CHAPTER 3
STUDY AREA
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3.1: INTRODUCTION:

Arid regions occupy 36% of the earth land surface (Mansour and Efe, 2010) and water shortage is the main limiting factor in the development of dry lands. The hot arid zones of India occupies an area of 0.32 million km$^2$ forming a continuous stretch in the north western states of Rajasthan, Gujarat, Punjab, Haryana and scattered landmasses in the Peninsular states of Maharashtra, Karnataka and Andhra Pradesh. Rajasthan and Gujarat alone account for 81.5% of the total hot arid zones in India (Kar et.al, 2009).

Mayureshwar Wildlife Sanctuary (MWS) at Supa is the unique sanctuary in the state of Maharashtra, dedicated solely for the conservation of Indian gazelle as flagship species along with the other wild faunal species of scrub land type of habitat. Population of Chinkara (Gazelle gazelle bennetti) in the sanctuary is estimated to be 120 to 200 (Ben et.al, 2013). The sanctuary also provides shelter to another rare wild animal of India's natural heritage, the Wolf.

The Blackbuck (Antelope cervicapra Linn.) has been the part of the Indian culture since time immemorial. Rehekuri Blackbuck Sanctuary (RBS) is the only sanctuary in the Maharashtra state dedicated solely to the conservation of blackbuck as flagship species along with the other scrub/grassland species like Wolf, Indian Fox, Jackal, etc. The sanctuary provides ideal habitat for the blackbuck. The visitors especially the school children come to understand the conservation values and enjoy the beauty of nature. There are more than 100 different species of birds (As per the information displayed in the nature interpretation center at MWS and RBS) in the sanctuary area (Annexure II). The nature lovers, visitors and students enjoy the bird watching.

The MWS and RBS are especially developed for the conservation of endangered animal species i.e. Chinkara (Gazelle gazelle bennetti) and Blackbuck (Antelope cervicapra) respectively.

3.2: LOCATION
MWS is located at $18^\circ$ 20' 0" N to $18^\circ$ 22' 30" N latitude and $74^\circ$ 20' 10" E to $74^\circ$ 23' 0" E longitude at 623 m elevation from mean sea level (Figure 3.1). The area of sanctuary is
5.14 km². Initially it was reserved forest, and declared as sanctuary on 19th August 1997, vide Govt. Resolution No. WLP 1094/cr-510/F-1 dated 27th August 1997, Mantralaya, Mumbai 400032 under Wildlife Protection Act 1972, clause (b) of subsection 26-A (53 of 1972). It is situated in biogeographic province 6B (Rodgers Panwar 1988, Ben et al 2014), at Supa in Tehsil Baramati of Pune district. The land of 5.68 ha has been diverted for construction of Janai and Shirsai Lift Irrigation Scheme by the Irrigation Department (IA No. 36 & 57 in WP (c) No. 337 of 1995) (http://www.moef.nic.in/sites/default/files/Minutes_meeting_200106.pdf).

**Figure 3.1**: Location map of MWS showing study regions, co-ordinates and altitudes (Spot heights) and roads.

The sanctuary area has been recently extended to 26.44 km² that falls in Indapur, Daund and Baramati Tehsils of Pune district. There is no zonation in the sanctuary except tourism zone (3 ha). Tourism zone is the area around the interpretation centre and the faculty house. The tourists are allowed to move freely in the area. All the workshops and seminars are held here. All the buildings are constructed in this zone (Abhang, 2004)
MWS is 72 Kms from Pune. It is approached by Pune-Solapur highway (National Highway No.9 now 65). The route by railway is Pune to Kedgaon (54 Kms) then via Chaufula (3 Kms) to Supa (12 Kms). It is 43 Kms. far from Tehsil place Baramati, and 26 Kms. from famous place Jejuri (Khandoba Temple) via Morgaon (famous for Mayureshwar Astavinayak Temple 9 Kms.).

RBS is located on 18°19’30” N to 18°22’0” N latitude and 74°19’0” E to 74°23’0” E longitude (Figure 3.2) at an elevation 604 m ASL. The forest type is dry deciduous scrub and falls in tropical thorn forest category (Champion and Seth, 1968). It is classified under the Biogeographic zone of Deccan Peninsula under Central Plateau. This Sanctuary lies in the Karjat tehsil of Ahmednagar district in Maharashtra in the rain shadow region of the Western Ghats. The area of sanctuary is 2.17 km².

Government of Maharashtra realized the importance of blackbuck conservation in the state and declared an area of 2.17 Sq. Km. of reserved forest in Rehekuri Village of Karjat Taluka as “Rehekuri Blackbuck Sanctuary”: vide Notification No.WLP/1378/85549-F-1 dt. 29th February 1980. The sanctuary is under the administrative control of the Conservator of Forests (wildlife), Pune. The sanctuary falls in the territorial jurisdiction of Dy. C.F. Ahmednagar district, in the Nashik territorial circle. The entire 217.13 ha of the sanctuary area is Reserved Forest.

3.2.1: Mayureshwar Wildlife Sanctuary:

a. Topography

MWS is at 623 m elevation from mean sea level. The terrain is gently undulating. The area of sanctuary is hilly at north and south with slopes towards middle of the sanctuary. The hills in sanctuary area range at altitudes up to 688 m.

b. Drainage

The overall drainage of the area was towards east. The area was hilly with slopes towards the middle, forming water flow or rivulets locally known as ‘nallas’.

c. Geology:

It is part of Deccan trap. Recently deposits of Tephra ash are found near Morgaon (Pune district). According to Prof. Somaya, the age of tephra (ash) deposit is seven lakh
years (Singh et.al, 2000).

**Figure 3.2** Location Map of RBS showing study regions, co-ordinates and altitudes (Spot height) and roads

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**d. Soils:**

The Soils are mostly yellowish or whitish as well as reddish brown soils with mixed sedimentary rocky coarse sand pieces of small and large size, known as murum. At some places, black soil with little depth is formed by weathering of basaltic rock. The soils are porous with good drainage. Recently Ben, et.al (2014) reported soil composition, micro-flora and myco-flora from this protected area of MWS.

**e. Climate:**

The climate is hot and dry. It is a drought prone and rain shadow area of Western Ghat. The maximum temperature was about 43°C, and minimum about 6°C. There are three seasons i.e. summer (February to June), monsoon (July to September), and winter (November to February). The average rainfall is about 400-800 mm distributed from June
to October. Humidity varies in different seasons. In monsoon it is maximum (>50%) and in winter moderate, while in summer the lowest (<35%). Generally the precipitation received is from south west monsoon. The rains are uncertain and scanty. Rainy season is comparatively of shorter duration because this area comes under the rain shadow zone.

f. Nature and distribution of water sources:

There is acute scarcity of water in and around the sanctuary due to scanty rainfall. There are no natural wetlands or marshes in the sanctuary. There are three existing percolation tanks. The water is made available to Indian gazelle and other wildlife of the sanctuary by way of artificial means. The three percolation tanks and an old quarry were partly de-silted during the year 1999-2000. Further de-silting will help in resolving the water problem considerably. There are two bore wells in the sanctuary, of which one yields sufficient water. Installation of pump and pipeline is suggested to supply water to the artificial waterholes for the animals and to the interpretation centre for the staff and the visitors. New bore wells are also suggested to minimize the present water scarcity. During summer there is an acute water-shortage forcing deployment of water tankers. The total waterholes in the sanctuary are - three old percolation tanks; two old cement water holes; and two newly constructed waterholes (during 1999-2000).

g. Vegetation:

According to revised forest types (Champion and Seth, 1968) the study area has been classified as Southern Tropical Thorn and Scrub Forests (Group 6 subgroup 6A/C1/DS1). According to Rodgers and Panwar (1988) biogeographic classification the regions falls in what is known as Deccan biogeographic zone (6) and Deccan Plateau South (6A) biotic province. The vegetation forms a habitat for Chinkara and supports its survival as well as other animals of the sanctuary. The sanctuary consists of dry deciduous scrub forest interspersed with grasslands. The sanctuary area was the reserve forests of Pune forests division, comprising old plantations not subjected to any silviculture system of working so far. These are open forests in which thorny hardwood species predominate.

This type of vegetation has been observed in all isolated blanks surrounded on all sides by revenue villages and subjected to excessive grazing and browsing. It is typical of the extremely dry of the eastern region, and also the drought prone area. The vegetation is
characterized by sparse stunted growth of *Azadirachta, Acacia, Ziziphus, Gymnosporia*, and other deciduous species along with grasses (Abhang, 2004).

h. Land use pattern:

The main land use pattern was reserved forest and surrounded by revenue villages along with interspersed agricultural fields. 5.68 ha of forest land were diverted from Mayureshwar Sanctuary for construction of Janai and Shirsai Lift Irrigation Scheme by the Irrigation Department (I A No. 36 & 57 in WP (c) No. 337 of 1995).

i. Boundaries:

North: Village boundaries of Vadhane, Padvi, and Supa
East: Supa and Supa-Morgaon Road.
South: Supa-Jejuri Road, and Supa.
West: Supa

j. Status of Boundaries:

Trench Cum Mound (TCM) of 5 kms length was dug up during 1999-2000 on the sanctuary boundary. RCC cement pillars (200 Nos.) are erected. The total length of the external boundary is 23.5 kms. The ecological boundaries extend into the surrounding agricultural fields up to a radius of 10 to 15 kms from the external physical boundaries of the sanctuary.

3.2.2: Rehekuri Blackbuck Sanctuary:

The RBS is located in Karjat Tahsil of Ahmednagar district. The Reserved Forest area of this newly constituted blackbuck Sanctuary overlaps the area of already constituted Great Indian Bustard (GIB) wildlife Sanctuary, which was already notified in the year 1979. RBS is located 75 km from Ahmednagar, and 7 km from Karjat. It is habitat for deer and the Great Indian Bustard.

RBS is accessible by road from Ahmednagar and Pune cities. The nearest railway station is Ahmednagar. The sanctuary is 70 kms south of Ahmednagar city and it is 150 kms east of Pune city. The sanctuary is situated along state highway no.55 from Shrigonda to Mahi-Jamkhed. State transport bus facility is available from Pune, Ahmednagar and
Karjat at fairly regular intervals. The nearest Airport is Pune (150 kms).

a. Topography:

In general, the terrain of the sanctuary is flat and gently undulating with an average elevation of 600 to 650 m above mean sea level. This sanctuary area is east part of Ahmednagar plateau, and having a general south-easterly slope. Middle area of sanctuary is elevated. (http://ahmednagar.nic.in/gazetteer/gen_geography.html)

b. Drainage:

Middle area of sanctuary is elevated. Water flows from middle area towards North-East and also from middle to South-West forming nallas or rivulets. Sanctuary area is the catchment for surrounding agricultural farms. The habitat improvement works like continuous contour trenches (CCT), nala bunds, grass beds, afforestation etc. has improved the ground water table in the surround villages. The sanctuary area is almost flat, having good drainage.

c. Geology and Soils:

Geologically it is part of Deccan Trap. Majority of the area contains black cotton soil and rarely porous soil containing iron (RBS Management Plan, 2010). In general soils of area are black loam type. The surrounding area is covered by a thin mantle of black cotton soil. Apart from black soil, the soil colour varies from reddish brown to coarse grey.

d. Climate:

The climate is hot and dry. It is bright in summer. Humidity varies in different seasons. In monsoon or rainy season it is more and in winter moderate while in summer the lowest. The summer temperatures are comparatively higher. Maximum temperature is about 44°C in summer, while minimum temperature is about 8°C. In the month of May it goes up to 45°C. The rainy season is of shorter duration and rains are erratic and scanty as the entire tract falls in the rain shadow zone. The average annual rainfall varies from 500 mm to 750 mm. The monsoon rains wet this tract during mid-June to September end. In June, July, September and part of October the maximum precipitation is received. The bulk of the rainfall is received from South–West monsoon. The cold season starts in November and lasts till January.
Rains are erratic and scanty. Bulk of the rainfall is received from the south-west monsoon. The average rainfall is about 300-500 mm distributed from June to October. The average rainfall for last ten years comes to 419 mm, which is less as compared to the fifty year average of 500-750 mm. Rainfall during 2003 was very scanty. However in the last 2 years of the outgoing plan, the sanctuary area received plentiful rains, i.e. 726 mm and 689 mm in 2008 and 2009 rainy seasons respectively. As far as winter is concerned, December and January are coolest having temperatures from 12°C to 29°C.

e. Vegetation:

The area is used for marginal cultivation and the wasteland is overgrazed by sheep and cattle. The erstwhile natural habitat was a typical example of the 'Southern Tropical Thorn Forest where grassland and scrub were interspersed with open thorn woodland characterized by *Acacia* species reaching a height of 4 to 6 meters. However the vegetation has been altered significantly due to recent plantations. In the early 1960s the Forest Department established plantation of *Eucalyptus* spp., *Dalbergia sisoo* and *Azadirachta indica* under the Drought Prone Area Project (DPAP) Scheme. Certain species of grasses were also introduced in the recent years. Jowar and Bajra are the main crops cultivated in nearby agricultural fields of RBS.

The predominant plant species are *Azadirachta*, *Dalbergia latifolia*, *Acacia catechu*, *Acacia leucophloea*, *Acacia nilotica*, *Ziziphus*, *Cassia auriculata*, *Balanites aegyptiaca* among trees and shrubs. The common grasses were *Aristida*, *Heteropogon*, *Sehima*, *Themeda*, and *Iseilema* (Abhang, 2004).

RBS is the only sanctuary in the state dedicated solely to the conservation of blackbuck as flagship species along with the other scrub/grassland species. The sanctuary provides ideal habitat for the blackbuck; and also shelters another rare wild animal of India’s natural heritage and it is the Wolf. The faunal species other than blackbuck and Wolf are Common Fox, Jackal, Mongoose, Hawks, Owls, and Hares etc.

f. Land Use Pattern:

The main land use was reserved forest, surrounded by revenue villages and agricultural farms. The forest department continues to plant trees both in the sanctuary and in the neighboring DPAP plots, that should be decreased and emphasis is shifted to developing area as grassland (Bharucha and Asher, 1993).
g. **Boundaries:**

RBS is a small sanctuary having an area of 217.43 ha of reserved forest. As such, the boundaries of this sanctuary are well defined. TCM fencing dug away back in 1984-85 has *Agave* planted partly along the TCM, which provides a very good barrier. RCC pillars have been erected along the external boundary of the sanctuary.