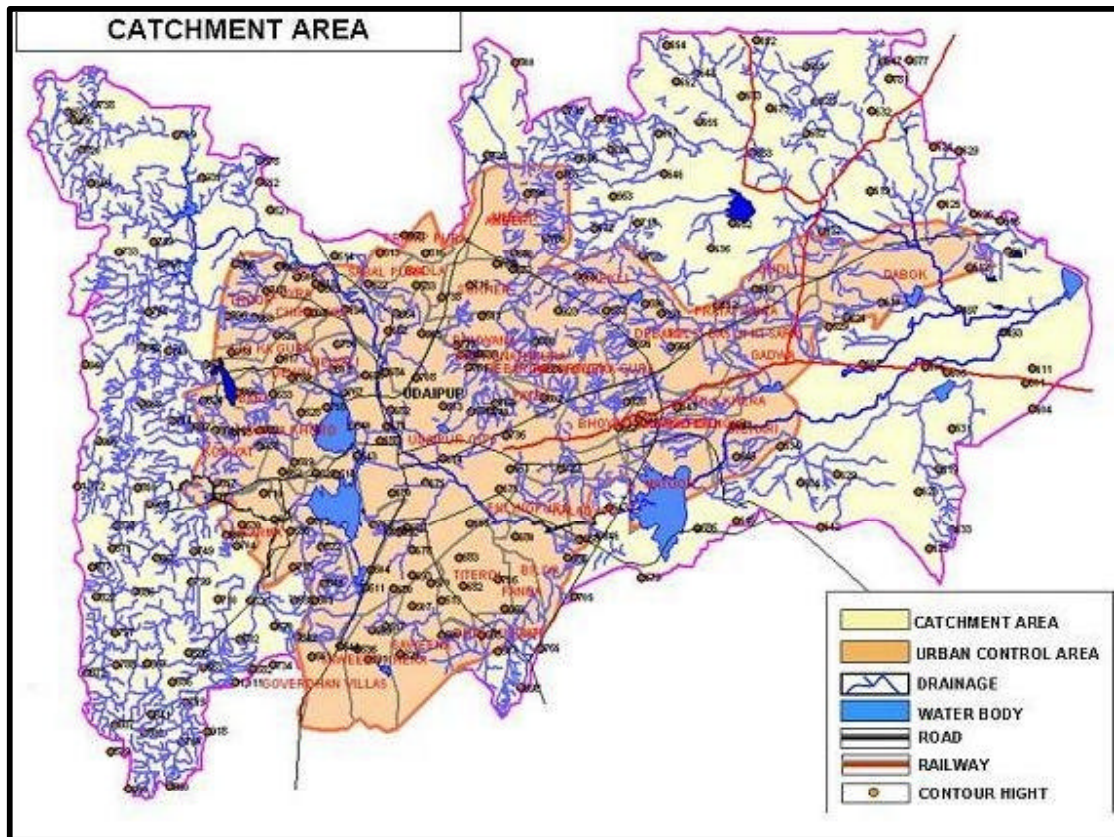
This chapter establishes the urban environment baseline situation of Udaipur City. It describes the status of urban environment, quality and services, identifies environmental issues and strategies to address these issues through CDP.

### **5.2 CATCHMENT AREA**

Catchment area boundary of the basin is clearly defined by nature. The northern and eastern portions of Udaipur generally consist of elevated plateau and there are long strips of waste and rocky sierras, with single hills rising here and there in the plains. Southern and western portions on the other hand, have most part covered with rocks, hills and fairly dense jungle; more particularly the rugged region in southwest, which embraces the wildest portion of Aravali.

Aravali hills form a barrier of wind extends along the entire western border. There are numerous artificial lakes and tank in and around Udaipur (Jaisamand, Udai Sagar, Pichola and Fateh Sagar. Northern and Eastern portions are covered with rocks, hills and fairly dense jungle. The watershed dividing drainage of Bay of Bengal from that of Gulf of Cambay runs almost through middle of Udaipur. Aravali hills extend along the entire western border. Principal River in this region is Banas. Bearach River is on north, Wakal in southwest; Som and Jhakam in south. Bearach River starts from hills north of Udaipur, and flows southeast into Udai Sagar.

MAP 5.1: CATCHMENTS AREAS



### 5.2.1 Water Resources

Utilizable major water source in Udaipur is surface water. The utilizable water in Udaipur from surface water sources is sharing of Pichola Lake, Jaisamand Lake, Fateh Sagar, and Bari Lake. This has been discussed in detail in chapter on Urban Services under the head of Water Supply.

### 5.2.2 Water Bodies in Udaipur

Udaipur region water supply depends upon surface and underground water sources of water such as lakes, step wells, tube wells, wells etc. these sources of water supply obtain water during rainy season. Udaipur has numerous lakes in its vicinity those are Pichola, Fateh Sagar, Bari and Jaisamand lakes. These lakes along with Step wells, tube wells have been Udaipur's major sources of drinking water in past.

Udaipur Water Bodies have been discussed in more detail in section on lakes under chapter on lakes tourism and heritage.

Following is morph metric feature table of water bodies of Udaipur:

**TABLE 5.1: MORPH METRIC FEATURE OF FIVE WATER BODIES**

				<b>Udai Sagar</b>			
		73*42' E	73*41' E	73*36' E	73*---' E	73*44' E	
		24*35' N	24*34' N	24*41' N	24*---' N	24*37' N	
	Average Annual Rainfall (mm)	635	635	711	711	635	
	Gross catchment Area (sq. km)	53.6	55.0	478.96	1813	28	
	Water spread (sq. km)	4.0	6.96	4.75	160.6	1.7	
	Capacity at FLT (MCM)	12.10	13.08	31.13	560	3.4	
<b>6</b>	Mean depth (M)	7.21	4.32	7.5		5.3	
<b>7</b>	Maximum depth (M)	12.46	8.5	15.0		9.8	

Source: Unpublished Dissertation, Virendra Singh Parihar DRP SPA, Development and Water resource Interface in Udaipur Urban Control Area.

### 5.3 FOREST RESOURCES IN UDAIPUR

Geographically forest reserves in Udaipur are divided into three parts: Northern, Central and Southern region. According to category they are classified into reserve forests, protected forests and unclassified forests. Statistics of each of the following regions are given below:

**TABLE 5.2: FORESTS IN SOUTHERN REGION**

Type of forest	No of blocks	Area
	53 nos.	69338.49 ha.

Protected forests	66 nos.	41839.01 ha.
Unclassified forests	7 nos.	383.00 ha
<b>Total forests</b>	<b>126 nos.</b>	<b>111560.59 ha.</b>

Source: Forest department, Udaipur

**TABLE 5.3: FORESTS IN NORTHERN REGION**

Type of forest	No of blocks	Area
	50 nos.	33051.00 ha.
Protected forests	91 nos.	27769.00 ha.
Unclassified forests	5 nos.	463.00 ha
<b>Total forests</b>	<b>146 nos.</b>	<b>61283.00 ha.</b>

Source: Forest department, Udaipur

**TABLE 5.4: CENTRAL REGION**

Type of forest	No of blocks	Area
	38 nos.	92985.95 ha.
Protected forests	42 nos.	54349.27 ha.
Unclassified forests	1 nos.	14.00 ha
<b>Total forests</b>	<b>81 nos.</b>	<b>147349.22 ha.</b>

Source: Forest department, Udaipur

**TABLE 5.5: ENCROACHMENTS INTO FORESTLANDS FROM 1998-2003**

	Year	Area of forest encroached
<b>1</b>	1998-1999	38.47 ha
<b>2</b>	1999-2000	68.63 ha
<b>3</b>	2000-2001	88.84 ha
<b>4</b>	2001-2002	231.86 ha
<b>5</b>	2002-2003	6245.16 ha

Source: Forest department, Udaipur

The above table shows increasing levels of encroachment into forestland over past few years. Encroachments rose from 38.47 ha in 1998 to 6245.16 ha in 2003. In 2003-04 the forest department carried removal of people from encroached areas. About 6165.49 ha of encroached area were evacuated in this year.

## **5.4 URBAN ENVIRONMENT AND QUALITY OF LIFE**

This section discusses the impact of urbanization on natural and social environment and resulting deterioration in urban environment quality perceived in the city. Following parameters establish environment health of the city and have been discussed in detail for Udaipur:

?? Air Quality

- ?? Water Quality
- ?? Ground water quality
- ?? Access to basic urban infrastructure facilities

#### 5.4.1 Air Quality

Air Quality testing in Udaipur is done at the following three stations:

- /// Town Hall
- /// Ambamata
- /// Regional Office, Madri Industrial area

**TABLE 5.6: AIR QUALITY PARAMETERS AT TOWN HALL**

	<b>Pollution Parameters</b>				
1		13.266	11.033	7.1	6.25
2		45.233	49.933	33.7	29.4
3	SPM	307.666	315.66	349	295
4	RSPM	132.333	90.00	103	54

Source: Rajasthan State Pollution Control Board, 2006.

**TABLE 5.7: AIR QUALITY PARAMETERS AT AMBAMATA**

	<b>Pollution Parameters</b>				
1		4.2	6.7	7.133	12.2
2	NO2	47.133	26.5	73.183	25.533
3	SPM	405	252	273.66	333.00
4	RSPM	N.A.	168	83	70.00

Source: Rajasthan State Pollution Control Board, 2006.

**TABLE 5.8: AIR QUALITY PARAMETERS AT REGIONAL OFFICE, MADRI INDUSTRIAL AREA**

	<b>Pollution Parameters</b>				
		11.433	9.366	6.2	8.550
2	NO2	105.3	59.566	58	39.033
3	SPM	561.33	312.333	462	756.33
4	RSPM	167.66	84	149	116.66

Source: Rajasthan State Pollution Control Board, 2006.

### *Safety levels for Air Quality*

Central pollution board in exercise of its powers conferred under section 16(2)h of Air (prevention and control of pollution) Act, 1981 (section 14) has notified national Ambient Air Quality Standards with immediate effect.

As compared to ambient air quality standards, quality of air in Udaipur has been steadily improving over the last two years as per the data available. However air quality with respect to parameters like SPM and RSPM is still in bad condition, and needs large improvement, especially in industrial zones.

**TABLE 5.9: AMBIENT AIR QUALITY STANDARDS**

	Concentration in ambient air			
		Residential & Others		
	80	60	15	West and Gacke Method
	120	80	30	Ultraviolet fluorescence
	80	60	15	Jacob & Hochhelser Method
	120	80	30	Gas phase Chemiluminescence
	360	140	70	High Volume Sampling
	500	200	100	
	120	60	50	Respirable particulate matter sampler.
	150	100	75	

Source: Rajasthan State Pollution Control Board, 2006.

### **5.4.2 Water Quality**

Water Quality testing in Udaipur is done at following three stations:

- ~~///~~ Pichola Lake
- ~~///~~ Udaipur Lake
- ~~///~~ Fatehsagar

The Pollution levels recorded at these stations are as follows:

**TABLE 5.10: WATER QUALITY OF PICHOLA LAKE**

S.	Pollution	Units	19/1/2005	18/10/2005	23/3/2006
----	-----------	-------	-----------	------------	-----------

No.	Parameters				
		Mg/L	6.72	5.46	6.80
2	pH	No. Value	8.1	8.43	8.29
3	BOD	Mg/L	2.48	2.2	3.3
4	Nitrate	Mg/L	0.14	0.08	N.A.
5	Nitrite	Mg/L	0.004	0.005	N.A.
6	Fecal Coliform	MPN/100	28	11.00	9.00
7	Total Coliform	MPN/100	210	28.00	93

Source: Rajasthan State Pollution Control Board, 2006.

**TABLE 5.11: WATER QUALITY OF FATEHSAGAR LAKE**

	Pollution Parameters				
1		Mg/L	6.89	4.66	9.20
2	pH	No. Value	8.84	8.39	8.20
3	BOD	Mg/L	1.05	2.68	5.7
4	Nitrate	Mg/L	0.16	0.14	0.14
5	Nitrite	Mg/L	0.006	0.005	N.A.
6	Fecal Coliform	MPN/100	11	11.00	4
7	Total Coliform	MPN/100	28	28.00	14

Source: Rajasthan State Pollution Control Board, 2006.

**TABLE 5.12: WATER QUALITY OF UDAISAGAR LAKE**

	Pollution Parameters				
1		Mg/L	0.84	6.16	4.05
2	pH	No. Value	8.66	8.24	8.22
3	BOD	Mg/L	4.87	3.54	8.09
4	Nitrate	Mg/L	0.16	0.16	0.22
5	Nitrite	Mg/L	0.006	0.005	0.002
6	Fecal Coliform	MPN/100	28	20	20
7	Total Coliform	MPN/100	1100	210	210

Source: Rajasthan State Pollution Control Board, 2006.

#### 5.4.2 Ground Water Quality

**TABLE 5.13: GROUND WATER QUALITY AT VARIOUS LOCATIONS**

S.No.	Location	PH	TDS	COD	Alkalinity	Total Hardness	TC
1	Ambamata Area	7.58	644	11	452	200	240
2	Pverio ki Madri	7.54	724	6	368	220	24

3	Sajjan garh Residential Area	7.48	608	5	348	220	6
4	RICCo Industrial Area	7.59	606	4	384	48	12

Source: Rajasthan State Pollution Control Board, 2006.

### 5.4.3 Environmental Issues

- ✍ Water resources in city are polluted due to disposal of sewerage directly into surface drains or surface water bodies.
- ✍ Ground water contamination is essentially due to absence of septic tanks in the city, leakages and overflowing of sewerage pipelines, mixing of water and sewerage due to faulty lines.
- ✍ Air pollution has increased in last few years due to increased traffic and large scale cutting of trees, deforestation along hill slopes, burning of wood and charcoal in low-income areas in urban fringes of the city.
- ✍ Large-scale and uncontrolled mining of marbles and other minerals have also lead to heavy deforestation on hill slopes.

**TABLE 5.14 ISSUES, STRATEGIES & PROJECT IDENTIFICATION FOR ENVIRONMENTAL HEALTH OF UDAIPUR**

S. No.				
		Degrading air quality	Pollution reduction programs to be undertaken	Relocation of pollution causing activities from city
		Congestion of walled city		Tree plantation along roads
		Poor traffic management	Increasing efficiency in management	PTS for the city
		Increase in SPM levels		
		Depletion of ground water	Promotion of rain water harvesting	Afforestation programs along hill slopes
		Degraded water quality	Restoration of catchments areas of natural water bodies and Main Drains	Incorporation of rainwater harvesting in building byelaws
		Loss of UFW	Upgrading/improving infrastructure	Replacing damaged water losses in the city