

CHAPTER - II

THE KOYANA BASIN

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2.1 INTRODUCTION:

The Koyana basin, a part of Krishna basin in Satara district of Maharashtra has total area of 2108 km², consisting of 20 per cent of the area of Satara district (Location Map No. 1). Administratively the region consists of 380 villages from 14 circles in four tahsils, a part of Mahabaleshwar, Jaoli, Patan and Karad.

The region is famous for its biodiversity. It has also natural, historic and cultural tourist resources. A present Mahabaleshwar is fully developed tourist center, rather overcrowded, need to have to reduce the flow of tourists. Koyana dam and Karad are the known tourist attractions. While Bamnoli, Tapola, Koyana Wild life sanctuary, vankusavade-Ghanbi wind mill zone, Dhebewadi have greater tourist potentials. These potential tourist centres are near to Mahabaleshwar and have much scope to develop as well as to divert the tourists flow from Mahabaleshwar to these destinations.

Topographically the region has large diversified surface. The upper Koyana basin, with Walmiki plateau, has Sahyadri Crestline. The region can be divided in to two parts, Upper Koyana basin and lower Koyana basin. The upper Koyana basin has deep Valleys with steep slopes. The lower Koyana basin has wide valleys with steep sides. The region has unique relief feature in Western Ghats and good vegetative cover to the west. Mahabaleshwar plateau has luxurious vegetation cover which attract the tourists. Tiger, Panther, Bear, Bisson, Giant

squirrel are the animal attractions in the forests. The lower Koyana basin has rare thorny shrub forests with grass.

The climate of the region is mild and temperate. Temperature decreases from east to west. Summer average temperature of Karad is 38°C, Patan 36°C, Koyana 33°C and Mahabaleshwar 32°C. There is a great variation in the amount of rainfall from west to east. Mahabaleshwar, Navja track gets more than 5400 mm rainfall, Patan 1831 mm and Karad 713 mm rainfall. Climatically the region shows four seasons namely Monsoon, Post monsoon, Cold season and summer.

The region flowed by Koyana and its tributaries Solsi, Kandati, Kera, Morna and Wang. Koyana originates at Mahabaleshwar at an altitude of 1438 metres from mean sea level. It runs south parallel to main Sahyadri Crestline and formed a deep valley. After flowing first 80 kms, turns east and joins Krishna at Karad and confluence named as "Priti Sangam". The main Sahyadris and adjoining steep valleys provide water falls and beautiful landscapes which attracts the tourists.

2.2 LOCATION:

Geographically, the Koyana Basin is located in between 17°7' N to 17°57'N latitude and 73°34' E to 74°10'E longitude. The region spreads from Mahabaleshwar plateau towards north to Walmiki plateau towards south. The main Sahyadri Crestline towards west and extend to Bamnoli spur towards east in upper Koyana basin and river Krishna in lower Koyana basin. A desh towards east and Konkan towards west are at

stone throwing distance, surrounded by Raigad and Ratnagiri at West, Sangli to South, Pune to North and Satara to East.

2.3 PHYSICAL SETTING OF THE REGION:

Physical setting of Koyana basin reveals a variety of landscapes. The variation in relief ranges from the pinnacles and high plateaus of the main Sahyadri range having height over 1300 metres above mean sea level to the subdued basin of Koyana about 675 metres and parallel to the Crestline. Rugged topography of the hills crowned by historic Maratha forts like Pratapgad, Makarandgad, Vasota, Jangli-Jaygad, Bhairavgad and well tilled valleys of tributaries of Koyana with the amphitheatre morphology of middle terraces where villages established is a recurrent theme in the landscape.

2.3.1 The Crestline:

For the major part, the western boundary of the Koyana basin lines with the water shade of the Sahyadris about 95 kms in North-South direction. On the Konkan side the scarp is steep and forbidding in appearance, but on the east the landscape is mature and mellow (Gazetteer, 1998). The Crestline proper is a succession of high plateaus interrupted by occasional rounded peaks and connected by low saddles. The average height of the Crestline is 1000 metres ranges from 750 to 1250 metres. The Konkan scarps, throughout the Crestline, have scenic locations to see Konkan and Koyana valley at a glance. On the north the Mahabaleshwar plateau dominates the source region of the river Koyana

and Krishna. Pratapgad about 1080 metres above the mean sea level on main Crestline is on 8 kms west of Mahabaleshwar plateau, stands prominently with steep grass and shrub covered sides. The fort is having glorious association with the founder of the Maratha Empire. To the south of Pratapgad, Makarandgad (1236 metres) stands prominently on the Crestline. Towards south many peaks such as Mahimangad (953 metres), Nageshwar (1060 metres), Vasota (1102 metres), Old Vasota (1174 metres), Jangli-Jaygad (965 metres) and Bhairavgad (1087 metres) are important and spread many offshoots eastwards and give rise to small tributaries of the Koyana. The rocky trap provides many interesting features of valley in the valley, which has influence on the landuse and human habitation in the region.

The Sahyadri within Koyana basin has many cols. It provides major ghat routes. Fitz-Gerald (Ambinalli) and Kumbharli ghat are significant ghat routes, joined Desh and Konkan. Babukada of Vasota fort is a typical cliff on the Crestline. Many waterfalls are found but they are seasonal in nature. Ozarda is the highest water fall with 232 metre height.

2.3.2 Spurs:

The Bamnoli Gheradategad (1150 metres), the main Sahyari spur, originates from Mahabaleshwar plateau and divide Solshi River to west and Venna to east from the plateau. The spur runs towards south for a distance of about 65 kms, separates Solshi and Koyana to west and Venna,



Urmodi, Tarali and Mand to the east. The cliffs and waterfalls are common in which Kas (78 metres), Chalkewadi (173 metres), Ghanbi (50 metres), Bharsakhale (85 metres) are important places and having greater tourist potentials. The region is also supplemented by wind power, produce 160 M.W. electricity by 450 wind mills.

The spur has reservoirs like Kas-lake, constructed in 1886 A.D., provides gravitational water to Satara, surrounded by evergreen dense shrubby vegetation with seasonal waterfall near by. The Chalkewadi and Ghanbi have greater tourist potentials of scenic waterfalls. The spur has also attractive peak of Ghera-dategad towards extreme south and Vasantgad is at close proximity reveals potential attractions.

The region consists of Bhairavgad-Walmiki plateau towards south. It extends spurs of Bhairavgad-Gunvantgad, Walmiki-Kirpa, Kalgaon (Gudhe-Panchgani) and Agashiv Hill are important to develop as tourist places. Gunvantgad is only fort on the spur, Agashiv hill is known for place of Buddha caves, with 63 caves in it which are of tourist's importance. Gudhe Panchgani a twin village is coming up as tourist attraction and also significant for wind power generation, consists of 50 mills produce 25 M.W. electricity.

2.3.3 The Plateau:

The Koyana basin has the extensive Mahabaleshwar plateau, capped with several rounded peaks in which Wilson point is the highest (1446 metres). The average height of the plateau is 1340 metres. The

plateau is completely capped by laterite. The plateau is deeply furrowed by the Savitri in the extreme north, Koyana in the west Solsi in the south. Krishna and Vena in the east. The steep rocky surfaces are void of any vegetation. The narrow ledges of trap layers, however, support Luxurious vegetation of monsoonal type which from a distance appears as green bands of vegetal cover against the dark rampart of the main scarp. The Aurtherseat point at extreme N-W is joined to main Sahyadri Crest and separated Koyana (Left) and Krishna (right). The hill top is uneven and the Malcolm peth is completely known as the saddle back. It is a place of great natural beauty. The plateau extends in North West to South East direction, and spreads in the plain. Deep Koyana valley, the water falls, dense forests, healthy climate are greater tourist resources developed the plateau as a famous hill station in Maharashtra.

2.3.4 Altitude:

Altitude plays a dominating role in the ecological set up of the region. It causes heavy rainfall, low temperature and humidity. Such climate is favourable for the growth of flora and fauna, natural vegetation and other related phenomenas. The Koyana basin is also having all such favorable conditions. The altitude wise distribution of area in km² is given below.

Table No. 1
Altitude wise distribution of area

Sr. No.	Altitude in metres	Area in km ²	% Area
1	550 to 600	270	12.3
2	600 to 700	628	28.6
3	700 to 800	367	16.7
4	800 to 900	348	15.8
5	900 to 1000	535	24.2
6	1000 and above	53	2.4
	Total	2198*	100.0

Source-- Umarji Kar, 1983

*The area compiled by author is 2108 km²

The table No. 1 reveals that the region has altitudinal variations from 550 metres to 1000 metres above mean sea level. About 2.4 percent area is above 1000 metres height. The highest areas covered in between 600 to 700 metres altitude. Altitudinally it creates physiographic variations, which help to frame ecology of the region and this should be the great potential for the eco-tourism.

2.4 DRAINAGE SYSTEM

The river Koyana is the Heart of 'KOYANA BASIN'. It originates at the N.W of Mahabaleshwar plateau near Elpiston point at 17°58' N Latitude and 73°43'E longitude, at an altitude of 1364 metres. Its limited width and high plateaus shoulders created beautiful valley with full ecological environment which sustains better tourism activity.

The Koyana dam is constructed near Helwak and electricity is produced at Pophali, Alore and Kolkewadi. Therefore, these places have

become major tourist attractions in the Koyana basin. Tapola is also beautiful potential tourist place in the region. The confluence of Koyana and Krishna near Karad is also well known tourist point added by 'Samadhi', of great leader Yashwantrao Chavan, in the beautiful garden.

2.5 CLIMATE

The climate of the region is agreeable throughout the year. It shows seasonal variation. According to Koppen's classification the region falls in to two divisions, the western part having altitude higher than 900 metres falls in the zone Am and has a tropical monsoon climate. The area lower than 900 metre falls in the zone BSh, indicating tropical steep-semi-arid climate (Umarjekar-1983).

2.5.1 The Summer

According to Indian meteorological department, the region is divided in to four seasons and the seasonal changes in climatic elements are as below.

March to May is summer months in the region. The record of temperature for last sixty years shows the average maximum temperature in summer months is not exceeding beyond 30°C at Mahabaleshwar and the areas of above 900 metre altitude. The lower Koyana basin, an altitude below 900 metres has the mean maximum temperature of 38.2°C and some times it increases up to 44°C in the month of May. The night temperature remains 28°C in the lower Koyana basin and 19°C in upper Koyana basin.

In the middle of May, wind changes in the west and cool moist and invigorating sea breezes set in. In the month of May there are occasional showers and thunder storms and the moisture increases. On most hot weather mornings the hill sides are covered with white clouds which completely veil the Koyana valley, but these disappears as the day advances (Gazetteer)

2.5.2 South West Monsoon:

June to September is the south west monsoon season. The rainfall in the belt is roughly 15 to 20 km wide parallel to the crest line of the Sahyadrian range. From Mahabaleshwar to koyananagar, an annual rainfall varies between 6226 mm to 5800 mm (Gazetteer). The average of last sixty years rainfall record at Mahabaleshwar is 5437 mm., Navja. 5819 mm. and Koyana 5081 mm. At Navja the rainfall is highest in the Koyana basin. The south-west monsoon receives 71 per cent to 80 per cent of the annual rainfall. July is the month of highest rainfall. The lower Koyana basin has more variations in the annual rainfall than upper Koyana basin. The weather is highly humid in hilly areas while humidity decreases towards the east in the basin. It remains 80 to 100 per cent at Mahabaleshwar, 78 per cent at Patan and 70 per cent at Karad.

2.5.3 Post Monsoon Season

The months of October-November falls in post monsoon season. The day temperature shows an increase, but night temperature remains comparatively cool. The rain occurs by retreating monsoon winds. Most

of the rain in this season is associated with regional conventional movement of atmospheric gasses. In general skies are clear. The winds are light to moderate, blows from east to west. The fog occurs occasionally in the valleys in the mornings.

2.5.4 The Cold Season:

December to February are the cool months in this region. The cool weather experiences from the end of November to the February end. December is the coldest month. Mean daily minimum temperature in upper Koyana basin is 13.8°C while in lower Koyana basin shows 14.4°C. The mean maximum temperature is 23.1°C in upper Koyana basin and 28.4°C in lower Koyana basin. The range of temperature is higher (14°C) in lower Koyana basin and lower (9°C) in upper Koyana basin.

The skies are generally clear. The cyclonic clouds overcasts the sky some times. The fogs occasionally occurs at early morning and fog in valleys are more common. The winds are from north east to south east in the afternoons. No thunderstorms occur but cyclonic rain may occur with cooling the region. Humidity is in between 45 to 50 per cent.

2.6 FLORA:

The region lies at the centre of Sahyadri and identified as one of the biodiversity 'Hot Spot' amongst eighteen such potentially important locations in the entire world. It has dense wood forest cover but is under strain of human interference like the traditional practice of burning. But there are a few sheltered pockets of sacred (Devoting to God) forests

known as Dev-Rai, protecting ancient lofty trees with rare species. In this region the Chandoli and Koyana wild life sanctuaries have got protection covering 500 km² forest areas. Altitude, slope rainfall, humidity, temperature and human being govern the vegetation of the region. The region can be classified in four vegetation groups.

2.6.1 Semi Evergreen Forest:

This type of forest is found in upper Koyana valley such as Walmiki plateau, at an altitude of 700 metres to 1100 metres having 2000 mm to 5000 mm rainfall per annum. The trees, shrubs, the common climbers and epiphytic orchids with grass patches are observed in this forest.

2.6.2 Western Subtropical Hill Forest:

Vasota, Jungti, Jangli-Jaygad, Mahabaleshwar plateau, Walmiki-Bhairavgad Plateau, Kas plateau have such type of forests found on an altitude above 1100 meters. The rainfall is over 5000 mm and low temperature with high humidity have thick forest patches. These patches possess low plant species diversity. Common tree is Anjan.

2.6.3 Moist Mixed Deciduous Forest:

The track of Helwak, Patan, Morgiri, and Dhebewadi are covered by the moist mixed deciduous forests. The common tree species are Teak, Katesaver, Sandle wood pimple, Palas Pangera, Dhyati (Shrub). The rare climbers are observed. The herbs and grass patches are seen

with the rainfall 1000 to 2000 mm and temperature 20°C to 35°C. The forest cover occurs on the hill slopes and within the agri belt on terraces.

2.6.4 Dry Mixed Deciduous Forests:

The dry deciduous forest is found in east. This type of forest is represented on the track of eastern spurs of Agashiva and Vasantgad. Rainfall varies between 750 mm to 1000 mm. Tarvad, Dhyati Nirgudi with babhul and grasses are the prominent species of these forests.

2.7 FAUNA:

The region consists of varied animals taking shelter in the forests. Prominent amongst the wild animals are the Tiger and Panther. At one time this region was the house of tigers especially in Mahabaleshwar, Upper Koyana Valley and Dhebewadi forests. But at present the tiger population decreased to two (one pair only). Panthers are found in Mahabaleshwar plateau, Upper Koyana Valley and Dhebewadi forests. The record shows that Koyana wild life sanctuary has 11 panthers and Chandoli forest has a few. The other animals like Sambhar Cheetals are also seen. The wild cats are found in large numbers, live in open forests shrub jungles. Udmanjar and Javadi manjar live in thick jungle. The sloth bear is found in wooden hilly portions of the region, particularly in Bamnoli Kas plateau, Koyana wild life sanctuary, Chalkewadi and Dhebewadi forest range. The other animals are Taras, Wolf, Jackle, Indian Fox are found in the region. The Indian giant squirrel is very attractive due to its reddish brown colour, is found in the evergreen

forests of Mahabaleshwar, Koyana wild life sanctuary and Dhabewadi range. It is the attraction of the region to tourists. The five striped squirrel is usually found in the neighbourhood of habitations. The hare is found in the shrub jungles. The deer families also occur in the interior forests and feed on the scrubs and grass patches within the forests. The Indian Bison is the largest of all the bovines, is common in Koyana wild life sanctuary and west Dhabewadi forests with mala Kolana. The wild life authority recently recorded 220 to 250 Bisons in Koyana wild life sanctuary and with about same number of Chandoli wild life sanctuary.

2.8 LANDUSE PATTERN:

Table No. 2
Land use Pattern

Sr. No.	Land under	Area in Km ²	% area
1.	Forest	264.4	12.5
2.	Wild life sanctuary	270.6	12.8
3.	Agriculture	845.6	40.1
4.	Water bodies	130.00	6.2
5.	Wind mill farms	48.00	2.4
6.	Cultivable waste	288.00	13.6
7.	Other use	261.4	12.4
Total geographical area		2108.00	100.00

Source: Compiled by Author (2002).

The table No. 2 reveals that the region has 2108 sq.km. geographical area in which 40 per cent area is under agriculture. More than 25% area is under forest cover in which 12.5 percent area is occupied by wild life sanctuary. The reservoir occupies 6.2 per cent

area and 2.4 percent area is under wind mill farm. Cultivable waste land occupies 3.6 per cent area. The area within wind mill zone may use for tourism infrastructural facilities. It reveals that from Fig. 2 and Landuse map, of region the 60 per cent land has tourist potentials.

2.9 CULTURAL SETTING:

Population of Koyana basin is 405922 persons (1991), in which 196040 males and 209887 females. The average population density of the region is 192.5/km². The average literacy is 53 per cent. The 35.5 per cent population of the region is in working group, of which 67 per cent working in agriculture, 7 per cent in trade and commerce and 26 per cent people engaged in other activities. The agrarian economy is dominant.

The region has good cultural setting. The historic monuments like Pratapgad, Vasota, Jangli Jaygad, Bhairav gad, Gunvantgad, Gheradategad, Vasantgad show the historic culture of the region. The Agashiv caves highlighting the 1st Century Buddhist sculpture in the region. The religious centres like Kshetra Mahabaleshwar, Nivakane, Yerad, Naikaba, Walmiki and Karad are included within the boundries of the Koyana basin. The yearly fairs of religious centres are attended by the outsiders. The Naikaba fair is popular and attended by the people of Maharashtra and Karnataka. Nageshwar is developing religious centre in the region.

The technological development is achieved in the region. Koyana dam, Shivaji sagar (reservoir), Koyana Hydel electric grid at Pophali,

Alore and Kolkewadi are attracting tourist potentials. Currently 'Lake Taping and wind mill power generation are achieved and have become new tourist attractions. Mahabaleshwar is saturated hill station included within the boundary of the region. Koyana, Tapola, Bamnoli are the developing cultural centres. Thus the region has culturally rich and may support to tourism development.

2.10 TRANSPORT NETWORK:

The region is provided by well transport network. National Highway No. 4 and South Central Railway passes from eastern side in North-South direction, nearly parallel to the region. Karad town is common to both. Satara and Wathar are the nearest railway stations to Bamnoli and Mahabaleshwar National Highway-4 is important to enter in the region from east. Kavathe, Pachwad, Satara, Shendre, Kashil, Umbraj, Karad. Pachwad-phata are the important places on the N.H.4 (Map No. 4) to reach different places in the region.

Towards west Konkan Railway and N.H. 17 runs in north south direction nearly parallel to the region. Poladpur and Chiplun towns are common places to both rail and road. The places in the region are well connected to these towns by roads. These towns are the western gateway of the Koyana basin.

Within the state highway 73, 78 and 83 are important. S.H.78 passes through lower Koyna basin along with the river Koyana in East west direction. It covers Karad, Patan, Koyna nagar and Chiplun towns.

The S.H.73 and S.H. 83 are the ways to Mahabaleshwar from Satara and Wai respectively from east. S.H.73 is shortest route to Mahabaleshwar from Satara, passes through Vena basin. Medha is important place on the road. Mahabaleshwar and Poladpur places are well connected by Ghat route through Fitz gerald pass. This road is very important to tourists from Bombay and Ratnagiri to Mahabaleshwar (Map No. 4).

Internal transport network is also good. Karad-Dhebewadi road is now constructed up to Walmiki passes through wang basin. The places in the wang basin are connected by this road to other roads. Satara-Bamnoli road runs through Bamnoli-Satara spur. Satara-Patan road passes through the wind mills zone of Bamnoli spur. Sajjangad, Chalkewadi (Water fall), Ghanbi (Water fall), Ghera dategad are the important places on this road. Patan-Umbraj road passes through Ural chafal road joins to this road near caphal-phata. Patan-Nivakane-Karale road crosses the Jalu vasantgad spur. Patan-Dhebewadi, 36 kms. road crosses Walmiki-Kirpa spur.

Koyana-Navja-Chiplun is the shortest road passes through Koyana project. Mahabaleshwar-Tapola 26 kms, road, passes on Vanavali spur. Chiaplun-Chorvan road from the west reaches to foot of Sahyadri which is useful for Nageshwar and Vasota fort from Konkan.

Karad, Patan and Mahabaleshwar are three State Transport Depots provide transport services within the region and outside cities.

The outside S.T. depots of Satara, Medha, Wai, Chiplun and Mahad have well connected by the roadways to the region.

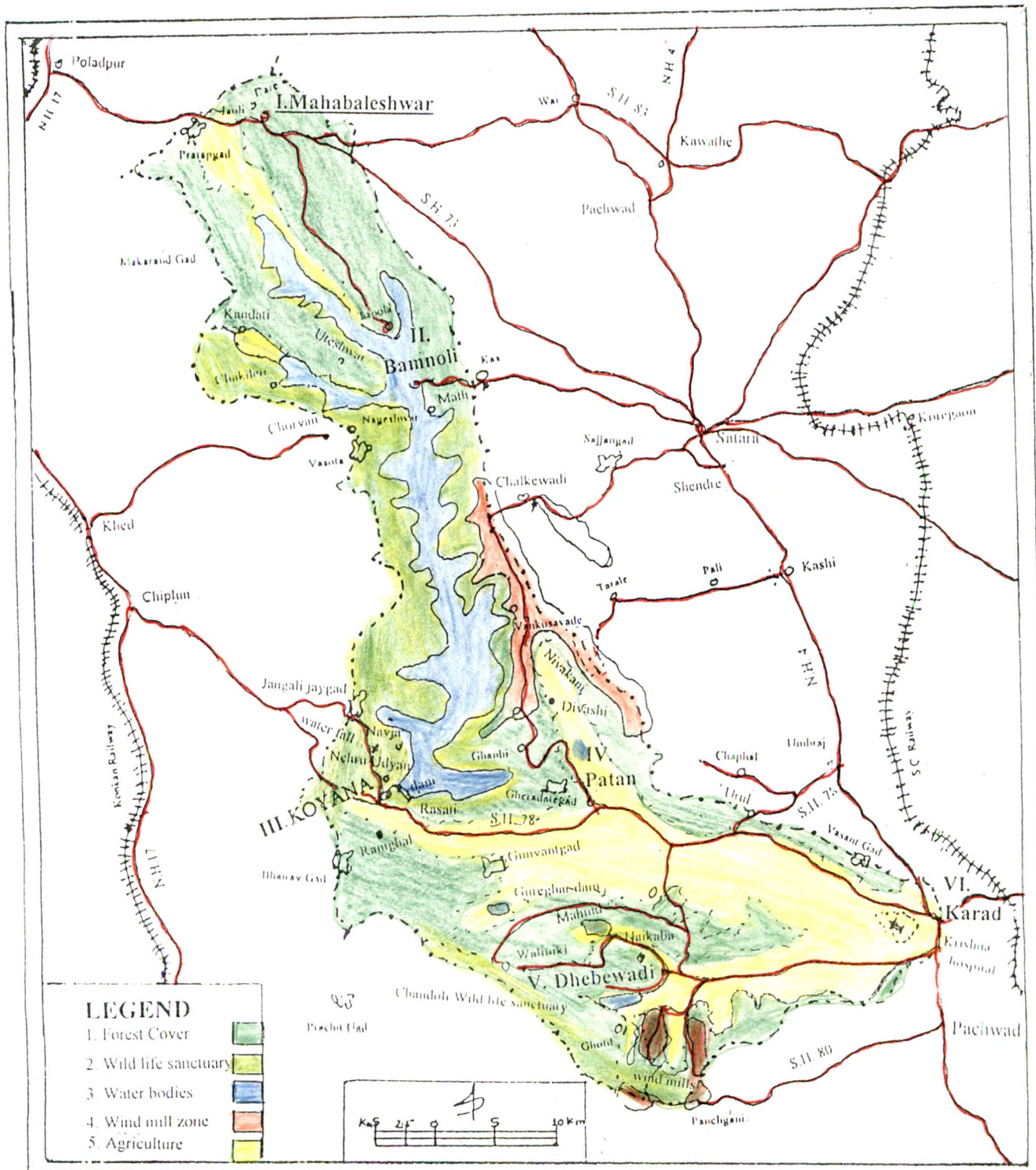
Air port is available at Karad and Heli-pad at Mahabaleshwar. But regular air service is not available. Pune is the nearest air port to the region.

2.11 REFERENCES:

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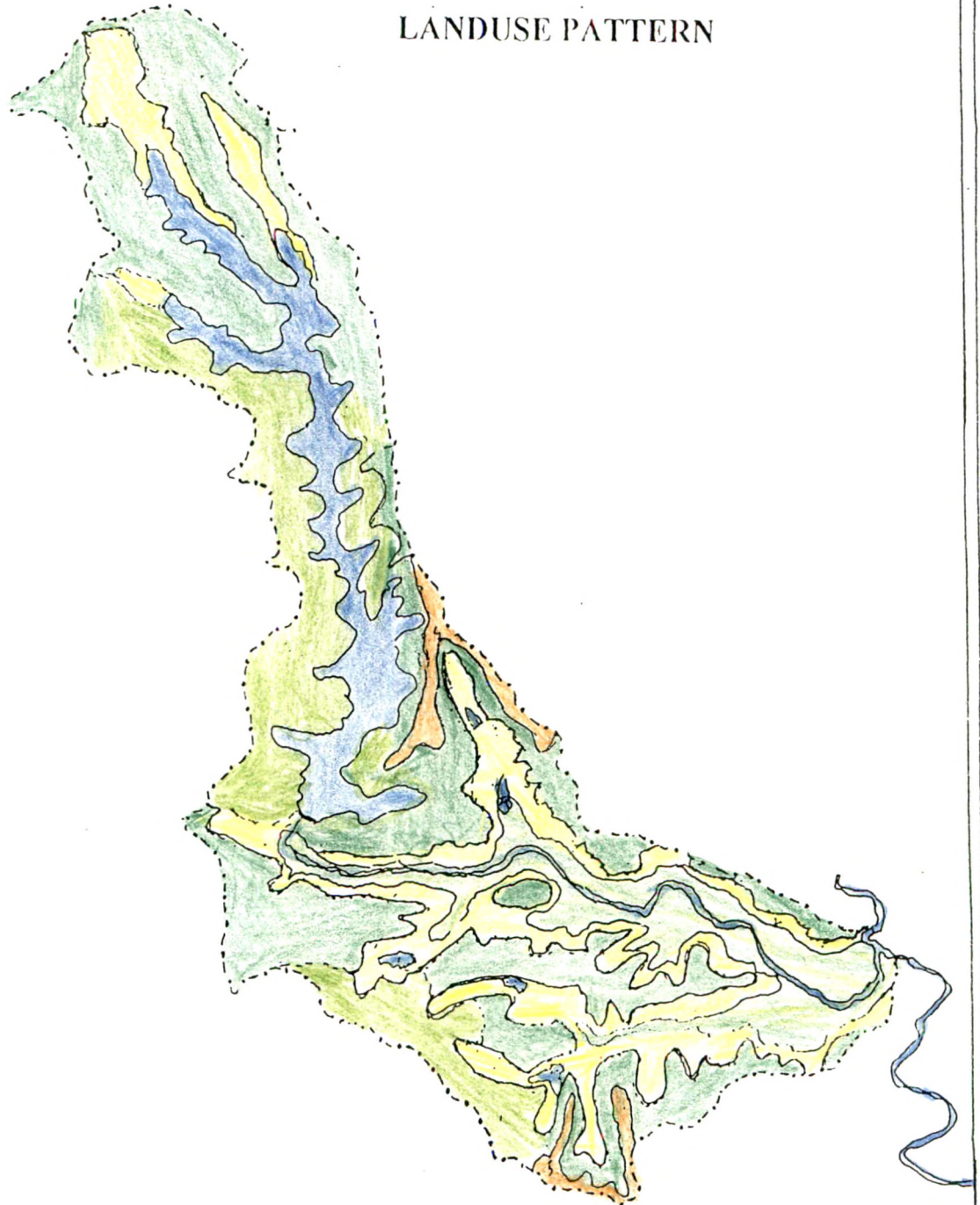
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TRANSPORT NETWORK



MAP NO. 4

LANDUSE PATTERN



LEGEND

1. Forest Cover
2. Wild life sanctuary
3. Water bodies
4. Wind mill zone



SCALE

1 cm = 5 km



LEGEND

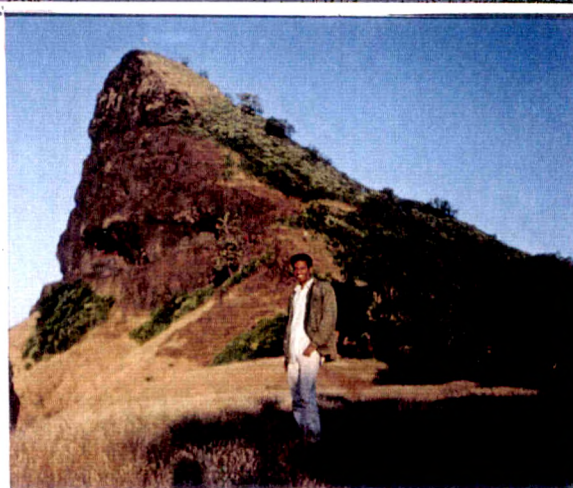
5. Agriculture within forest
6. Unirrigated
7. Irrigated

MAP NO. 3

PLATE 1 PHYSIOGRAPHIC WEALTH



1. Sahyadri Crestline – Konkan View (September)



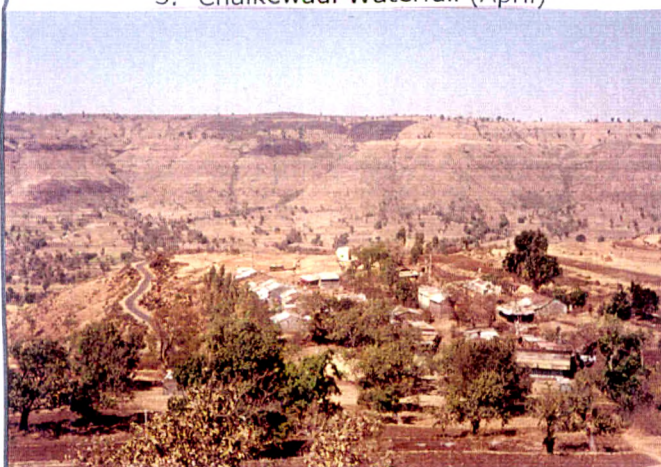
2. Nageshwar Hill (November)



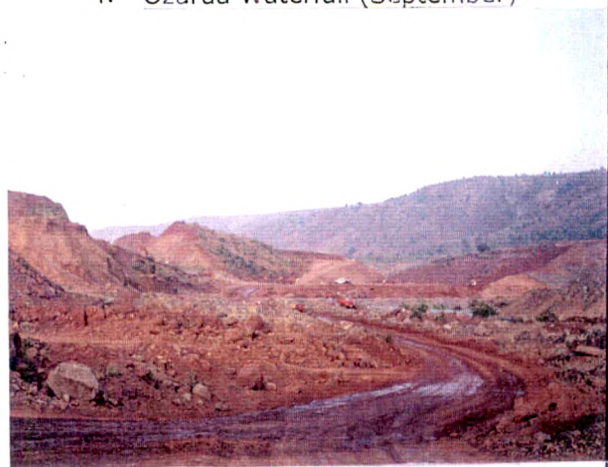
3. Chalkewadi Waterfall (April)



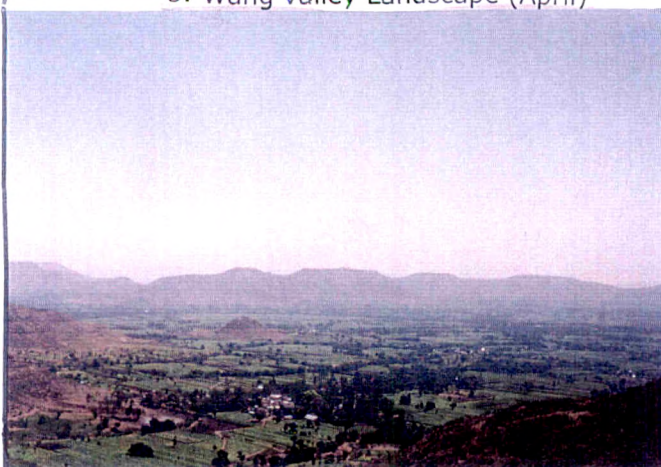
4. Ozarda Waterfall (September)



5. Wang valley Landscape (April)



6. Gureghar Project (April)

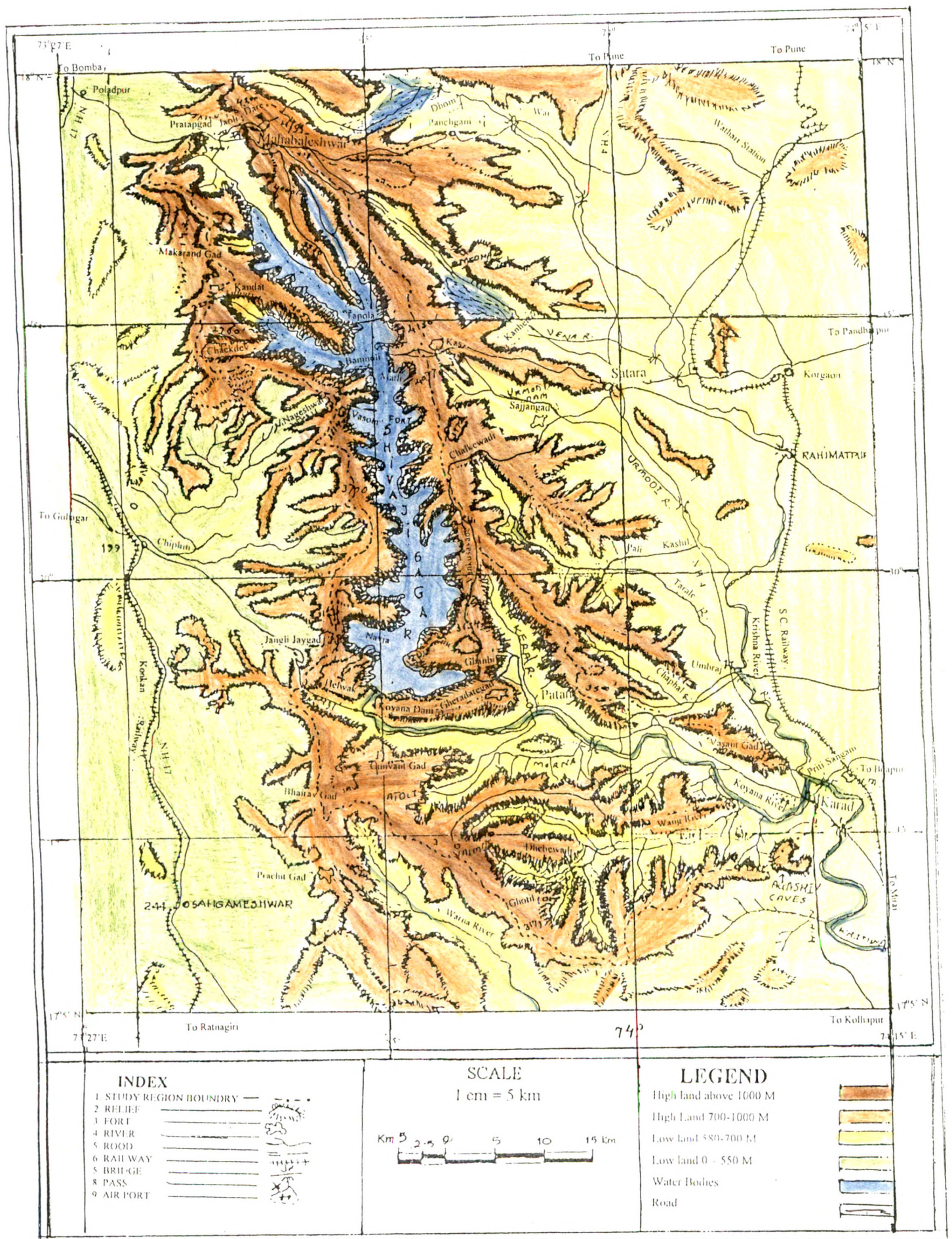


7. Lower Kovana Landscape (April)



8. Wind Mill Zone Vankusavade (April)

KOYANA BASIN WITH SURROUNDING AREA



MAP NO. 2

PLATE 2 ECOLOGY OF THE REGION



1. Thick forest – Vasota foot (November)



2. Kas Plateau (September)



3. Anjani-Evergreen Tree (February, April)



4. Lower Koyana Landscape (March)



5. Ants Home – wind life sanctuary (October)



6. Mountain Agro ecology – Atoli (April)

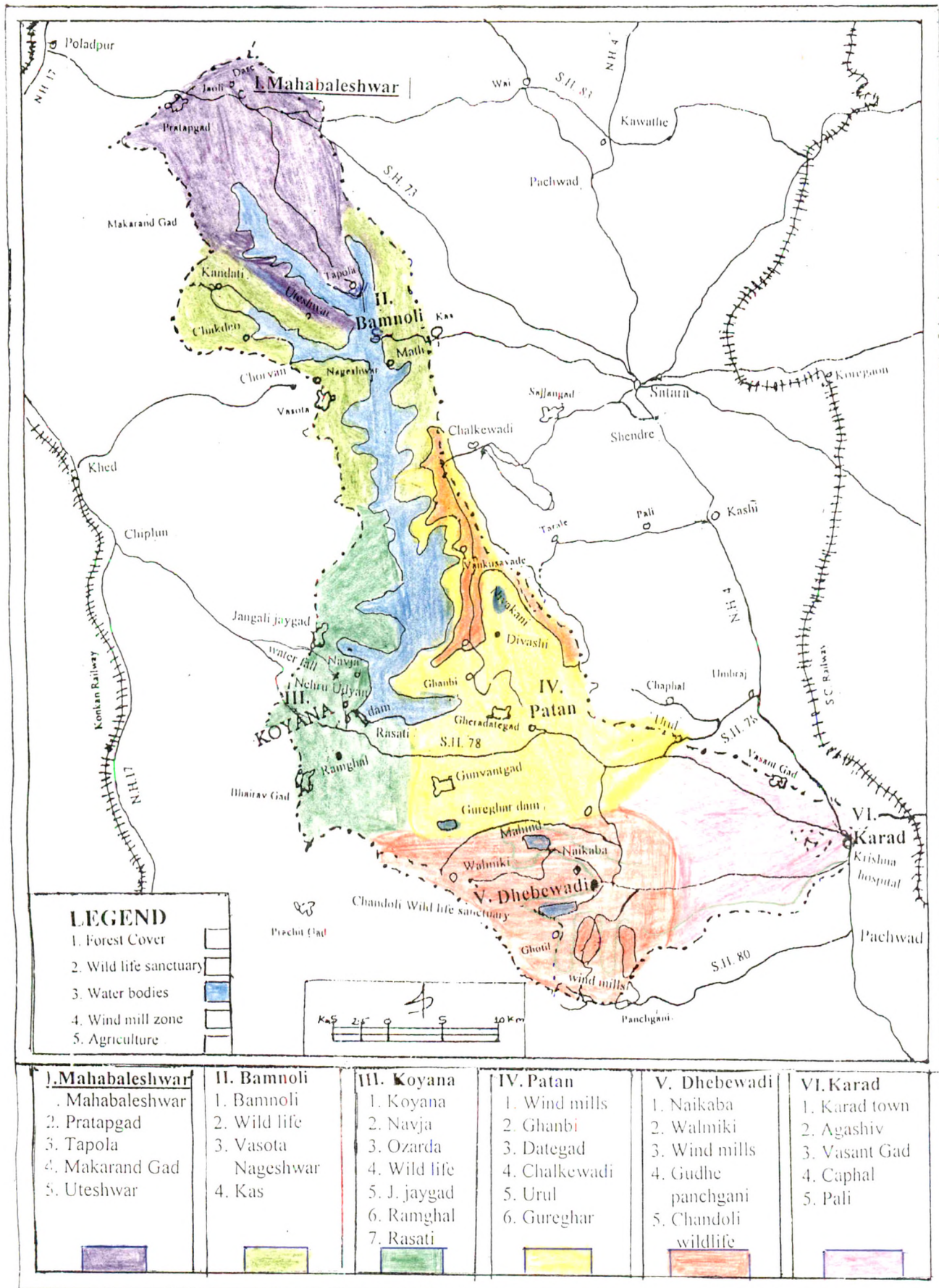


7. Keshavnagar – Deciduous tree (March)



8. Milk Harvesting – Vankusavade (March)

TOURIST POCKETS



MAP NO. 5

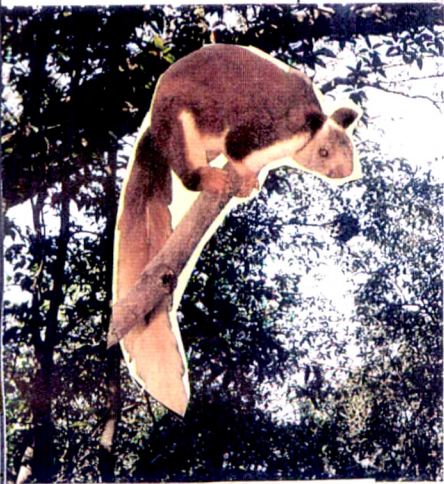
PLATE 3 TOURIST ATTRACTIONS



1. Tapola – Boating (December)



2. Glory of region



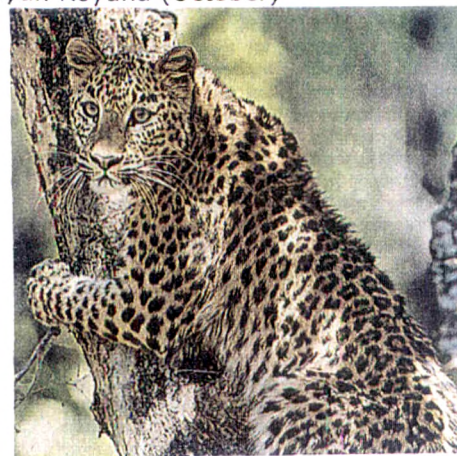
3. I am here only



4. Nehru Udyan Koyana (October)



5. wind mill farm – Vankusavade (April)



6. Dare not, to meet

