Chapter 3

Study area

3.1 Introduction

Ranthambore Tiger Reserve (RTR) named after a great monument of history, bravery, culture and natural beauty, the majestic ‘Fort of Ranthambore’ is one of the globally acclaimed high priority conservation areas, supporting a population of the critically endangered tigers. Besides, it also supports enormous faunal and floral diversity. The Reserve is situated in the Rajasthan state in western (Rajasthan) India. It is the one of the first nine Tiger Reserves taken up in the country in 1973 for the conservation of tigers. It is situated at the confluence of the Aravali Hills and the Vindhyan plateau in eastern Rajasthan. The Chambal River in the South and the Banas River in the North drains the Ranthambore National Park. Six man-made reservoirs and many perennial streams add to the beauty of the national park.

3.2 History

Ranthambore National Park was the hunting ground of the Maharajas of Jaipur. This region under the control of the Rajput King Hamir was annexed by Ala-ud-din Khilji’s army in AD 1301. The history of Ranthambore reached the pinnacle of its glory when Emperor Akbar captured it in 1569 AD. He also took over the control of the fort from the Rajputs. This event has been recorded in the miniature paintings of the Akbarnama. The fort was transferred to the Kachwaha rulers of Jaipur later and remained under their control till 1949 when Jaipur was made the part of Rajasthan. The region is played host to several hunting parties organized in this region for dignitaries. One such party was organized in honor of Queen Elizabeth II and Duke of Edinburgh in 1949. The former rulers of Jaipur first felt the need to preserve the area. In 1955, Ranthambore became a game sanctuary and was among the first few protected areas in India. In 1984, Ranthambore Sanctuary acquired the status of a
National Park covering almost 400 sq km of area. It was declared as one of the first nine Tiger Reserves in India, with the inception of Project Tiger in 1972.

3.3 Physical attributes

3.3.1 Location and extent

Ranthambore Tiger Reserve lies between latitudes 25°41' N to 26°22' N and longitudes 76°16' E to 77°14' E. The reserve is situated in south eastern part of Rajasthan in Sawai Madhopur and Karauli districts of Rajasthan, India. Ranthambore Tiger Reserve is located on the Western bank of river Chambal. The other river Banas divides the reserve into two parts, the north eastern part being the Keladevi Wildlife sanctuary. The total area of Ranthambore Tiger Reserve is 772.63 km² falls in Sawai Madhopur district and the in Karauli district 621.84 km². Ranthambore National Park covers an area of 392 km². The total area of the Ranthambore Tiger Reserve is 1,394.47 km², which includes the adjoining protected areas Kaila Devi Sanctuary (672 km²) and the Sawai Man Singh Wildlife Sanctuary (242 km²) and 40 km² of Qualji game sanctuary.

3.3.2 Topography

The physiography of Ranthambore Tiger Reserve includes undulating terrain with rolling hills of low to moderate height traversed with perennial rivers and several streams. The altitude ranges from 244 m to 507 m above sea level (asl). The terrain of RTR is mostly rugged and hilly. The hills to the north-west of fault are typical Gwalior and lower Vindhyans and are characterized by ridges on one side and gentle slope on the other side. This Gwalior and lower Vindhyans tract are highly undulating except for a few small plateaus like Salawata ki dang, Rann ki dang and Mandook, and some small valleys like Kachida, Anantpura, Berda, Lakarda and Malik Talab. The highest point of this tract is Gazella peak, 507 m asl. The lowest altitude of this tract is 244 meters above sea level (asl) at Bodal village.
3.3.3 **Drainage pattern**

Streams flowing in northern tract form the catchment of the Banas and streams flowing in southern tract drain directly in the Chambal. Streams facing sharp ridges contain water for almost throughout the year, as the folded impervious rocky strata beneath does not permit the water to percolate. The hills on south west of Great boundary fault are Upper Vindhyan. The sand stone beds of these hills are particularly horizontal and form extensive table lands known as ‘Dangs’ like Indala ki Dang, Dang Dood Bhatt and Karauli Dang, etc. These Dangs rise abruptly from flat ground above a mass of crumbling shale where inclined sand stone forms continuous strike ridges along deep, long and narrow gorges of eroded shale. These gorges are locally known as ‘Khohs’. The Khohs are cool and retain moisture even in the hot summer and are heaven for wild life of this dry and parched area. These Khohs are the main wildlife areas. In the Keladevi sanctuary particularly, the gorges are very long and wide, in some areas extending up to 10 km in length, up to 0.5 km wide and as deep as 100 meter or more. In this tract one hill range starts from Qualji, runs in north-east direction and goes up to Sawta. The hill range passes through Sawai Man Singh and Sawai Madhopur sanctuaries.

3.3.4 **Geology and edaphic characteristics**

The area includes the confluence of the ancient Aravalli system with Vindhyan system, where in the later are brought against the former at the Great Boundary fault. It has a unique geomorphology. The Vindhyan system is characterized by flat topped hills. The soil of the RTR is formed by the Aravalli, Gwalior and Vindhyan system of rocks. The Aravalli system rocks cover a small portion on the north-west side of the reserve while Gwalior and Vindhyan systems share most of the RTR. A part of the terrain comprises of pre-Cambrian Igneous, Metamorphic and Sedimentary rocks belonging to pre-Aravalli-Vindhyan system. Pre-Aravalli rock units are made up of Quartzite, Mica Schists, Gneiss and Migmatites. The rocks of the Vindhyan super group are made up of sand stones, shales, limestone and breccias of widely variable composition and characters occupying most part of the reserve. The Gwalior systems
are made up of slate and shale. The soils though shallow on the hills, are, suitable for supporting forests of *Anogeissus pendula*.

### 3.4 Ecological attributes

#### 3.4.1 Climate

The area is characterized by Sub-tropical dry climate with distinct cold (November-February), hot (March-June) and rainy (July-September) seasons. October is a transition period. The highest temperature (above 47°C) is recorded in May-June and the lowest (up to 2°C) in December-January. The diurnal variation of temperature is high. Frost is common in winter. Drought is of common occurrence. Relative humidity on an average is 30-34%. Hot dry winds locally called ‘loo’ are frequent in summer. The early south-west monsoon blows mainly from westerly and south-westerly directions. Thunder storms in May-September and dust storms during summer are common. Cold westerly waves from North-North-west direction blow during winter.

#### 3.4.2 Temperature

During the summer months of March to June the temperature is on a continuous rise. May and first half of June, being are hottest parts of the year. The maximum temperature in May and June rises up to 47°C. In the second half of June, normally pre-monsoon showers start, which brings down the temperature by 3°C to 5°C. After withdrawal of monsoon by the end of second week of September, days become hot. The nights become progressively cooler. After mid-November both day and night temperatures drop. During the winters, January is the coldest month. The daily maximum temperature may be as high as 20°C and the minimum temperature may drop down to 4°C. During the cold wave spells the temperature drops further down. In the valley areas of the RTR like Lahpur valley the temperature touches freezing point.
3.4.3 Rainfall pattern and distribution

The bulk of the precipitation is from SW monsoon and occurs during the months of July to September. The winter rains from NE monsoon are quite common. The average rainfall is 800 mm. The rainfall during the period from June-September constitutes about 92% of the annual rainfall. There is a large variation in rainfall from year to year. The distribution of rainfall is fairly erratic.

3.4.4 Humidity

The relative humidity is generally low in most part of the year. It becomes as low as 10 to 15% during summer months. However, during the rainy days the relative humidity goes over 60%.

3.4.5 Wind

Winds are generally light to moderate. During the pre-monsoon period the northerly winds are comparatively strong with occasional dust storms. The northeasterly winds during winters are mild. In the summer season hot winds blow from the direction between SW and NW, and are known as ‘loo’ and have a desiccating effect. Thunder storms occur during the period from May to September. Hail may also be associated with thunder storms during the months from February to May. During the hot season, dust storms are also not uncommon. During the month from January to March low pressure areas moving from the west affect the area when the situation of ‘cold waves’ develop.

3.4.6 Drought and its periodicity

Droughts are cycle period occurred in the RTR. During the drought period there is an acute shortage of fodder inside and outside the RTR. All the water holes tend to dry up very early and water becomes a limiting factor.
3.4.7 Floral diversity and vegetation types

According to the Biogeographic classification (Rodgers and Panwar, 1988) vegetation falls in 4 B (Semi-arid zone and Gujrat—Rajwara biotic province). The area forms the transition zone between the true desert and seasonally wet peninsular India. The forests type of Ranthambore Tiger Reserve is mainly an edaphic climax and belongs to the sub group 5B/C2 Northern Tropical Dry Deciduous forests and subgroup 6B/DS1 - *Zizyphus scrub*. The degradation stages found here are DS1 - Dry deciduous scrub and 5/DS1 - Dry Grass lands (Champion and Seth, 1968). The area is representative of dry deciduous *Anogeissus pendula* Forests type in association with *Acacia*, *Capparis*, *Zizyphus* and *Prosopis* species. Fairly large area is dominated by *Anogeissus pendula* with *Grewia flavesens* in under-story as a common associate. The main associates of dhok (*Anogeissus pendula*) are, kadaya (*Sterculia urens*), salai (*Boswellia serrata*), palash (*Butea monosperma*), amaltas (*Cassia fistula*), churail (*Holoptelia integrifolia*), gurjan (*Lannea coromandelica*) and khair (*Acacia catechu*) etc. These associated tree species form the middle storey in almost all the communities and in certain cases the under storey also. The common associates of khair (*Acacia catechu*) are raunj (*Acacia leucophloea*), berjhari (*Zizyphus nummularia*), guter (*Zizyphus xylopyra*) and tall grass species like buhari (*Eremopogon flaveolatus*), kali lamp (*Heteropogon contortus*), karad (*Dichanthium annulatum*), bhanjura (*Apluda mutica*). Some patches of tropical moist mixed forest mostly consists of jamun (*Syzygium cumini*), guler (*Ficus racemosa*), tendu (*Diospyrus melanoxylon*), khajoor (*Phoenix sylvestris*), kusum (*Schleichera oleosa*), rohini (*Mallotus philippinensis*), behera (*Terminalia belerica*), mango (*Mangifera indica*). Such forests are common in the valley areas around water streams, lakes and reservoirs.

3.4.8 Faunal and diversity

Ranthambore National Park is bestowed with a wide diversity of fauna. This is one of the most striking features of the area. The Ranthambore ecosystem supports about 30 species of mammals, 12 species of reptiles and more than 300 species of birds. The nomenclature used here follows Corbett and Hill (1992). A total of 12 species of
carnivores are found in RTR, of which 5 are felids - tiger (*Panthera tigris*) and leopard (*Panthera pardus*), jungle cat (*Felis chaus*), caracal (*Felis caracal*) and rusty spotted cat (*Prionailurus rubiginosus*). Other carnivores include striped hyaena (*Hyaena hyaena*), jackal (*Canis aureus*), sloth bear (*Melursus ursinus*), common mongoose (*Herpestes edwardsii*), small Indian mongoose (*Herpestes auropunctatus*), ruddy mongoose (*Herpestes smithii*), ratel (*Mellivora capensis*), Indian false vampire (*Megaderma lyra*), palm civet (*Paradoxurus hermaphroditus*) and small Indian civet (*Viverricula indica*). Earlier, the Indian wild dog or dhole (*Cuon alpinus*) used to occur in RTR but there have been no sightings in recent times. Wild ungulates forming a prey base for the larger carnivores include chital (*Axis axis*), sambar (*Cervus unicolor*), nilgai (*Boselaphus tragocamelus*), chinkara (*Gazella gazella*), wild boar (*Sus scrofa*) etc. Two primates, common langur (*Presbytis entellus*) and rhesus macaque (*Macaca mulata*) are found within the Reserve. Other animals found in the reserve are the rufous tailed hare (*Lepus nigrigollis ruficaudata*), porcupine (*Hystrix indica*) and rodents such as the Indian gerbille (*Tatera indica*) and Indian bush rat (*Golunda ellioti*). A large number of aquatic birds also visit the reserve during winter. Due to the presence of villages inside and on the periphery, variety of domesticated animals also occurs within the reserve. These include livestock, domestic cats and dogs.

### 3.5 Anthropological attributes

#### 3.5.1 Human settlements

Ranthambore National Park protected area is under heavy anthropogenic influence from the 95 peripheral revenue villages within the buffer of two kilometers from park boundary estimated human and livestock populations in these villages are of approximately 1,50,000 and 95,000, respectively. In addition to that there are 4 villages within the Reserve having human population of 2,540 and cattle population of 9,811.
3.5.2 Tourism

Owing to good network of roads tourism is well managed and regulated by the park administration. Some core zones are closed for tourism so as to keep some tiger population away from tourist pressure and rest of park area is divided into 5 tourist zones. Tourists are taken into park in vehicles. In each zone 20 vehicles are allowed at one time. Park opens at 6 am in the morning and closes 6 pm in the evening. Park remains closed for 3 months from 1st July to 30th September due to rainy season in a year. Besides the ecotourism, a number of local religious tourists come for the “Ganesh temple” situated 5 km inside the Park area. In the month of September a fair is held at the Ganesh temple due to which there is very heavy traffic in the park.

3.6 Research

A number of short and long term research projects have been conducted in relation to socio economics, prey abundance and population estimation of tiger in RNP (Berkmuller et al., 1986; Kumar, 2000; Bagchi, 2003; Sharma, 2001; Karanth et al., 2004 and Chauhan et al., 2005). Apart from these, WII has been conducting research on tigers on population estimation by camera traps 2005 and intensive monitoring of source population of tiger by radio-telemetry with special reference to dispersal of male tiger sponsored by National Tiger Conservation Authority since 2007.
Map 1: Conservation area of Ranthambore Tiger Reserve, Sawai Madhopur.