CHAPTER I

INTRODUCTION

" The forest makes no demands for its sustenance
and extends protection to all beings, offering
shade even to the axe man who destroys it."

This quotation by Lord Buddha encapsulates
the relationship between people and nature.

Human life and aspirations are linked with land. Natural resources are attributes of the land, without which survival of man is at stake. Economic development of man has led to over exploitation of natural resources resulting in depletion.

Sitting in our urban homes, we tend to forget that we live on this earth as guests of the green plants that convert sunlight, nutrients and water into food. If green plants cease to exist, animals cannot exist. In nature a delicate web of inter-dependence is spun among all living organisms as well as between the biosphere and geosphere (Swaminathan, 1990).

Modern development abuses nature to provide excessive benefits for one or two generations. The symptoms of this abuse can be seen all around us - deforestation, increase in population, high poverty and global climatic change.

Human beings, in their quest for economic development and enjoyment of the riches of nature must come to terms with the reality of resource limitation and carrying capacities of ecosystems and must take into account the needs of future generations. This is the message of Conservation (WCS, 1980). ***The World Conservation Strategy*** provided an intellectual framework and practical guidance for necessary conservation actions.

Subsequently, ***Caring for the Earth*** (1991) proposed a universal ethic of care for nature and for people. The latter conservation strategy defines principles on which a sustainable society should be based, and recommends 60 actions for the same.

Both the strategies propose recommendations and follow-up implementation actions. It is for the countries of the world to legalise proposals to achieve the aims of the strategies. The Earth's resources are limited; some countries consume them at a rate that would leave little for future generations and other countries consume far too little and live with the prospect of hunger, squalor, disease and early death (WCED, 1987).

The ***Biodiversity Convention***, a world treaty, first of its kind, was signed by 150

States at the UN Conference on Environment and Development, held at Rio de Janiero, Brazil in June 1992. By September 1994, 89 countries had ratified the Convention. In India, the Biodiversity Convention came into effect on 29th December, 1993 and was formally ratified on 18th February, 1994 (Kothari, 1994). The signing countries are bound by this treaty to frame policies for environment protection and biodiversity conservation.

The Global Biodiversity Strategy (1992) is built around 85 specific proposals for action to conserve biodiversity essential for all life-support systems. The strategic objectives of significance are:

- development of national and international policy frameworks that foster sustainable use of biological resources and the maintenance of biodiversity;
- there is need to create conditions and incentives for effective conservation by local communities;
- tools for conserving biodiversity must be strengthened and applied more broadly;
- human capacity for conserving and using biodiversity sustainably must be greatly strengthened, particularly in developing countries;
- conservation actions must be catalyzed through international cooperation and national planning.

CONCEPT OF PEOPLE AND PROTECTED AREAS

Conservation of natural resources was always practised by earlier generations. At that time everything was in plentiful and the human population was much less. When national parks were established some 50 years ago, it was not deemed necessary to consult the public on the subject.

In the year 1971, the human population in India was 548 million, increasing to 900 million by mid-1994. This population increase in 20 years has been more than the total increase in the earlier six decades of this century (Repetto, 1994), resulting in severe strains on limited natural resources. Consequently, it has become difficult to strike a balance between the land resources and needs of the people.

In the year 1962, the first World Congress on National Parks and Protected Areas was held. The main objective in view was to promote the development and effective management of the world's natural heritage so they can make their optimal contribution to the sustenance of human society. Thereafter, every decade such a Congress is held to review the existing situation.

The Declaration of the World National Parks Congress held at Bali in 1982 highlights: Protected areas are an indispensable element of living resource conservation because,

- they maintain essential ecological processes that depend on natural ecosystems;
- they preserve the diversity of species and the genetic variation within them;
- they maintain the productive capacities of ecosystems and safeguard habitats critical for sustainable use of species;
- they provide opportunities for scientific research and for education and training (McNeely & Miller, 1984).

The IVth World National Parks Congress held at Caracas, Venezuela in 1992, recognises that parks and protected areas are intended to bring lasting benefits to humanity. It follows, therefore, that detailed knowledge of the people whose lives are affected by the processes of park creation, planning and management is as important as an inventory of the plant and animal species to be conserved.

The protected area network of our country is distributed over 10 bio-geographic zones, having 75 national parks and 428 wildlife sanctuaries covering nearly 1,40,000 sq. kms, which is approximately 4.2% of the land area of our country (Dey, 1994).

Establishing more small protected areas in a variety of habitats may save more species than establishing fewer larger protected areas would; since the smaller areas will provide a larger sample of different assemblages of organisms (Reid & Miller, 1989).

The IVth World Congress on National Parks and Protected Areas emphasized

that protected areas are about meeting people's needs; that protected areas should not be islands in a sea of development but must be part of every country's strategy for sustainable management and the wise use of its natural resources, and must be set in a regional planning context (IUCN, 1992).

A protected area is defined as, "An area of land and/sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means" (IUCN, 1994).

Overall management of landscapes with its natural and modified surroundings, including farms, grazing areas, village settlements, protected areas having biodiversity rich forest, and land restoration projects would result in an integrated regional planning.

Therefore, **BIOREGION** is a territory whose limits are defined by the geographical limits of human communities and their associated ecological systems. Such a region should be large enough to maintain the integrity of the region's biological communities, habitats and ecosystems and small enough for the local human communities to consider it home. Thus, a bioregion is defined by its unique biodiversity and cultural identity and should be a place wherein local communities have the primary right to determine their own development (WRI, IUCN, UNEP, 1992).

Most of India's natural landscapes such as forests, grasslands, marshes, rivers, lakes, and coastal areas are known as **COMMON PROPERTY RESOURCES** because rights to use and manage them are mostly with the Governments or by local communities rather than by private individuals. In semi-arid regions, spanning 8 States, the area of the commons declined by 30-50% between 1950 to 1980. When remaining areas of the common property resources couldn't meet the demands on them sustainably, a cycle of continuing degradation was set in motion. Overexploitation reduced the stock of the trees and useful plants and of fish and animals. As more people and animals sought sustenance on a smaller resource base, thus, exploitation only intensified (Repetto, 1994).

India is one of the "megadiversity" countries, being home for an unusually large number of endemic species. However, most of India's distinct ecological zones have been destroyed or extensively disturbed, and now exist only in scattered remnant patches, many of India's unique plants and animals are threatend or endangered (Nayar & Sastry, 1987).

Why select JWLS as study area ?

1. The study area was in close proximity (72 kms) to the University of Baroda. Possibly in recent times, very rarely one would come across a deciduous forest in the vicinity of a highly urbanised and industrialised centre.

2. In the Panchmahals, the forests are home to tribal populations. In order to ascertain their dependency on forest resources and to understand the forest-people relationship, JWLS was an ideal location, as the sanctuary status was accorded in the year 1990.

3. We share the belief of not uprooting the tribal communities from their traditional homes and that they should act as the custodians of their biodiversity for future prosperity.

4. The ultimate aim was to ensure that such a unique heritage does not face further violations from various man-made threats and that the bioregion be conserved for the benefit of future generations.

PROFILE OF STUDY AREA

GEOGRAPHICAL LOCATION :

'Jambughoda Wildlife Sanctuary' (JWLS) is located between lat. 22°20' N to 22°30' N and long. 73°35' E to 73° 45' E in the Panchmahal and Vadodara districts of Gujarat State, India (Figure I. 1). It was notified as a Protected Area in May 1990, having a total area of 130.38 sq. kms, comprising of forests of Jambughoda and Halol talukas of Panchmahal district, and those of Sankheda taluka of Vadodara district. The Sanctuary finds a place in the ***1993 United Nations List of National Parks and Protected Areas*** prepared by the World Conservation Monitoring Centre (WCMC) and the IUCN Commission on National Parks and Protected Areas (CNPPA). The Sanctuary is listed in Category IV as per the ***Guidelines for Protected Area Management Categories*** (CNPPA and WCMC, 1994).

The Sanctuary is connected by road, being 11 kms north of Bodeli, 30 kms east of Halol and approximately 72 Kms north-east of Vadodara. No railway line traverses the Sanctuary.

MAIN FEATURES OF THE REGION :

The Sanctuary area is hilly, forming the western fringes of the Vindhyan mountain ranges (Gazetteer 1972). Therefore, most of the hills run in east to west direction and only some in the north to east direction. The flats in between the hill ranges (except 'Ranna') and the valleys are under cultivation. The Sanctuary is surrounded by 4 talukas (Figure I. 1). Towards the north-west of the Sanctuary, the historic hill of Pavagadh is situated, having an altitude of 865 m (Plate I. 1. 1). The highest point in the Sanctuary is the Masabar hill (354 m) which forms the southern boundary of the sanctuary (Plate I. 1. 2); the next highest is the Poyali hill (353m) forming the northern boundary. There are no perennial rivers traversing the Sanctuary, but the Sukhi river runs almost parallel to its eastern boundary. Few perennial springs are present, at Jhand, Jabban and Ranjitnagar. The drainage waters from the hills have been dammed at several places in the Sanctuary - Kada, Dharia, Laphni and Targol (Figure I. 1), to conserve the available moisture. Canals from the Sukhi dam are connected to Kada - Targol - Dev Dam, providing water throughout

the year to the peripheral villages on the eastern and southern fringes.

CLIMATE :

The Climate is characterised by a general dryness except during the monsoons when it is damp and humid, leading to malarial conditions. Based on the field experience, the year may be divided into three seasons: Summer - March to June, Monsoon - July to October and Winter - November to February.

RAINFALL :

The entire annual rainfall is received from south-west monsoon only. Occasional showers may occur in winter and at times during summer. Rainfall in general is very erratic, consisting of heavy showers interspersed with long periods of drought.

From past rainfall records of the Panchmahal district, it is observed that Jambughoda area shows maximum average rainfall and almost the highest number of rainy days. Total annual average rainfall in Jambughoda is about 40" to 60". Working plan for the Forests of Panchmahal (1973) reveals rainfall statistics for 12 year period, 1957 to 1969 for Jambughoda, which is as follows :

Average Annual Rainfall in mm	Average number of Rainy days in a year	Average Number of Rainy days in			
		June	July	August	September
996	61	5	20	16	20

**Refer TABLE I - RAINFALL DATA FROM SHIVRAJPUR AND JAMBUGHODA

TEMPERATURE :

There is wide variation in maximum and minimum temperatures depending upon the seasons. During the hot season, the maximum temperature is about 44°C to 46°C and minimum temperature is about 26°C to 27°C. During the cold seasons, the minimum temperature is about 7°C to 8°C and maximum temperature is about 23°C to 24°C.

TABLE I

Total Annual Rainfall and number of rainy days during the period 1986-93
STATION : Shivrajpur - Halol Taluka

Year	Number of Rainy Days						Annual Rainfall
	June	July	August	Sept	Oct.	Total	in mm
1986	3	12	15	—	—	40	441.00
1987	5	7	10	1	—	23	407.00
1988	5	23	21	14	1	6	836.00
1989	7	20	19	5	—	51	764.00
1990	4	21	24	18	1	68	1354.25
1991	1	18	18	3	—	40	600.00
1992	4	15	22	10	1	52	825.00
1993	6	18	5	5	—	34	837.50

Total Annual Rainfall during the period 1980-94
STATION : Jambughoda - Jambughoda Taluka

Year	Annual Rainfall in mm
1980	1124
1981	1640
1982	683
1983	1564
1984	842
1985	350
1986	762
1987	334
1988	775
1989	1052
1990	1932
1991	716
1992	1031
1993	1077
1994	1723

WIND :

General direction of winds is from the west. In the winter, cold winds blow from the north - east. During the hot months, hot winds start blowing from early afternoon. Cyclonic winds occur occasionally during summer months causing mild damage by uprooting *Madhuca* trees.

RELATIVE HUMIDITY :

Relative humidity is generally high during the rains (about 70%) and less during the hot season (about 20%).

GEOLOGY :

The rock formations observed in the study area are regarded as the Southern continuation of the Aravalli rocks of N. Gujarat and Rajasthan. The Aravalli series was found to strike in the vicinity of Baroda on the site of the ancient city of Champaner, therefore called as Champaner series (Wadia, 1978). The main rock formations of the Champaner series in the region are quartzites, conglomerates, sandstones, slates, limestones, and siltstones, each showing a number of varieties. Manganiferous beds are encountered near Bhat and Shivrajpur (Figure I. 2).

Structurally, the rocks of the Champaner series show a strong and repeated folding roughly in east-west direction. Superimposed on the east-west folds, deformation roughly in north-south direction are encountered (Jambusaria,1970).

VEGETATION :

According to the Revised Classification of the Forest types of India (Champion & Seth, 1968), the forests of JWLS show similarity with those of Banswara and Udaipur divisions of Rajasthan - Type 5A/sub-type C1a [Type 5A - Southern tropical dry deciduous forest, sub-type C1a - Very dry teak forest].

BOTANICAL EXPLORATIONS OF THE REGION AND THE ENVIRONS :

The study area was accorded a Sanctuary status in May 1990 (Gazzette

Notification, 1990). Regions lying in close proximity to the Sanctuary are Pavagadh hill (Chavan & Oza,1966) and Ratan Mahal Sloth Bear Sanctuary (Bedi, 1968). During the years 1973-78, Jambughoda mahal and surrounding hills were explored for floristic studies (Asari & Padate, 1979).

OBJECTIVES OF THE PRESENT STUDY:

1. What is the Biodiversity Potential of the Bioregion ?

2. Can the cultural life-styles of the indigenous local people be linked to biodiversity sustenance and/or to the ecological degradation of the habitat ?

3. Devise a management strategy for the Common Property Resource, prioritizing Participatory Approach and Conservation Education.

ORGANIZATION OF THE THESIS :

The thesis is divided into four Chapters. General introduction with a profile of study area and the Objectives of the study form the first Chapter. The second and third Chapters commence with brief introductory remarks, method, results and discussion. The inventory of plant and animal species is provided alongwith results of Chapter II. Chapter III deals with Socio-Cultural and Ecological Aspects. The final Chapter provides Management Recommendations. Tables, Figures and Plates are inserted in the relevant portions of the text.

The Chapters are followed by a Summary of Findings and References. The thesis ends with Indexes of Scientific and Vernacular names of forest tree species found in JWLS.

FIGURE I.1

1. Map of India

   ■ Gujarat State

2. Map of Gujarat State

   ▨ Panchmahal District

   ■ Jambughoda Wildlife Sanctuary

3. JWLS with Sanctuary boundary and surrounding talukas

LOCATION MAP OF JAMBUGHODA WILDLIFE SANCTUARY, GUJARAT STATE, INDIA.

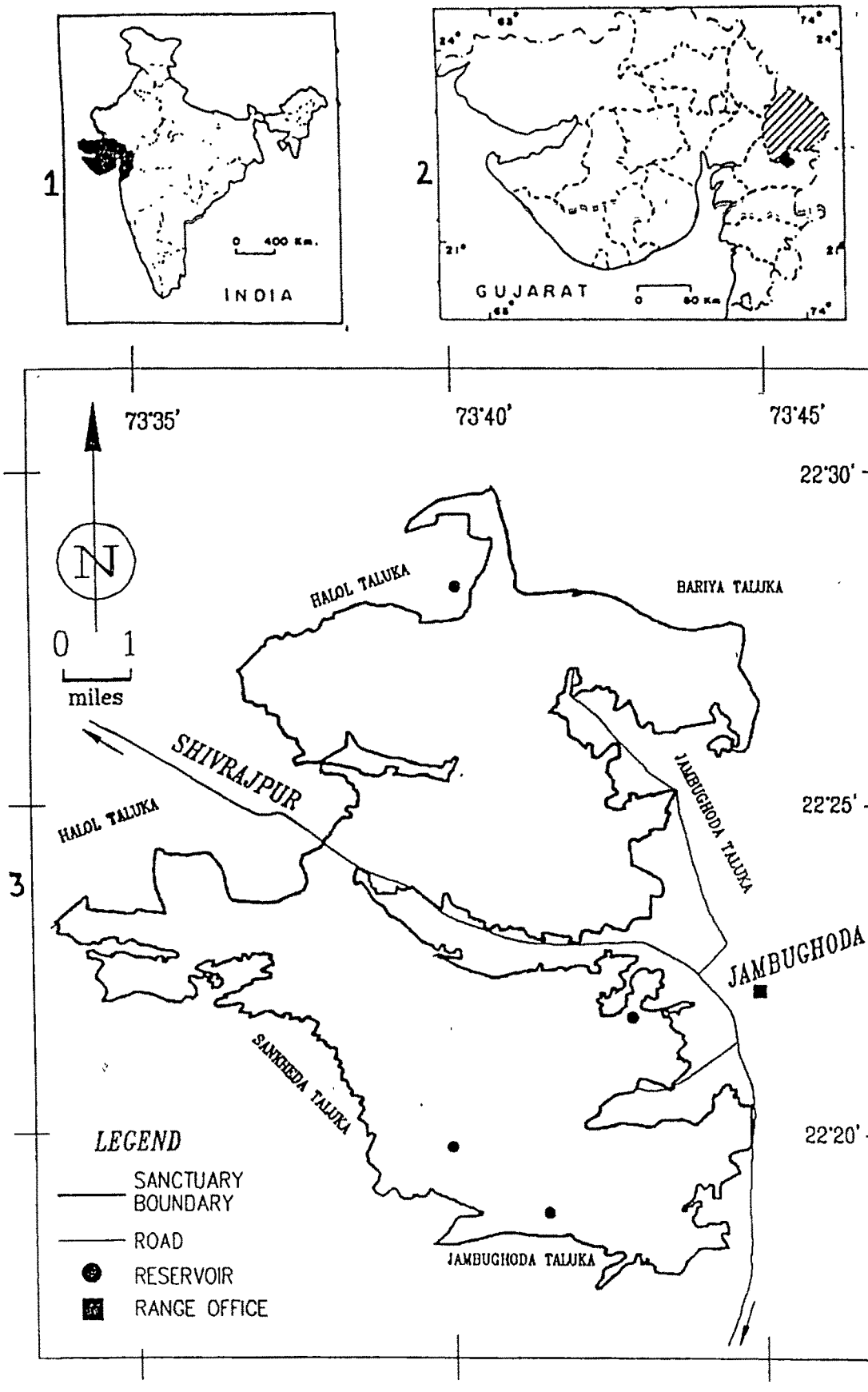

FIGURE I.2

A detailed map of Jambughoda Wildlife Sanctuary

A MAP OF JAMBUGHODA WILDLIFE SANCTUARY

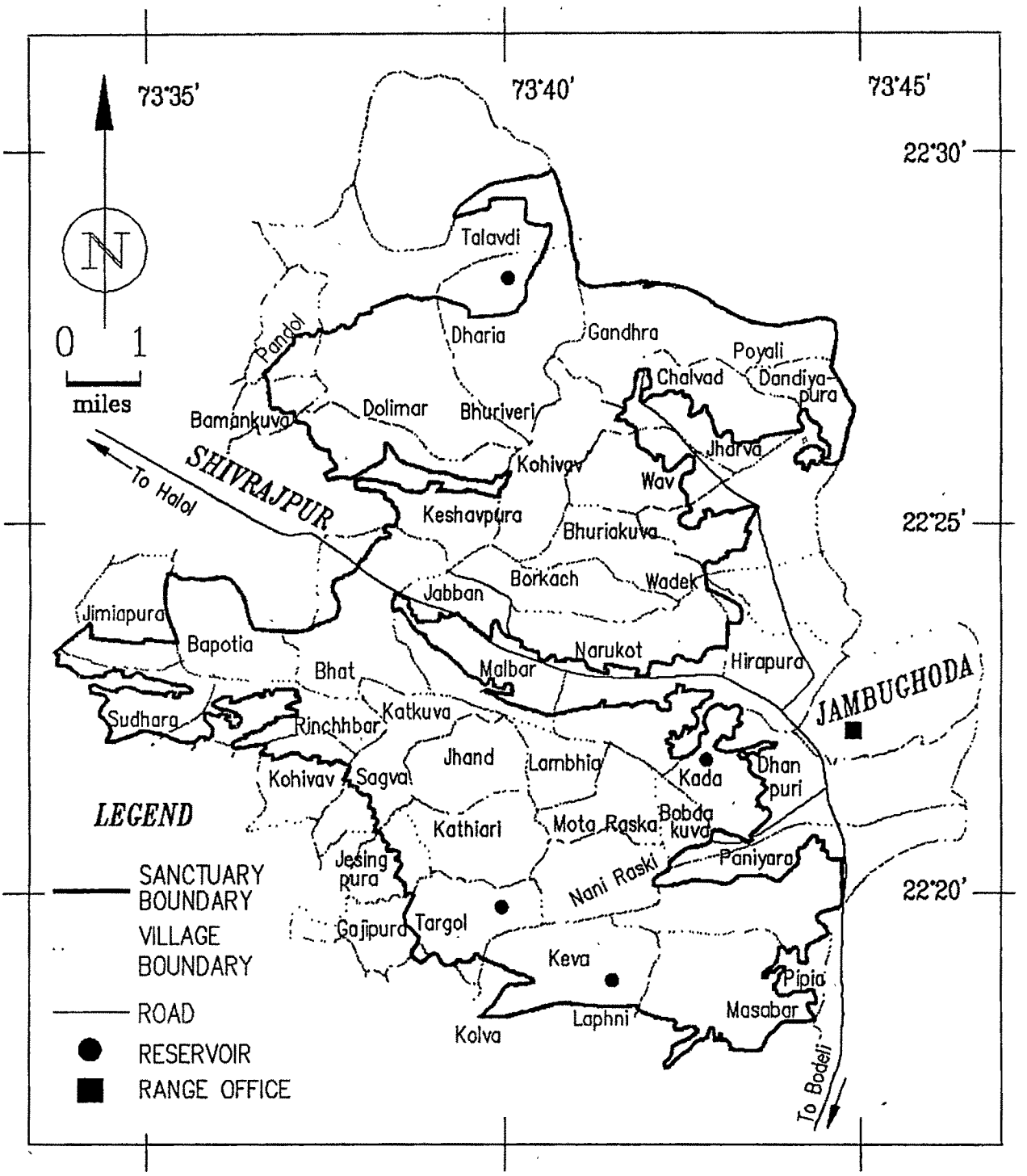

PLATE I.1

I. 1. 1 - North - West boundary of the Sanctuary with Pavagadh hill in the background

I. 1. 2 - View from Masabar hill top (354 m) of the Southern boundary of the Sanctuary