CHAPTER 3

STUDY AREA

3.1 INTRODUCTION

The study area is located in Maharashtra state of India. The Maharashtra state is divided into four natural divisions – Konkan (Coastal area), Western Maharashtra, Marathwada and Vidarbh. It represents an irregular dentate pentagon, on the west of which Arabian Sea is making a long coastline of 720 kms.

Pune region consists of three districts namely Pune, Satara and Solapur. There are three sub-regional offices in Pune district and one each in Satara and Solapur district. Bhor, Velhe, Baramati, Indapur Purandar, Daund Tahsils and Pune Municipal Corporation constitute sub-regional office Pune-I. Khed, Ambegaon, Junnar, Mulshi, Shirur, Haveli and Maval Tahsils are under sub-regional office Pune-II. Under sub-regional office Pune-III Pimpri – Chinchwad and area of Pimpri – Chinchwad are covered. The study area is located in the Pune district of Maharashtra state, India.

3.2 PUNE DISTRICT

Pune district is the second largest district in Maharashtra state covering 5-10% of the total geographical area. The district has a geographical area of about 14,642 sq. kms. It is bounded on the north and east by Ahmednagar, on the south by Satara, on the west by Raigad, on the south-east by Solapur and on the north-west by Thane district of Maharashtra. The landscape of Pune district is distributed triangularly in western Maharashtra at the foothills of Sahyadri Mountains. It is divided into 3 parts viz., Ghatmatha, Maval and Desh (Collectorate - Pune District, 2009).

3.2.1 Location

It is situated in the western part of the state and lies between 17° 54’N to 10°24’ N latitudes and 73°19’ to 75°10’ E longitudes.
3.2.2 Administrative divisions

The district is divided into 14 tahsils for administrative convenience which include Pune, Haveli, Khed, Ambegaon, Junnar, Shirur, Daund, Indapur, Baramati, Purandhar, Bhor, Velhe, Mulshi and Mawal. There are 34 towns and 1768 villages in Pune district. The urban area includes two municipal corporations, eleven municipal councils and three cantonment boards.

3.2.3 Population

The population of the district is 94,26,959 as per 2011 census with rural population 39.11% and urban population 60.89%. The population density is 603 per sq. km. (www.census2011.co.in).

3.2.4 Physical features and Land use pattern

Based on topographical features Pune district has three natural divisions: 1) The hilly area comprising the Sahyadri mountain ranges 2) The basaltic plateau and 3) The river valleys.

The land use of Pune district are categorised as built up land (6,350 hectares), agricultural land (10,07,429 hectares), forest land (1,19,344 hectares), wasteland (2,53,494 hectares) and water bodies 32,693 hectares). Small patches of evergreen forests are observed in Ambegaon, Khed and Mulshi tahsils. Large areas of the western part are covered with deciduous forest.

3.2.5 Geology

The rocks of Pune district are varieties of Deccan trap basalts. Very old rocks of Archaean and Proterozoic age are exposed over more than half of the Indian peninsular region. The rest of the region is covered by the lava flows due to volcanic activities of Eocene to upper Cretaceous interval. These basalts constitute Deccan Volcanic Province (Krishnan, 1982).

The two rock types in Pune district are hard rock and soft rock.

1) **Hard Rock (Deccan Trap Basalt)**: The basaltic lava flows belonging to the Deccan traps of Eocene – Cretaceous occupies almost entire area of the district
which are horizontally disposed over a wide stretch forming table type of topography known as a Plateau. The factors like intensity of weathering, fracturing and jointing affect the water bearing properties of these flows and thus provide availability of open space within the rock for storage and movement of groundwater.

2) Soft Rock (Alluvium): Alluvium occurs along river banks and flood plains of major rivers like Bhima, Ghod, Mula, Mutha and their tributaries. The alluvium deposits have very narrow stretch across the river consisting of granular material like sand and gravel. The thickness varies between 6 – 10 meters.

3.2.6 Climate and rainfall

The climate of Pune district is pleasant and cooler on the western side. Western part of the district is cool whereas the eastern part of the district is dry and hot. Minimum average temperature of the district is 10° C whereas maximum temperature rises above 36° C.

The rainfall is unevenly distributed and most of this rain is brought by southwest monsoon. The monsoon arrives in the month of June and maximum rainfall is in July and August. The normal annual rainfall varies from 500 mm to 4500 mm. The western part of the district is adjacent to west coast and is hilly area with forest cover resulting in high intensity of rainfall to the western side. In the eastern part of the district, Daund Tahsil receives minimum rainfall (465 mm) which increases towards west and reaches to maximum for Velhe Tahsil (2809 mm) in the western part.

3.2.7 Humidity

Due to increased evaporation losses from the atmosphere humidity is low in the summer season.
3.2.8 Soil

Red, brown or black coloured soils occur in the district. In desh two types of soils are observed, light brown soil in Maval and deep coloured cotton soil on low gradients. In this region, below the black soil, there is coarsely powdered sedimentary rock, which is called ‘Murum’. The fertility of soil increases from west to east.

3.2.9 Agriculture and Crop pattern

Bhima river basin covers almost entire area of Pune district. Agriculture is the most important activity of the area. The district is irrigated by surface irrigation and groundwater irrigation. Agriculture is the main land use in all tahsils except Pune. Velhe, Mulshi and Mawal tahsils have more forest cover. Major land area of the district is covered with Jawar crop (37%). Remaining area is under the cultivation of Bajra, Wheat, Pulses, Sugarcane and Maize. In recent years, horticultural activities are increasing for fruits like orange, grapes, sweet lime and banana.

3.2.10 Geomorphology

The Deccan Plateau and part of Western Ghat forms the district. There are four major characteristic land forms: 1) Hills and ghats 2) Foot hills 3) The plateau and 4) Plains (Jain, 2009).

3.2.11 River systems and Dams

The steep flowing hills which are parts of Sahyadri hill ranges are termed as highly dissected plateau. These areas are covered with basaltic lava flows. The drainage density is very high. All the major rivers originate from the Sahyadri hills. The district is fed with following major drainage systems: 1) Bhima-Ghod river system covering northern, north-eastern and eastern part of the district. Bhima, flows towards south east and enter in Solapur district with total length 355 km. The left tributaries of Bhima are Vel and Ghod.
2) Indrayani, Bhama, Mula, Mutha and Nira are right tributaries of Bhima. The central part of the district is covered with Mula-Mutha river system with total length 242 km.
3) Nira river system which has total length 231 km covering south, south-east and eastern part of the Pune district (Jain, 2009).

Although, there is at least one river flowing through each tahsil, none of these rivers are perennial. During monsoon all these rivers flow with a magnificent volume and during summer all the rivers shrink to a narrow thread in broad stretches of gravel. These rivers have semi-dendritic drainage pattern with high drainage density. Based on geo-morphological setting and drainage pattern the district is divided into 71 watersheds.

The major irrigation projects in the district are Khadakwasla, Panshet, Varasgaon, Bhatghar, Veer, Chaskaman which are the major sources for drinking and irrigation.

3.2.12 Industrial developments

There are ten MIDCs and several Co-operative industrial estates in Pune district. Agro based industries such as sugar, distilleries, dairy, food processing units, paper etc are predominant in Pune region. In Pune district, co-operative sugar factories and automobile industries play an important role in the development (Report: Environmental Status of Pune Region, 2004-05; Relief and Rehabilitation).

3.3 STUDY AREA

The study area of Nira river basin lies between 18°8’N to 18°4’N latitudes and 73°47’E to 74°40’ E longitudes and is situated in Maharashtra state of India (Fig. 3.1). Nira river is one of the small tributary of Bhima river flowing in Pune district originating in western hilly regions of Sahyadri near Shirawali. The catchment area of Nira river is 6,342 Km² with stream length is 203 Km. and has well developed dendritic drainage pattern (Fig. 3.2). Nira river drains in Tahsils Pune, Baramati and Indapur.
Fig. 3.1 Location map of Nira river basin
Fig. 3.2 Drainage pattern of the study area
3.4 SUMMARY

1) Study area is located in Pune district of Maharashtra State, India.

2) District has three natural divisions: Hilly area, basaltic plateau and river valleys.

3) Geology: Deccan trap basalts. Two rock types: Hard and soft rocks.

4) Minimum temperature 10°C. Maximum temperature 36°C.

5) Annual rainfall 500 – 4500mm.

6) Red, brown and black coloured soils.

7) Surface and groundwater irrigation. Main crop: Jawar

8) Origin of the rivers from Sahyadri hills, Non-perennial rivers with semi-dendritic drainage pattern.

9) Co-operative sugar factories and automobile industries play an important role in the development of the district.